sikla

Anchor injection systems

Technical data and application

Product selection guide

Feature	VMZ	VMU plus	VMH	VME plus
Cartridge size	280 ml	280 ml	280 ml	440 ml
ETA Option 1 – racked concrete	✓	✓	✓	✓
Fire resistance	Compliant to ETK and ZTV-Ing.	Compliant to ETK	Compliant to ETK	Compliant to ETK
Seismic	C1 und C2[1)]	C1	C1 und C2[1)]	C1 und C2[1)]
ETA masonry	✗	✓	✗	✗
Type approval WHG	✗	✗	✓[2)]	✓[3)]
Maximum load for M12 in cracked concrete C20/25 and 24°C/40°C	22,9 kN with h_{ef} = 125 mm	19,7 kN with h_{ef} = 240 mm	20,0 kN with h_{ef} = 240 mm	20,0 kN with h_{ef} = 240 mm
Borehole cleaning	With dust removal pump	Manual blowers up to and including M16; from M16 compressor required	Compressor required	Compressor required
No cleaning required when using a suction drill	✓	✗	✓	✓
Diamond drilled holes	✓	✗	✗	✓[4)]
Large clamping thickness	✗	✓	✓	✓
Anchor rods	VMZ-A with conically shaped geometry	Commercially available threaded rod with test certificate 3.1 (see ETA)	Commercially available threaded rod with test certificate 3.1 (see ETA)	Commercially available threaded rod with test certificate 3.1 (see ETA)

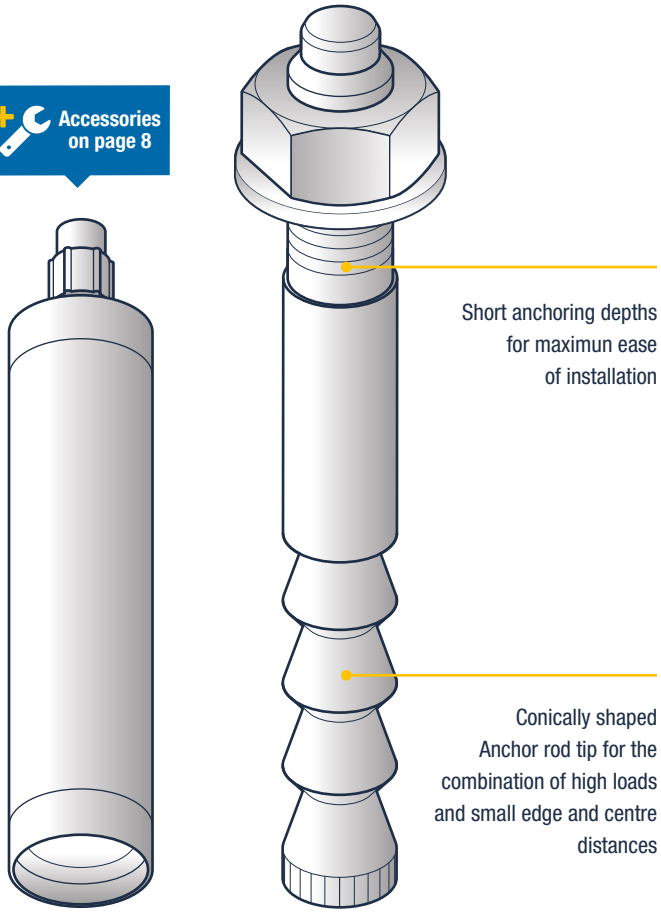
[1)] only certain dimensions
[2)] only for FD/FDE concrete
[3)] only for coated concrete (StoCretec WHG System 2)
[4)] in non-cracked concrete without seismic effects

Chemical anchor VMZ
The powerfull

Chemical anchor system VMZ consisting of anchor rod VMZ-A and injection resin VMZ.

- No reduction in holding values in wet drill holes or from d_0 = 14mm in water-filled drill holes
- Approved for use under seismic loads of performance category C1 and C2 (M10-M24)
- The injection resin must always be used with the VMZ-A anchor rod

Accessories on page 8



ETA-10/0260

F30-120

SEISMIC

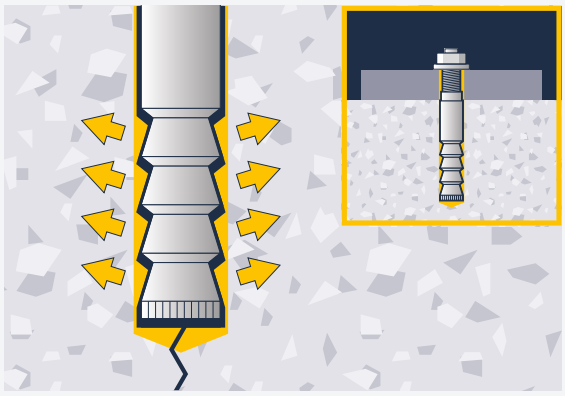
EDELSTAHL Rost frei

200°C ZTV M10-M16 HCR

ADVANTAGES

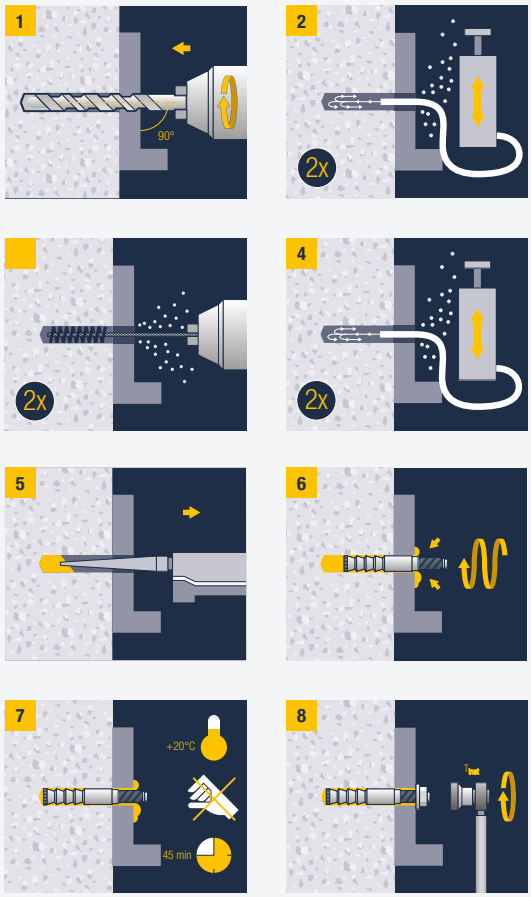
- High loads with low anchorage depths and component thicknesses
- Small edges and centre distances
- Small anchors with minimum drilling effort ensure maximum cost-effectiveness
- Expands automatically when cracks appear in the drill hole

Function



The combination of a conial anchor rod with 2-component injection resin combines the advantages of bonded and expansion ancors in a crack-resistant system.

Installation example:

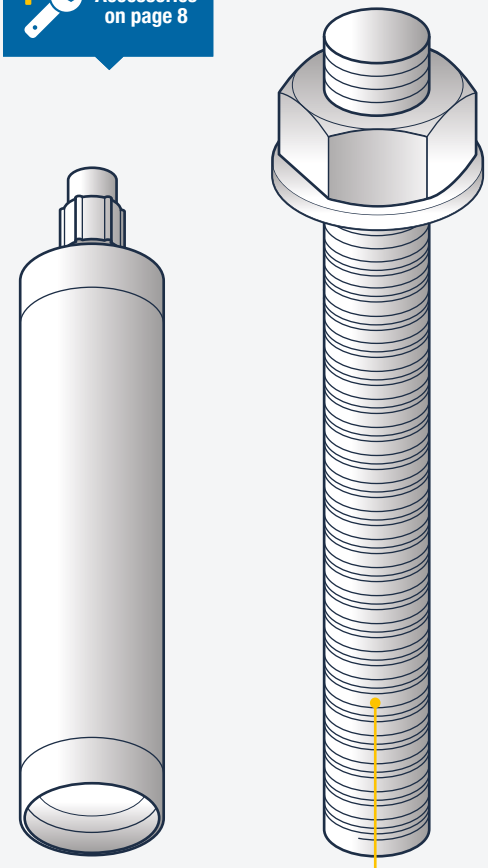


Chemical anchor VMU plus
The universal in concrete and masonry

Chemical anchor system VMU Plus consisting of anchor rod VMU-A and injection resin VMU plus for concrete and solid masonry. When setting in perforated brickwork, the SH perforated sleeve must also be used.

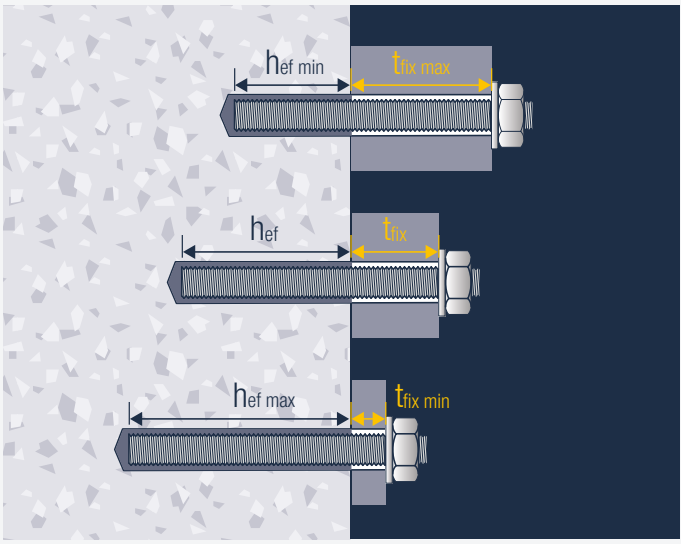
- Approved for cracked and non-cracked concrete
- Approved for aerated concrete, solid and perforated brickwork
- Approved for use in damp concrete and water-filled drill holes
- Variable anchoring depths for optimum adaptation to the respective installation

Accessories on page 8



The variable anchoring depths in concrete make it possible to adapt the setting depths to the required load

Completely flexible



The anchor rod can be installed to a minimum anchoring depth, depending on the thickness of the attachment to be connected. The anchor rod can also be embedded deeper into the building structure, taking into account the load and clamping strength.

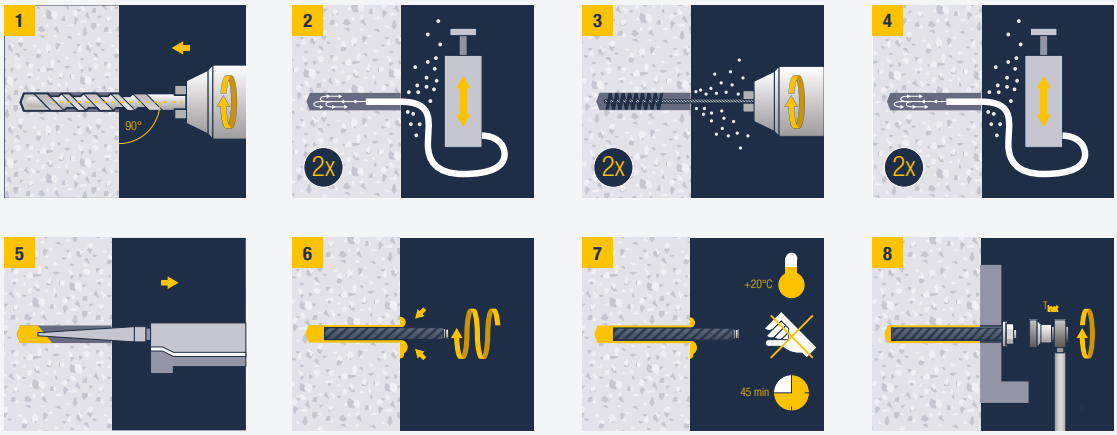
ETA-17/0307 ETA-15/0270 F30-120 SEISMIC Rost frei

Chemical anchor VMU plus in cracked and non-cracked concrete

ADVANTAGES

- Only one resin needed for almost all applications, thus more flexibility, less storage and greater application
- Substrate temperature during processing from -10 C to 40°C

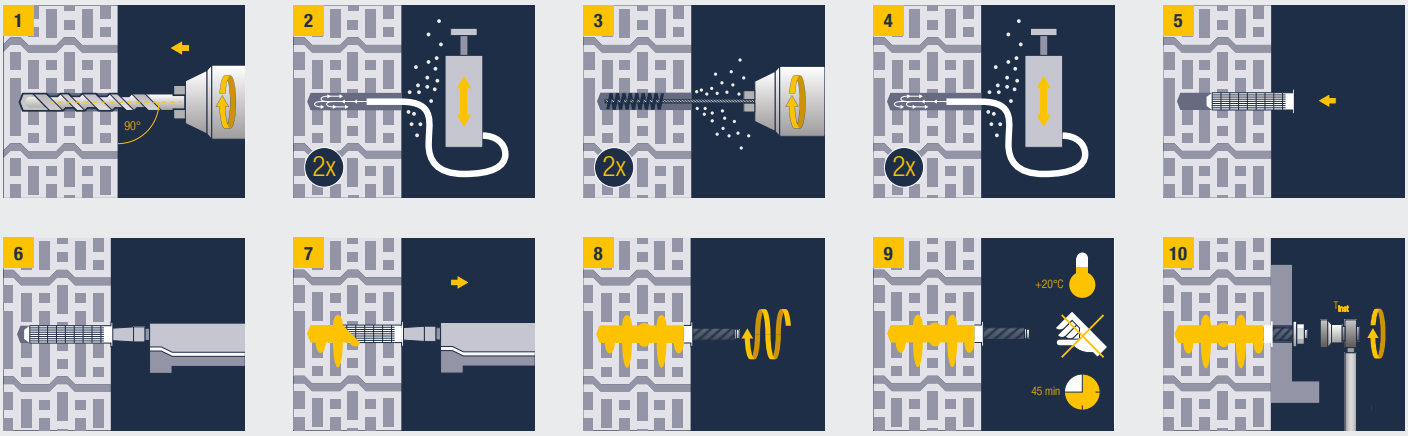
Installation example



Chemical anchor VMU plus in masonry

ADVANTAGES

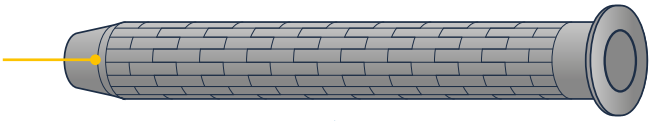
- 15 different types of stone are regulated in the ETA approval
- Significant savings in the amount of resin when using the SH mesh sleeve



Mesh sleeve SH

Matching sieve sleeves for use in conjunction with VMU-A anchor rods,Variants are to be selected depending on the desired setting depth.

Grid structure ensures a significant savings amount of resin in the perforated brick



Accessoires on page 8

Bonded anchors for WHG[1] surfaces

VMH The professional for FD / FDE concrete surfaces

ADVANTAGES

- ✔ General type approval for use in uncoated FD/FDE concrete surfaces in LAU[2] systems (Z -74.8-204)
- ✔ Substrate temperature during application -5°C to +40°C

FD concrete: liquid-tight concrete

FDE concrete: liquid-tight concrete after penetration test

Accessories on page 8

ETA-17/0716 · F30-120 · SEISMIC · EDELSTAHL Rost frei

VME plus The expert for coated concrete surfaces

ADVANTAGES

- ✔ General type approval for use in coated concrete surfaces in LAU[2] systems (Z -74.8-210)
- ✔ Long processing time, even at high temperatures
- ✔ No shrinkage, therefore very high tightness of the Attachments

Exclusive use when setting in WHG[1] areas with "StoCretec WHG[1] System 2"

Accessories on page 8

ETA-19/0483 · F30-120 · SEISMIC · EDELSTAHL Rost frei

[1] Water Resource Act

[2] LAU = Storage(L) Filling(A) Handling(U)

LAU[2] plants

LAU[2] are stationary facilities for the storage, filling and handling of substances hazardous to water that are kept there for direct or indirect use or for later disposal.

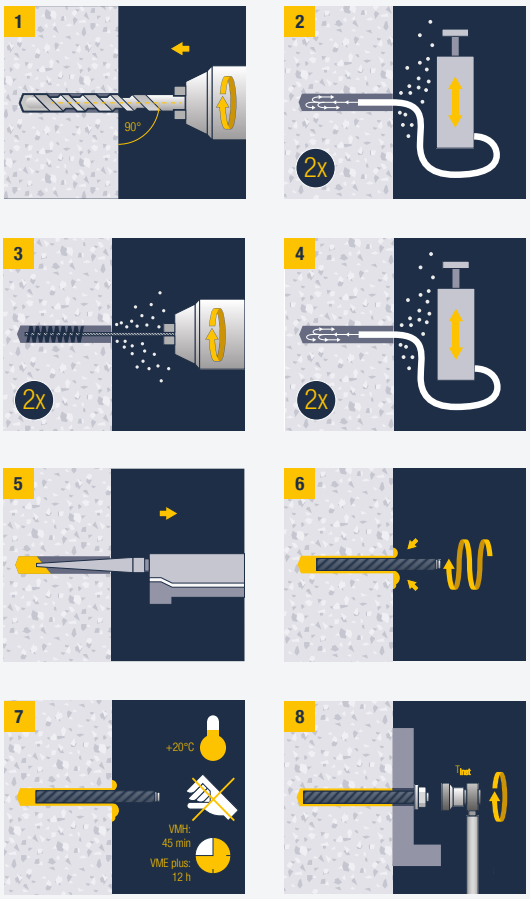
These terms are used in water law for types of facilities whose planning, construction and maintenance must take into account environmental regulations for substances hazardous to water.

The handling of substances hazardous to water is stipulated by the Water Resources Act. This stipulates in the so-called principle of concern that LAU[2] facilities "must be designed, constructed, maintained, operated and decommissioned in such a way that there is no reason to fear any adverse change in the characteristics of water bodies."

[§ 62 Section. 1 sentence 1 WHG[1]]

Type approval for WHG[1] areas

Installation example



Authorised liquids according to type approvals for WHG[1] areas

Stress level low (1), medium (2), high (3)		Group no.	Authorised liquids for the plant operating modes [2] Storage, filling, handling	material finish		
VMH	VME plus			Bright Zinc Plates	A2/A4	HCR
L2A2U2	---	1[3]	Petrol fuels according to DIN EN 228 with a maximum (bio) ethanol content of 5 % by volume according to DIN EN 15376	✗	✓	✓
		1a[3]	Petrol fuels according to DIN EN 228 with the addition of biofuel components according to Directive 2009/28/EC up to a total content of max. 20 % by volume	✗	✓	✓
	L2A2U2	2	Aviation fuels	✗	✓	✓
		3[3]	- EL heating oil according to DIN 51603-1 - Unused combustion engine oils - Unused automotive transmission oils - Mixtures of saturated and aromatic hydrocarbons, characterised by an aromatic content of ≤ 20 ma% and a flash point of > 60 °C	✗	✓	✓
---		3b	Diesel fuels according to DIN EN 590 with the addition of fatty acid methyl ester (FAME) according to DIN EN 14214 up to a total content of max. 20 % by volume	✗	✓	✓
L2A2U2		4	Hydrocarbons and mixtures containing benzene with max. 5% benzene by volume, except fuels	✗	✓	✓
		4a	Benzene and mixtures containing benzene	✓	✓	✓
		4b	Crude oils	✗	✓	✓
		4c	- Used combustion engine oils and - Used motor vehicle gear oils with a flash point > 60 °C	✗	✓	✓
		5	Monohydric and polyhydric alcohols with max. 48 % by volume methanol and ethanol (in total), glycol, polyglycols, their monoethers and their aqueous mixtures	✗	✓	✓
	L1A1U1	5a	Alcohols and glycol ethers and their aqueous mixtures	✗	✓	✓
	L2U2A1	5b	Monohydric and polyhydric alcohols ≥ C2 with max. 48% ethanol by volume and their aqueous mixtures	✗	✓	✓
	---	5c	Ethanol including ethanol according to DIN EN 15376 (regardless of the manufacturing process) and its aqueous solutions	✗	✓	✓
	L2A2U2	6b	Aromatic halogenated hydrocarbons	✗	✓	✓
		7	Organic esters and ketones, except biodiesel	✗	✓	✓
		7a	Aromatic esters and ketones, except biodiesel	✗	✓	✓
L2U2		7b[3]	Fatty acid methyl ester (FAME) according to DIN EN 14214, vegetable oil fuel - rapeseed oil according to DIN 51605 and vegetable oil fuel according to DIN 51623	✗	✓	✓
L2A2U2		8	Aqueous solutions of aliphatic aldehydes up to 40 %	✗	✓	✓
	---	8a	Aliphatic aldehydes and their aqueous solutions	✗	✓	✓
	L2A2U2	9	Aqueous solutions of organic acids (carboxylic acids) up to 10 % and their salts (in aqueous solution) except lactic acid and formic acid	✗	✓	✓
	---	9a	Organic acids (carboxylic acids, except formic acid > 10 %) and their salts (in aqueous solution)	✗	✓	✓
	L2A2U2	10	Inorganic acids (mineral acids) up to 20 % as well as acid hydrolysing, inorganic salts in aqueous solution (pH < 6), except hydrofluoric acid and oxidising acids and their salts	✗	✓	✓
		11	Inorganic alkalis and alkaline hydrolysing inorganic salts in aqueous solution (pH > 8), with the exception of ammonia solutions and oxidising solutions of salts (e.g. hypochlorite)	✗	✓	✓
L2U2		12	Aqueous solutions of inorganic non-oxidising salts with a pH value between 6 and 8	✗	✓	✓
L2A2U2	---	13	Amines and their salts (in aqueous solution)	✗	✓	✓
	L2A2U2	14	Aqueous solutions of organic surfactants	✗	✓	✓
		15a	Acyclic ethers	✓	✓	✓
	---	E85[3]	Ethanol fuel E85 according to DIN 51625	✗	✓	✓
	---	E10[3]	E10 petrol according to DIN EN 228	✗	✓	✓

[1] Water Resource Act

[2] Worksheet DWA-A-786:2020-10, Technical rules for substances hazardous to water (TRwS), design of sealing surfaces

[3] Can be used in petrol stations in accordance with TRwS 781 to TRwS 784 (worksheets DWA-A 781:2018-12, with correction sheet from May 2019, DWA-A 782:2006-05, DWA-A 783:2005-12 and DWA-A 784:2006-04, Technical Rules for Substances Hazardous to Water (TRwS), Fuelling Stations for Motor Vehicles, Rail Vehicles, Watercraft and Aircraft)

Chemical anchor accessories

Mixing nozzle VM-X / ANT VM-XHP

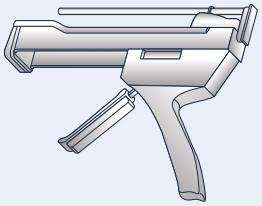
The shape of the Mixer nozzle allows the two resin components to be mixed. If the Mixer nozzle reaches the bottom of the drill hole, the drill hole can be filled with resin without bubbles.

Mixer extension VM-XE 10/200

The mixer extension is required if the mixer is not long enough to reach the bottom of the drill hole. The mixer extension can be used universally and is suitable for all drilling diameters.
Hose diameter: 10 mm
Hose length: 20 mm

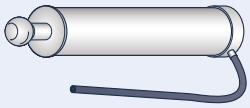
Dispensing gun ANT VM-P 345 P / ANT VM-P 585 P

The dispensing gun is required for cartridges with an attached shuttle. It ensures that both mortar components are pressed out evenly.
ANT VM-P 345 P: suitable for the 280 ml cartridge
ANT VM-P 585 P: suitable for 280 ml and 440 ml cartridges



Dust removal pump ANT VM-AP 360

The Dust removal pump is required for borehole cleaning when using chemical anchors. It can be used universally and is suitable for all drill diameters.

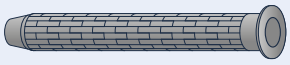


Cleaning brush VMZ-STB

The cleaning brush is required for the approval-compliant, thorough cleaning of drill holes when using chemical anchors.

Mesh sleeve SH

The mesh sleeve is required for the use of chemical anchors in perforated brickwork. The fine mesh structure of the sleeve prevents the resin from being injected unhindered into the cavities and thus reduces resin consumption.



List of accessories on page 12

Resin Anchor Range

Injection resin VMZ

Type	Item no.	Contents	W	Quant.
		[ml]	[kg]	[Pack]
VMZ 280[1)]	501634	280	0,56	1
Static mixer ANT VM-X	190829		0,01	1

One VM-X mixing nozzle is supplied with each cartridge.

[1)] Two static mixers are attached to each VMZ cartridge.

Anchor rod VMZ-A

Type	Item no.	Drill hole Ø x depth	Setting depth	Seismic C1 / C2	Max. Clamp thinckness	Rod length	Thread	Quantity	W
		[mm]	[mm]		[mm]	[mm]	[mm]	[Pack]	[kg]
VMZ-A 40 M8-15/65	*	10 x 42	41	– / –	15	65	M8 x 22	10	0.3
VMZ-A 50 M8-15/80	190712	10 x 55	52	– / –	15	80	M8 x 22	10	0.36
VMZ-A 50 M8-30/95	190721	10 x 55	52	– / –	30	95	M8 x 31	10	0.41
VMZ-A 50 M8-45/110	*	10 x 55	52	– / –	45	110	M8 x 31	10	0.47
VMZ-A 60 M10-10/85	190739	12 x 65	63	☑ / ☑	10	85	M10 x 18	10	0.61
VMZ-A 60 M10-20/95	*	12 x 65	63	☑ / ☑	20	95	M10 x 27	10	0.66
VMZ-A 60 M10-30/105	190748	12 x 65	63	☑ / ☑	30	105	M10 x 27	10	0.72
VMZ-A 60 M10-60/135	190757	12 x 65	63	☑ / ☑	60	135	M10 x 47	10	0.87
VMZ-A 60 M10-100/175	*	12 x 65	63	☑ / ☑	100	175	M10 x 57	10	1.1
VMZ-A 75 M10-20/110	*	12 x 80	78	☑ / ☑	20	110	M10 x 27	10	0.75
VMZ-A 75 M12-25/120	*	12 x 80	78	☑ / ☑	25	120	M12 x 37	10	0.85
VMZ-A 75 M12-40/135	*	12 x 80	78	☑ / ☑	40	135	M12 x 52	10	0.95
VMZ-A 75 M12-60/155	*	12 x 80	78	☑ / ☑	60	155	M12 x 72	10	1.05
VMZ-A 75 M12-80/175	*	12 x 80	78	☑ / ☑	80	175	M12 x 87	10	1.2
VMZ-A 70 M12-25/115	*	14 x 75	74	☑ / ☑	25	115	M12 x 36	10	1.2
VMZ-A 80 M12-10/110	190766	14 x 85	84	☑ / ☑	10	110	M12 x 21	10	1.17
VMZ-A 80 M12-25/125	190775	14 x 85	84	☑ / ☑	25	125	M12 x 36	10	1.28
VMZ-A 80 M12-50/150	190784	14 x 85	84	☑ / ☑	50	150	M12 x 46	10	1.49
VMZ-A 80 M12-100/200	*	14 x 85	84	☑ / ☑	100	200	M12 x 71	10	1.93
VMZ-A 80 M12-125/225	*	14 x 85	84	☑ / ☑	125	225	M12 x 71	10	2.17
VMZ-A 80 M12-165/265	*	14 x 85	84	☑ / ☑	165	265	M12 x 71	10	2.57
VMZ-A 95 M12-25/140	*	14 x 100	99	☑ / ☑	25	140	M12 x 36	10	1.4
VMZ-A 100 M12-25/145	*	14 x 105	104	☑ / ☑	25	145	M12 x 36	10	1.46
VMZ-A 100 M12-60/180	*	14 x 105	104	☑ / ☑	60	180	M12 x 56	10	1.75
VMZ-A 100 M12-100/220	*	14 x 105	104	☑ / ☑	100	220	M12 x 84	10	2.12
VMZ-A 110 M12-25/155	*	14 x 115	114	☑ / ☑	25	155	M12 x 36	10	1.55
VMZ-A 125 M12-25/170	117350	14 x 130	129	☑ / ☑	25	170	M12 x 36	10	1.75
VMZ-A 90 M16-30/145	*	18 x 98	94	☑ / ☑	30	145	M16 x 44	10	2.2
VMZ-A 105 M16-30/160	*	18 x 113	109	☑ / ☑	30	160	M16 x 44	10	2.45
VMZ-A 125 M16-30/180	190793	18 x 133	130	☑ / ☑	30	180	M16 x 44	10	2.78
VMZ-A 125 M16-60/210	190802	18 x 133	130	☑ / ☑	60	210	M16 x 55	10	3.6
VMZ-A 125 M16-100/250	*	18 x 133	130	☑ / ☑	100	250	M16 x 65	10	4.23
VMZ-A 125 M16-165/315	*	18 x 133	130	☑ / ☑	165	315	M16 x 90	10	5.25
VMZ-A 145 M16-30/200	*	18 x 153	150	☑ / ☑	30	200	M16 x 44	10	3.7
VMZ-A 160 M16-30/215	*	18 x 168	165	☑ / ☑	30	215	M16 x 44	10	3.54
VMZ-A 160 M16-60/245	*	18 x 168	165	☑ / ☑	60	245	M16 x 55	10	3.98
VMZ-A 160 M16-100/285	*	18 x 168	165	☑ / ☑	100	285	M16 x 65	10	4.62

* only available for specific orders

Anchor rod VMZ-A A4

VMZ-A 80 M12-25/125 as standard recommendation for anchoring siFramo components in concrete! In our Simotec user guideline, all our fasteners are designed with the VMZ-A 80 M12-25/125.

Type	Item no.	Drill hole Ø x depth	Setting depth	Seismic C1 / C2	Max. Clamp thickness	Rod length	Thread	Quantity.	W
		[mm]	[mm]		[mm]	[mm]	[mm]	[Pack]	[kg]
VMZ-A 40 M8-15/65 A4	*	10 x 42	41	– / –	15	65	M8 x 22	10	0.3
VMZ-A 50 M8-15/80 A4	*	10 x 55	52	– / –	15	80	M8 x 22	10	0.36
VMZ-A 50 M8-30/95 A4	*	10 x 55	52	– / –	30	95	M8 x 31	10	0.41
VMZ-A 50 M8-45/110 A4	*	10 x 55	52	– / –	45	110	M8 x 31	10	0.47
VMZ-A 60 M10-10/85 A4	*	12 x 65	63	☑ / ☑	10	85	M10 x 18	10	0.61
VMZ-A 60 M10-20/95 A4	*	12 x 65	63	☑ / ☑	20	95	M10 x 27	10	0.66
VMZ-A 60 M10-30/105 A4	*	12 x 65	63	☑ / ☑	30	105	M10 x 27	10	0.72
VMZ-A 60 M10-60/135 A4	*	12 x 65	63	☑ / ☑	60	135	M10 x 47	10	0.87
VMZ-A 60 M10-100/175 A4	*	12 x 65	63	☑ / ☑	100	175	M10 x 57	10	1.1
VMZ-A 75 M10-20/110 A4	*	12 x 80	78	☑ / ☑	20	110	M10 x 27	10	0.75
VMZ-A 75 M10-40/130 A4	*	12 x 80	78	☑ / ☑	40	130	M10 x 47	10	0.86
VMZ-A 75 M12-25/120 A4	*	12 x 80	78	☑ / ☑	25	120	M12 x 37	10	0.85
VMZ-A 75 M12-40/135 A4	*	12 x 80	78	☑ / ☑	40	135	M12 x 52	10	0.95
VMZ-A 75 M12-60/155 A4	*	12 x 80	78	☑ / ☑	60	155	M12 x 72	10	1.05
VMZ-A 75 M12-80/175 A4	*	12 x 80	78	☑ / ☑	80	175	M12 x 92	10	1.2
VMZ-A 70 M12-25/115 A4	*	14 x 75	74	☑ / ☑	25	115	M12 x 36	10	1.2
VMZ-A 70 M12-40/130 A4	*	14 x 75	74	☑ / ☑	40	130	M12 x 36	10	1.33
VMZ-A 80 M12-10/110 A4	*	14 x 85	84	☑ / ☑	10	110	M12 x 21	10	1.17
VMZ-A 80 M12-25/125 A4	112647	14 x 85	84	☑ / ☑	25	125	M12 x 36	10	1.28
VMZ-A 80 M12-50/150 A4	*	14 x 85	84	☑ / ☑	50	150	M12 x 46	10	1.49
VMZ-A 80 M12-100/200 A4	*	14 x 85	84	☑ / ☑	100	200	M12 x 71	10	1.93
VMZ-A 80 M12-125/225 A4	*	14 x 85	84	☑ / ☑	125	225	M12 x 71	10	2.17
VMZ-A 80 M12-165/265 A4	*	14 x 85	84	☑ / ☑	165	265	M12 x 71	10	2.57
VMZ-A 95 M12-25/140 A4	*	14 x 100	99	☑ / ☑	25	140	M12 x 36	10	1.4
VMZ-A 100 M12-25/145 A4	*	14 x 105	104	☑ / ☑	25	145	M12 x 36	10	1.46
VMZ-A 100 M12-60/180 A4	*	14 x 105	104	☑ / ☑	60	180	M12 x 56	10	1.75
VMZ-A 100 M12-100/220 A4	*	14 x 105	104	☑ / ☑	100	220	M12 x 84	10	2.12
VMZ-A 110 M12-25/155 A4	*	14 x 115	114	☑ / ☑	25	155	M12 x 36	10	1.55
VMZ-A 125 M12-25/170 A4	*	14 x 130	129	☑ / ☑	25	170	M12 x 36	10	1.75
VMZ-A 90 M16-30/145 A4	*	18 x 98	94	☑ / ☑	30	145	M16 x 44	10	2.2
VMZ-A 90 M16-45/160 A4	*	18 x 98	94	☑ / ☑	45	160	M16 x 59	10	2.78
VMZ-A 90 M16-60/175 A4	*	18 x 98	94	☑ / ☑	60	175	M16 x 74	10	3.08
VMZ-A 105 M16-30/160 A4	*	18 x 113	109	☑ / ☑	30	160	M16 x 44	10	2.45
VMZ-A 125 M16-30/180 A4	*	18 x 133	130	☑ / ☑	30	180	M16 x 44	10	2.78
VMZ-A 125 M16-60/210 A4	*	18 x 133	130	☑ / ☑	60	210	M16 x 55	10	3.6
VMZ-A 125 M16-100/250 A4	*	18 x 133	130	☑ / ☑	100	250	M16 x 65	10	4.23
VMZ-A 125 M16-165/315 A4	*	18 x 133	130	☑ / ☑	165	315	M16 x 90	10	5.25
VMZ-A 145 M16-30/200 A4	*	18 x 153	150	☑ / ☑	30	200	M16 x 44	10	3.7
VMZ-A 160 M16-30/215 A4	*	18 x 168	165	☑ / ☑	30	215	M16 x 44	10	3.54
VMZ-A 160 M16-60/245 A4	*	18 x 168	165	☑ / ☑	60	245	M16 x 55	10	3.98
VMZ-A 160 M16-100/285 A4	*	18 x 168	165	☑ / ☑	100	285	M16 x 65	10	4.62

*Available on order only basis

Injection resin VMU plus / VMH / VME plus

Type	Item no.	Contents	W	Quant.
		[ml]	[kg]	[Pack]
VMU plus 280	114176	280	0.56	1
VMH 280 - M	805227	280	0.56	1
VME plus 440 - M	407260	440	0.78	1
Mixer nozzle ANT VM-X	190829		0.01	1
Mixer nozzle ANT VM-XHP	804293		0.01	1

Two ANT VM-X mixer nozzles are attached to each VMU plus cartridge.
Two ANT VM-XHP mixer nozzles are supplied with each VMH and VME plus cartridge.

Anchor rod VMU-A

Type	Item no.			Use in										
				Concrete [1]	Solid brick without mesh sleeve		Sold or perforated brick with perforated sleeve VM-SH [2]							
	Bright Zinc plated 5.8	HDG 5.8	Stainless steel A4-70	Usable length t_{fix}	Drill hole Ø x Tiefe	Maximum clamping thickness t_{fix}	12 x 85	16 x 90	16 x 135	20 x 90	20 x 135	20 x 205	Quant.	W
							Maximum clamping thickness t_{fix}							
				[mm]	[mm]	[mm]	[mm]						[Pack]	[kg]
VMU-A 8 x 100	110444	*	*	90	10 x 80	10	10	5	–	–	–	–	10	0.42
VMU-A 8 x 110	*	*	804133	100	10 x 80	20	20	15	–	–	–	–	10	0.46
VMU-A 8 x 130	*	*	*	120	10 x 80	40	40	35	–	–	–	–	10	0.52
VMU-A 8 x 145	110445	*	804291	135	10 x 80	55	55	50	5	–	–	–	10	0.55
VMU-A 8 x 160	*	*	*	150	10 x 80	70	70	65	20	–	–	–	10	0.6
VMU-A 8 x 205	*	*	*	195	10 x 80	115	115	110	65	–	–	–	10	0.74
VMU-A 10 x 110	*	*	*	100	12 x 90	10	–	15	–	–	–	–	10	0.75
VMU-A 10 x 130	110447	*	800569	120	12 x 90	30	–	35	–	–	–	–	10	0.85
VMU-A 10 x 150	110448	*	803744	140	12 x 90	50	–	55	10	–	–	–	10	0.95
VMU-A 10 x 165	*	*	*	155	12 x 90	65	–	70	25	–	–	–	10	1.02
VMU-A 10 x 190	*	*	*	180	12 x 90	90	–	95	50	–	–	–	10	1.15
VMU-A 10 x 260	*	*	*	250	12 x 90	160	–	165	120	–	–	–	10	1.5
VMU-A 12 x 120	110449	*	803028	105	14 x 100	5	–	–	–	20	–	–	10	1.14
VMU-A 12 x 130	*	*	*	115	14 x 100	15	–	–	–	30	–	–	10	1.21
VMU-A 12 x 135	*	*	*	120	14 x 100	20	–	–	–	35	–	–	10	1.25
VMU-A 12 x 155	110450	*	501414	140	14 x 100	40	–	–	–	55	10	–	10	1.42
VMU-A 12 x 175	*	*	*	160	14 x 100	60	–	–	–	75	30	–	10	1.54
VMU-A 12 x 185	*	*	*	170	14 x 100	70	–	–	–	85	40	–	10	1.63
VMU-A 12 x 210	*	*	*	195	14 x 100	95	–	–	–	110	65	–	10	1.82
VMU-A 12 x 225	*	*	*	210	14 x 100	110	–	–	–	125	80	10	10	1.89
VMU-A 12 x 250	*	*	*	235	14 x 100	135	–	–	–	150	105	35	10	2.13
VMU-A 12 x 265	*	*	*	250	14 x 100	150	–	–	–	165	120	50	10	2.18
VMU-A 12 x 300	*	*	*	285	14 x 100	185	–	–	–	200	155	85	10	2.5
VMU-A 16 x 160	110451	*	802743	140	18 x 100	40	–	–	–	55	10	–	10	2.65
VMU-A 16 x 175	*	*	*	155	18 x 100	55	–	–	–	70	25	–	10	2.85
VMU-A 16 x 205	*	*	*	185	18 x 100	85	–	–	–	100	55	–	10	3.25
VMU-A 16 x 235	*	*	*	215	18 x 100	115	–	–	–	130	85	15	10	3.65
VMU-A 16 x 300	*	*	*	280	18 x 100	180	–	–	–	195	150	80	10	4.53

[1] Borehole diameter and depth depend on the selected anchor injection system and anchoring depth

[2] For drill hole Ø and depth, see mesh sleeves in the following table

*Available on order only basis

Mesh sleeve VM-SH

Note: Use only with VMU plus

			Suitable for		Resin requirements		
Type	Item no.	Drill hole Ø x depth	Anchor rods	Mesh sleeve		Quantity	W
		[mm]			[ml]	[Pack]	[kg]
VM-SH12 x 50[1)]	*	13 x 55	M8	–	7.5	10	0.01
VM-SH12 x 80	116925	12 x 85	M8	–	11.9	10	0.02
VM-SH16 x 85	116926	16 x 90	M8/M10	VMU-IG M6 x 80	24.9	10	0.03
VM-SH16 x 130	116927	16 x 135	M8/M10	–	38	10	0.04
VM-SH16 x 130/330[2)]	*	16 x 135 + t_{fix} [2)]	M8/M10	–	96.5	10	0.16
VM-SH20 x 85	116928	20 x 90	M12/M16	VMU-IG M68 x 80 / M10/80	41.1	10	0.04
VM-SH20 x 130	116929	20 x 135	M12/M16	–	62.9	10	0.07

[1)] For non-approval-relevant fastenings

[2)] VM-SH 16 x 130/330 is only approved in conjunction with VM-EA. tfix = shortened mesh sleeve length -130 mm

*Available on order only basis

Other accessories

Type	W	Quantity	Item no.
	[kg]	[Pack]	
Dispensing gun ANT VM-P 345 P	1.20	1	190874
Dispensing gun VM-P585 P (for side-by-side-cartridges 440 ml VME plus)	1.67	1	501021
Cleaning brush VMZ-STB (RB 10) M8	0.02	1	190838
Cleaning brush VMZ-STB (RB 12) M10	0.02	1	190847
Cleaning brush VMZ-STB (RB 14) M12	0.03	1	190856
Cleaning brush VMZ-STB (RB 18) M16	0.04	1	190865
Dust removal pump ANT VM-AP 360	0.27	1	190883
Mixing nozzle ANT VM-X	0.01	1	190829
Mixing nozzle ANT VM-XHP	0.01	1	804293
Mixing extension VM-XE 10/200	0.12	12	117520

DIN EN 1992-4
and the history of the measurement methods

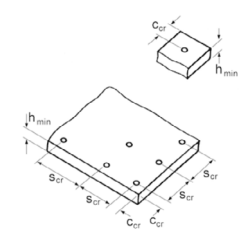
The introduction of DIN EN 1992-4 has made it possible to merge the different design guidelines from the field of subsequent fixing in concrete. As a result, there is now only one standard that regulates the design of fixings in concrete.

Anchor verification with our design software

As part of our anchor design software, it is possible to carry out a design in accordance with ETAG 001. This option only applies to the subsequent or control design of existing buildings or to the verification of construction projects abroad, in accordance with the building regulations in the respective country.

Anchor measurement programme page 26

Load values



Information on edge and centre distances

c_{cr} describes the characteristic edge distance according to the approval - i.e. from the edge of the component to the fixing point.

s_{cr} describes the characteristic centre distance regulated approval - i.e. the distance between two fixing points.

Chemical anchor VMZ

Extract from the conditions of use of the European Technical Assessment ETA-10/0260 (M8 - M12)
Permissible loads in accordance with EN 1992-4 without the influence of centre and edge distances in dry or damp concrete for the temperature range -40°C to +50°C5 (briefly up to 80°C). The overall safety factor (yM and yF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire exposure, see www.sikla.com.

Technical data				Anchor injection system VMZ M8 - M12										
				40 M8	50 M8	60 M10	75 M10	70 M12	75 M12	80 M12	95 M12	100 M12	110 M12	125 M12
Cracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	4.1	5.8	7.6	10.7	9.6	10.7	11.7	15.2	16.4	18.9	22.9
Uncracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	4.3	8.3	10.9	11.9	13.7	15.2	16.8	19.0	23.4	23.8	23.8
Cracked and uncracked Concrete														
Permissible shear load	≥ C20/25	zul. V	[kN]	8.0	8.0	12.0	12.0	19.2/19.4	19.4	19.4	19.4	19.4	19.4	19.4
Permissible bending moment		zul. M	[Nm]	17.1	17.1	34.3	34.3	60	60	60	60	60	60	60
Centre and edge distances														
Anchoring depth		h_{ef}	[mm]	40	50	60	75	70	75	80	95	100	110	125
Characteristic centre distance		$s_{cr,N}$	[mm]	120	150	180	225	210	225	240	285	300	330	375
Characteristic edge distance		$c_{cr,N}$	[mm]	60	75	90	112.5	105	112.5	120	142.5	150	165	187.5
Cracked concrete														
Minimum component thickness		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum centre distance		s_{min}	[mm]	40	40	40	40	55	50	40	40	50	50	50
Minimum centre distance		c_{min}	[mm]	40	40	40	40	55	50	50	50	50	50	50
Uncracked concrete														
Minimum component thickness		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum centre distance		s_{min}	[mm]	40	40	50	50	55	50	55	55	80[1)]	80[1)]	80[1)]
Minimum edge distance		c_{min}	[mm]	40	40	50	50	55	50	55	55	55[1)]	55[1)]	55[1)]
Assembly data														
Borehole diameter		d_0	[mm]	10	10	12	12	14	14	14	14	14	14	14
Through hole in the attachement part for the push-fit installation		d_f	[mm]	9	9	12	12	14	14	14	14	14	14	14
Through hole in the attachment part for push through mounting[2)]		d_f	[mm]	–[4)]	–[4)]	14	14	16	16[6]	16	16	16	16	16
Borehole depth		h_0	[mm]	42	55	65	80	75	80	85	100	105	115	130
Torque when anchoring		$T_{inst} \leq$	[Nm]	10	10	15	15	25	25	25	25	30	30	30
Width across flats		SW	[mm]	13	13	17	17	19	19	19	19	19	19	19
Borehole filling quantity, scaling on cartridge 345			[mm]	2	3	4	4	4	4	5	6	6	6	6
Resin requirement per drill hole[3)]				3.4	4.1	6.1	7.0	6.8	7.0	8.6	9.0	9.2	9.4	9.6
Additional resin required per drill hole for push-through installation per 10mm add-on thickness			[ml/10mm]	–	–	1.0	1.0	1.2	0.7	1.2	1.2	1.2	1.2	1.2

Technical data				Anchor injection system VMZ M8 - M12										
				40 M8	50 M8	60 M10	75 M10	70 M12	75 M12	80 M12	95 M12	100 M12	110 M12	125 M12
Drill holes per cartridge[3] VMZ 280				70	58	39	34	35	34	27	26	26	25	24
Drill holes per cartridge[3] VMZ 345				88	73	49	43	44	43	34	33	32	32	31

[1] For edge distance c ≥ 80 mm, minimum centre distance smin = 55 mm

[2] The annular gap in the add-on part must be completely filled with resin after setting.

[3] Only push-through installation. For push-through installation, an additional quantity of resin is required to fill the through-hole.

[4] Cannot be used for push-through mounting.

[5] Max. Long-term temperature +50°C / max. short-term temperature +80°C

[6] 14 mm for distance mounting

Extract from the conditions of use of the European Technical Assessment ETA-10/0260 (M16 - M24)

Permissible loads in accordance with EN 1992-4 without the influence of centre and edge distances in dry or damp concrete for the temperature range -40°C to +50°C5 (briefly up to 80°C). The overall safety factor (yM and yF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire exposure, see www.sikla.com.

Technical data				Anchor injection system VMZ M16 - M24										
				90 M16	105 M16	125 M16	145 M16	160 M16	115 M20	170 M20	190 M20	170 M24	200 M24	225 M24
Cracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	14.0	17.6	22.9	28.6	33.2	20.2	36.3	42.9	36.3	46.4	55.3
Uncracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	20.0	25.2	32.7	35.7	42.9	28.9	51.9	61.3	51.9	66.2	79.0
Cracked and uncracked Concrete														
Permissible shear load	≥ C20/25	zul. V	[kN]	28.0/ 36.0	35.3/ 36.0	36.0	36.0	36.0	35.7	72.7	85.1	72.7/ 101.7	92.8/ 101.7	101.7
Permissible bending moment		zul. M	[Nm]	152.0	152.0	152.0	152.0	152.0	200.0	296.6	296.6	512.0	512.0	512.0
Centre and edge distances														
Anchoring depth		h_{ef}	[mm]	90	105	125	145	160	115	170	190	170	200	225
Characteristic centre distance		$s_{cr,N}$	[mm]	270	315	375	435	480	345	510	570	510	600	675
Characteristic edge distance		$c_{cr,N}$	[mm]	135	157.5	187.5	217.5	240	172.5	255	285	255	300	337.5
Cracked concrete														
Minimum component thickness		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum centre distance		s_{min}	[mm]	50	50	60	60	60	80	80	80	80	80	80
Minimum centre distance		c_{min}	[mm]	50	50	60	60	60	80	80	80	80	80	80
Uncracked concrete														
Minimum component thickness		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum centre distance		s_{min}	[mm]	50	60	60	60	60	80	80	80	80	105	105
Minimum edge distance		c_{min}	[mm]	50	60	60	60	60	80	80	80	80	105	105
Assembly data														
Borehole diameter		d_0	[mm]	18	18	18	18	18	22	24	24	26	26	26
Through hole in the attachement part for the push-fit installation		d_f	[mm]	18	18	18	18	18	22	24 (22[3])	24 (22[3])	26	26	26
Through hole in the attachment part for push through mounting[1]		d_f	[mm]	20	20	20	20	20	24	26	26	28	28	28
Borehole depth		h_0	[mm]	98	113	133	153	168	120	180	200	185	215	240
Torque when anchoring		T_{inst} ≤	[Nm]	50	50	50	50	50	80	80	80	100	120	120
Width across flats		SW	[mm]	24	24	24	24	24	30	30	30	36	36	36
Borehole filling quantity, scaling on cartridge 345			[mm]	7	8	9	9	10	12	17	19	20	21	23
Resin requirement per drill hole[2]				11.1	12.6	14.5	15.8	17.4	20.8	30.1	32.2	33.3	36.6	41.3
Additional resin required per drill hole for push-through installation per 10mm add-on thickness			[ml/10mm]	1.6	1.6	1.6	1.6	1.6	2.1	2.9	2.9	2.6	2.6	2.6
Drill holes per cartridge[2] VMZ 280				21	19	16	15	13	11	7	7	7	6	5
Drill holes per cartridge[2] VMZ 345				27	23	20	19	17	14	10	9	9	8	7

[1] The annular gap in the add-on part must be filled with resin after setting.

[2] Only push-through installation. For push-through installation, an additional quantity of resin is required to fill the through-hole.

[3] Max. Long-term temperature +50°C / max. short-term temperature +80°C

If required: the practical dimensioning programme at www.sikla.com.

Chemical anchor VMZ A4

Extract from the conditions of use of the European Technical Assessment ETA-10/0260 (M8 - M12)
Permissible loads in accordance with EN 1992-4 without the influence of centre and edge distances in dry or damp concrete for the temperature range -40°C to +50°C5 (briefly up to 80°C). The overall safety factor (γM and γF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire exposure, see www.sikla.com.

Technical data				Anchor injection system VMZ M8-M12										
				40 M8	50 M8	60 M10	75 M10	70 M12	75 M12	80 M12	95 M12	100 M12	110 M12	125 M12
Cracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	4.1	5.8	7.6	10.7	9.6	10.7	11.7	15.2	16.4	18.9	22.9
Uncracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	4.3	8.3	10.9	11.9	13.7	15.2	16.8	19.0	23.4	23.8	23.8
Cracked and uncracked concrete														
Permissible shear load	≥ C20/25	zul. V	[kN]	8.3/8.6	8.6	13.1	13.1	19.2/19.4	19.4	19.4	19.4	19.4	19.4	19.4
Permissible bending moment		zul. M	[Nm]	17.1	17.1	34.3	34.3	60	60	60	60	60	60	60
Centre and edge distances														
Anchoring depth		h_{ef}	[mm]	40	50	60	75	70	75	80	95	100	110	125
Characteristic centre distance		$s_{cr,N}$	[mm]	120	150	180	225	210	225	240	285	300	330	375
Characteristic edge distance		$c_{cr,N}$	[mm]	60	75	90	112.5	105	112.5	120	142.5	150	165	187.5
Cracked concrete														
Minimum component thickness		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum centre distance		s_{min}	[mm]	40	40	40	40	55	50	40	40	50	50	50
Minimum edge distance		c_{min}	[mm]	40	40	40	40	55	50	50	50	50	50	50
Uncracked concrete														
Minimum component thickness		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum centre distance		s_{min}	[mm]	40	40	50	50	55	50	55	55	80[1)]	80[1)]	80[1)]
Minimum edge distance		c_{min}	[mm]	40	40	50	50	55	50	55	55	55[1)]	55[1)]	55[1)]
Assembly data														
Borehole dia		d_0	[mm]	10	10	12	12	14	12	14	14	14	14	14
Through hole in the attachment part for push-fit installation		d_f	[mm]	9	9	12	12	14	14	14	14	14	14	14
Through hle in the attachment part for push-through mounting[2)]		d_f	[mm]	–[4)]	–[4)]	14	14	16	16[5]	16	16	16	16	16
Borehole depth		h_0	[mm]	42	55	65	80	75	80	85	100	105	115	130
Torque when anchoring		$T_{inst} \leq$	[Nm]	10	10	15	15	25	25	25	25	30	30	30
Width across flats		SW	[mm]	13	13	17	17	19	19	19	19	19	19	19
Borehole filling quantity, scaling on cartridge 345			[mm]	2	3	4	4	4	4	5	6	6	6	6
Resin requirement per drill hole[3)]				3.4	4.1	6.1	7.0	6.8	7.0	8.6	9.0	9.2	9.4	9.6
Additional resin required per drill hole for push-through installation per 10mm add-on thickness			[ml/10mm]	–	–	1.0	1.0	1.2	0.7	1.2	1.2	1.2	1.2	1.2
Drill holes per cartridge[3)] VMZ 280				70	58	39	34	35	34	27	26	26	25	24
Drill holes per cartridge[3)] VMZ 345				88	73	49	43	44	43	34	33	32	32	31

[1)] For edge distance c ≥ 80 mm, minimum centre distance smin = 55 mm

[2)] The annular gap in the add-on part must be completely filled with resin after setting.

[3)] Only push-through installation. For push-through installation, an additional quantity of mortar is required to fill the through-hole.

[4)] Cannot be used for push-through mounting.

[5)] Max. Long-term temperature +50°C / max. short-term temperature +80°C

Extract from the conditions of use of the European Technical Assessment ETA-10/0260 (M16 - M24)
Permissible loads in accordance with EN 1992-4 without the influence of centre and edge distances in dry or damp concrete for the temperature range -40°C to +50°C5 (briefly up to 80°C). The overall safety factor (γM and γF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire stress, see www.sikla.com.

Technical data				Anchor injection system VMZ M16 - M24										
				90 M16	105 M16	125 M16	145 M16	160 M16	115 M20	170 M20	190 M20	170 M24	200 M24	225 M24
Cracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	14.0	17.6	22.9	28.6	33.2	20.2	36.3	42.9	36.3	46.4	55.3
Uncracked concrete														
Permissible tensile load	C20/25	zul N.	[kN]	20.0	25.2	32.7	35.7	42.9	28.9	51.9	61.3	51.9	66.2	79.0
Cracked and uncracked concrete														
Permissible shear load	≥ C20/25	zul. V	[kN]	28.0/ 36.0	35.3/ 36.0	36.0	36.0	36.0	40.4/ 43.9	72.7/ 74.9	74.9	72.7/ 89.1	89.1	89.1
Permissible bending moment		zul. M	[Nm]	152.0	152.0	152.0	152.0	152.0	231.6	259.4	259.4	448.0	448.0	448.0
Centre and edge distances														
Anchoring depth		h_{ef}	[mm]	90	105	125	145	160	115	170	190	170	200	225
Characteristic centre distance		$s_{cr,N}$	[mm]	270	315	375	435	480	345	510	570	510	600	675
Characteristic edge distance		$c_{cr,N}$	[mm]	135	157.5	187.5	217.5	240	172.5	255	285	255	300	337.5
Cracked concrete														
Minimum component thickness		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum centre distance		s_{min}	[mm]	50	50	60	60	60	80	80	80	80	80	80
Minimum edge distance		c_{min}	[mm]	50	50	60	60	60	80	80	80	80	80	80
Uncracked concrete														
Minimum component thickness		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum centre distance		s_{min}	[mm]	50	60	60	60	60	80	80	80	80	105	105
Minimum edge distance		c_{min}	[mm]	50	60	60	60	60	80	80	80	80	105	105
Assembly data														
Borehole diameter		d_0	[mm]	18	18	18	18	18	22	24	24	26	26	26
Through hole in the attachment part for push-fit installation		d_f	[mm]	18	18	18	18	18	22	24 (22[3])	24 (22[3])	26	26	26
Through hle in the attachment part for push-through mounting[1]		d_f	[mm]	20	20	20	20	20	24	26	26	28	28	28
Borehole depth		h_0	[mm]	98	113	133	153	168	120	180	200	185	215	240
Torque when anchoring		$T_{inst} \leq$	[Nm]	50	50	50	50	50	80	80	80	100	120	120
Width across flats		SW	[mm]	24	24	24	24	24	30	30	30	36	36	36
Borehole filling quantity, scaling on cartridge 345			[mm]	7	8	9	9	10	12	17	19	20	21	23
Resin requirement per drill hole[2]				11.1	12.6	14.5	15.8	17.4	20.8	30.1	32.2	33.3	36.6	41.3
Additional resin required per drill hole for push-through installation per 10mm add-on thickness			[ml/10mm]	1.6	1.6	1.6	1.6	1.6	2.1	2.9	2.9	2.6	2.6	2.6
Drill holes per cartridge[2] VMZ 280				21	19	16	15	13	11	7	7	7	6	5
Drill holes per cartridge[2] VMZ 345				27	23	20	19	17	14	10	9	9	8	7

[1] The annular gap in the add-on part must be completely filled with resin after setting.

[2] Only push-through installation. For push-through installation, an additional quantity of resin is required to fill the through-hole.

[3] Max. Long-term temperature +50°C / max. short-term temperature +80°C

If required: The practical dimensioning programme at www.sikla.com.

Chemical anchor VMU plus

Extract from the conditions of use of the European Technical Assessment ETA-15/0270
Permissible loads according to EN 1992-4 without influence of centre and edge distances in dry or damp concrete for temperature range I -40°C to +24°C (briefly up to +40°C) and for temperature range II -40°C to +50°C (briefly up to +80°C). The influence of the permanent load with the factor γsus = 1.0 and the total safety factor (γM and γF) were taken into account. For further details and temperature ranges see ETA. For load-bearing capacities under fire exposure, see below the table

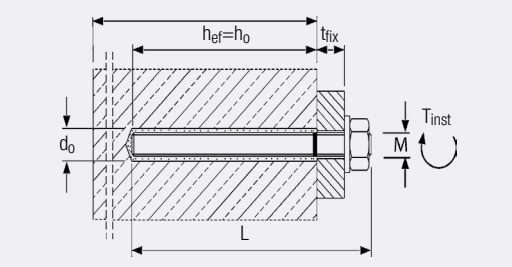
Technical data					Anchor injection system VMU plus M8 - M30							
Anchor rods					M8	M10	M12	M16	M20	M24	M27	M30
Range of anchoring depth	$h_{ef,min}$ – $h_{ef,max}$			[mm]	60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	108 - 540	120 - 600
Anchor injection system VMU plus, Anchor rod steel 5.8												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	2.9 - 7.7	3.7 - 12.5	5.8 - 19.7	8.8 - 35.1	11.7 - 54.9	12.9 - 79.0	15.3 - 109.5	18.0 - 133.3
	50°C/80°C [1]	C20/25	zul N.	[kN]	1.8 - 4.8	2.6 - 8.7	4.2 - 14.4	6.4 - 25.5	9.0 - 39.9	11.5 - 57.4	15.3 - 81.8	18.0 - 101.0
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	7.2 - 8.6	9.0 - 13.8	11.4 - 20.0	14.0 - 37.1	16.7 - 58.1	18.4 - 83.8	21.9 - 109.5	25.7 - 133.3
	50°C/80°C [1]	C20/25	zul N.	[kN]	5.4 - 8.6	6.7 - 13.8	9.4 - 20.0	14.0 - 37.1	16.7 - 58.1	18.4 - 83.8	21.9 - 109.5	25.7 - 133.3
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	5.7 - 6.3	9.0 - 9.7	13.8 - 14.3	21.1 - 26.9	28.0 - 42.3	30.8 - 60.6	36.8 - 78.9	43.1 - 96.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	3.6 - 6.3	6.3 - 9.7	10.1 - 14.3	15.3 - 26.9	21.5 - 42.3	27.6 - 60.6	36.8 - 78.9	43.1 - 96.0
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	6.3	9.7	14.3	26.9	40.0 - 42.3	44.1 - 60.6	52.6 - 78.9	61.6 - 96.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	6.3	9.7	14.3	26.9	40.0 - 42.3	44.1 - 60.6	52.6 - 78.9	61.6 - 96.0
Anchor injection system VMU plus, Anchor rod steel 8.8												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	2.9 - 7.7	3.7 - 12.5	5.8 - 19.7	8.8 - 35.1	11.7 - 54.9	12.9 - 79.0	15.3 - 118.1	18.0 - 145.9
	50°C/80°C [1]	C20/25	zul N.	[kN]	1.8 - 4.8	2.6 - 8.7	4.2 - 14.4	6.4 - 25.5	9.0 - 39.9	11.5 - 57.4	15.3 - 81.8	18.0 - 101.0
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	7.2 - 13.8	9.0 - 21.9	11.4 - 31.9	14.0 - 59.5	16.7 - 93.3	18.4 - 134.3	21.9 - 175.2	25.7 - 202.0
	50°C/80°C [1]	C20/25	zul N.	[kN]	5.4 - 13.8	6.7 - 21.9	9.4 - 31.9	14.0 - 57.4	16.7 - 89.8	18.4 - 122.1	21.9 - 136.3	25.7 - 145.9
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	5.7 - 8.6	9.0 - 13.1	13.8 - 19.4	21.1 - 36.0	28.0 - 56.0	30.8 - 80.6	36.8 - 105.1	43.1 - 128.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	3.6 - 8.6	6.3 - 13.1	10.1 - 19.4	15.3 - 36.0	21.5 - 56.0	27.6 - 80.6	36.8 - 105.1	43.1 - 128.0
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	8.6	13.1	19.4	33.5 - 36.0	40.0 - 56.0	44.1 - 80.6	52.6 - 105.1	61.6 - 128.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	8.6	13.1	19.4	33.5 - 36.0	40.0 - 56.0	44.1 - 80.6	52.6 - 105.1	61.6 - 128.0
Anchor injection system VMU plus, Anchor rod stainless steel A4-70, HCR 70												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	2.9 - 7.7	3.7 - 12.5	5.8 - 19.7	8.8 - 35.1	11.7 - 54.9	12.9 - 79.0	15.3 - 57.4	18.0 - 70.2
	50°C/80°C [1]	C20/25	zul N.	[kN]	1.8 - 4.8	2.6 - 8.7	4.2 - 14.4	6.4 - 25.5	9.0 - 39.9	11.5 - 57.4	15.3 - 57.4	18.0 - 70.2
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul N.	[kN]	7.2 - 9.9	9.0 - 15.7	11.4 - 22.5	14.0 - 42.0	16.7 - 65.3	18.4 - 94.3	21.9 - 57.4	25.7 - 70.2
	50°C/80°C [1]	C20/25	zul N.	[kN]	5.4 - 9.9	6.7 - 15.7	9.4 - 22.5	14.0 - 42.0	16.7 - 65.3	18.4 - 94.3	21.9 - 57.4	25.7 - 70.2
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Cracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	5.7 - 6.0	9.0 - 9.2	13.7	21.1 - 25.2	28.0 - 39.4	30.8 - 56.8	34.5	42.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	3.6 - 6.0	6.3 - 9.2	10.1 - 13.7	15.3 - 25.2	21.5 - 39.4	27.6 - 56.8	34.5	42.0
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$					Uncracked concrete							
Temperature range	24°C/40°C [1]	C20/25	zul V.	[kN]	6.0	9.2	13.7	25.2	39.4	44.1 - 56.8	34.5	42.0
	50°C/80°C [1]	C20/25	zul V.	[kN]	6.0	9.2	13.7	25.2	39.4	44.1 - 56.8	34.5	42.0
Centre and edge distances												
Minimum component thickness $h_{ef,min}$ – $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270	116 - 356	138 - 448	152 - 536	172 - 604	190 - 670
Minimum centre distance			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

Technical data					Anchor injection system VMU plus M8 - M30							
Anchor rods					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Range of anchoring depth	$h_{ef,min}$ – $h_{ef,max}$			**[mm]**	**60 - 160**	**60 - 200**	**70 - 240**	**80 - 320**	**90 - 400**	**96 - 480**	**108 - 540**	**120 - 600**
Assembly data												
Borehole diameter			d_0	[mm]	10	12	14	18	24	28	32	35
Through hole in the attachment part for push-fit installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Throug hole in the attachment part for push-through installation			$d_f \leq$	[mm]	12	14	16	20	25	30	33	38
Borehole depth range for $h_{ef,min}$ – $h_{ef,max}$			h_0	[mm]	60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	108 - 540	120 - 600
Torque when anchoring			$T_{inst} \leq$	[Nm]	10	20	40	80	120	160	180	200
Resin requirement per 100mm drilling depth				[ml]	6.53	8.16	9.82	13.61	26.71	32.25	42.03	48.70

[1] Max. Long-term temperature / max. short-term temperature.

Higher concrete strengths can lead to higher permissible loads. Technical data for water-filled drill holes see European Technical Assessment.

If required: The practical design programme at www.sikla.com.



Fire protection					
		Maximum load kN in the case of fire for fire resistance			
	Size	**R30 (30 min)**	**R60 (60 min)**	**R90 (90 min)**	**R120 (120 min)**
Bright Zinc Plated ≥ Fkl. 5.8	M8 h_{ef} > 80	1.60	1.10	0.60	0.30
Stainless steel A4 ≥ Fkl. 70	M10 h_{ef} > 90	2.60	1.80	0.90	0.50
Stainless steel HCR ≥ Fkl. 70	M12 h_{ef} > 110	3.40	2.60	1.80	1.40
	M16 h_{ef} > 125	6.20	4.80	3.40	2.70
	M20 h_{ef} > 170	9.80	7.50	5.30	4.20
	M24 h_{ef} > 210	14.00	10.80	7.60	6.00
	M27 h_{ef} > 250	18.30	14.10	9.90	7.90
	M30 h_{ef} > 280	22.30	17.20	12.10	9.60

Only uncracked concrete

Chemical anchor VMU plus in solid brick masonry

Extract from the conditions of use of the European Technical Assessment ETA-17/0307
Permissible loads without influence of centre and edge distances to component edges. Butt and bed joints mortared. Temperature range -40°C up to +24°C (briefly up to +40°C) - utilisation category dry/dry. The overall safety coefficient according to ETAG 029 (γM and γF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire exposure, see below the table.

Technical data				Anchor injection sytem VMU plus M8 - M16, solid brick without perforated sleeve [2]			
Anchor rods; steel: ≥ Strength class 5.8, A4, High cloride reistence: ≥ Strength class 70				M8	M10	M12	M16
Anchoring depth	h_{ef}		[mm]	80	90	100	100
Masonry brick Mz-DF in accordance with EN 771-1, brick density ⍰: 1,6 kg/dm3 , minimum brick size: 240x115x55 mm (e.g. Unipor)							
Centre distance		s_{cr}	[mm]	240	270	300	300
Minimum centre distance		s_{min}	[mm]	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60
Permissible tensile load for compressive strength	$f_b \geq 10$ N/mm²	zul N.	[kN]	1.00	1.00	1.14	1.14
	$f_b \geq 20$ N/mm²	zul N.	[kN]	1.29	1.57	1.71	1.71
	$f_b \geq 28$ N/mm²	zul N.	[kN]	1.57	1.71	1.94	1.94
Permissible shear load for stone compressive strength	$f_b \geq 10$ N/mm²	zul V.	[kN]	1.00	1.00	1.00	1.57
	$f_b \geq 20$ N/mm²	zul V.	[kN]	1.43	1.43	1.43	2.29
	$f_b \geq 28$ N/mm²	zul V.	[kN]	1.57	1.57	1.57	2.57
Drilling method				Hammer drilling			
Sand-lime brick KS-NF in accordance with EN 771-2, raw brick density ⍰: 2,0 kg/dm3 , minimum brick size: 240x115x71 mm (e.g.Wemding)							
Centre distance		s_{cr}	[mm]	240	270	300	300
Minimum centre distance		s_{min}	[mm]	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60
Permissible tensile load for compressive strength	$f_b \geq 10$ N/mm²	zul N.	[kN]	1.29	1.29	1.29	1.00
	$f_b \geq 20$ N/mm²	zul N.	[kN]	1.71	1.71	1.71	1.43
	$f_b \geq 27$ N/mm²	zul N.	[kN]	2.00	2.00	2.00	1.71
Permissible shear load for stone compressive strength	$f_b \geq 10$ N/mm²	zul V.	[kN]	0.71	0.86	0.71	0.71
	$f_b \geq 20$ N/mm²	zul V.	[kN]	1.14	1.29	1.14	1.14
	$f_b \geq 27$ N/mm²	zul V.	[kN]	1.29	1.57	1.29	1.29
Drilling method				Hammer drilling			
Solid brick made of lightweight concrete LAC in accordance with EN 771-3, raw brick density ⍰: 0,6 kg/dm3 , minimum brick size: 300x123x248 mm (e.g. Bisotherm)							
Centre distance		s_{cr}	[mm]	240	270	300	300
Minimum centre distance		s_{min}	[mm]	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60
Permissible tensile load for compressive strength	$f_b \geq 2$ N/mm²	zul N.	[kN]	0.86	0.86	1.00	0.86
Permissible shear load for stone compressive strength	$f_b \geq 2$ N/mm²	zul V.	[kN]	0.86	0.86	0.86	0.86
Drilling method				Hammer drilling			
Aerated concrete AAC6 in accordance with EN 771-4, raw brick density ⍰: 0,6 kg/dm3 , minimum brick size: 499x240x249 mm (e.g. Porit)							
Centre distance		s_{cr}	[mm]	240	270	300	300
Minimum centre distance		s_{min}	[mm]	100	100	100	100
Edge distance		c_{cr}	[mm]	120	135	150	150
Minimum edge distance		$c_{min,N}$	[mm]	75	75	75	75
		$c_{min,N,v,II}$	[mm]	75	75	75	75
		$c_{min,v,\_I\_}$	[mm]	120	135	150	150
Permissible tensile load for compressive strength	$f_b \geq 6$ N/mm²	zul N.	[kN]	0.89	1.43	1.79	2.32
Permissible shear load for stone compressive strength	$f_b \geq 6$ N/mm²	zul V.	[kN]	2.14	3.57	3.57	3.57

Technical data				Anchor injection sytem VMU plus M8 - M16, solid brick without perforated sleeve [2]			
Anchor rods; steel: ≥ Strength class 5.8, A4, High cloride reistence: ≥ Strength class 70				M8	M10	M12	M16
Anchoring depth	h_{ef}		[mm]	80	90	100	100
Drilling method				Hammer drilling			
Installation data in solid brick (without mesh sleeve)							
Borehole diameter		d_0	[mm]	10	12	14	18
Borehole depth		h_0	[mm]	80	90	100	100
Minimum wall thickness		h_{min}	[mm]	110	120	130	130
Through hole in the component to be connected		$d_f \leq$	[mm]	9	12	14	18
Assembly torque		$T_{inst} \leq$	[Nm]	2 (14 for masonry bricks Mz-DF)			
Resin requirement per 100 mm drilling depth			[ml]	5.2	7.3	9.8	13.6
Drill holes per cartridge VMU plus 280			[Stück]	46	33	24	18
Drill holes per cartridge VMU plus 345			[Stück]	59	42	31	22

[1] Max. Long-term temperature / max. short-term temperature

[2] Installation also permitted with perforated sleeve; for technical values see ETA-17/0307

[3] Minimum edge distance Cmin,v,II for shear loads parallel to the free edge

[4] Minimum edge distance Cmin,v,_I_ for shear loads perpendicular to the free edge

Fire protection					
		Maximum load [kN] in the event of fire for fire resistance class			
	Größe	R30 (30 min)	R60 (60 min)	R90 (90 min)	R120 (120 min)
Solid brick	M8 $h_{ef} > 80$	1.05	0.80	0.55	0.45
	M10 $h_{ef} > 90$	2.10	1.60	1.05	0.80
	M12 $h_{ef} > 100$	3.50	2.55	1.60	1.10
	M16 $h_{ef} > 100$	4.70	3.25	1.80	1.05
Lime sand solid brick	M8 $h_{ef} > 80$	1.05	0.80	0.55	0.45
	M10 $h_{ef} > 90$	2.10	1.60	1.05	0.80
	M12 $h_{ef} > 100$	3.50	2.55	1.60	1.10
	M16 $h_{ef} > 100$	4.70	3.25	1.80	1.05
Aerated concrete	M8 $h_{ef} > 80$	1.20 (1.35)[1]	0.85	0.35	0.10
	M10 $h_{ef} > 90$	1.70	1.15	0.65	0.35
	M12 $h_{ef} > 100$	2.05	1.45	0.90	0.60
	M16 $h_{ef} > 100$	1.70	1.20	0.70	0.45

[1] applies to A4 stainless steel

Extract from the conditions of use of the European Technical Assessment ETA-17/0307

Permissible loads without influence of centre and edge distances to component edges. Butt and bed joints mortared. Temperature range -40°C up to +24°C (briefly up to +40°C) - utilisation category dry/dry. The overall safety coefficient according to ETAG 029 (γM and γF) was taken into account. For further information and temperature ranges see ETA. For load-bearing capacities under fire exposure, see below the table.

Technical data				Anchor injection system VMU plus M8 - M16, brick with perforated sleeve					
Anchor rods; steel: ≥ Strength class 5.8, A4, High cloride reistence: ≥ Strength class 70				M8	M8 / M10		M12 / M16		
Mesh sleeve VM-SH				12 x 80	16 x 85	16 x 130	20 x 85	20 x 130	20 x 200
Anchoring depth	h_{ef}		[mm]	80	85	130	85	130	200
Porotherm Homebric perforated brick in accordance with EN 771-1, raw brick density ⍰: 0,7 kg/dm3 , minimum brick size: 500x200x299 mm (e.g. Wienerberger)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	500	500	500	500	500	
Centre distance perpendicular to the bed joint		$s_{cr,\_I\_}$	[mm]	299	299	299	299	299	
Minimum centre distance		s_{min}	[mm]	100	100	100	100	100	
Edge distance		c_{cr}	[mm]	100	100	100	120	120	
Minimum edge distance		c_{min}[2]	[mm]	100	100	100	120	120	
Permissible tensile load for compressive strength	$f_b \geq 4$ N/mm²	zul N.	[kN]	0.26	0.26	0.34	0.26	0.34	
	$f_b \geq 6$ N/mm²	zul N.	[kN]	0.26	0.26	0.34	0.26	0.34	
	$f_b \geq 10$ N/mm²	zul N.	[kN]	0.34	0.34	0.43	0.34	0.43	

Technical data				Anchor injection system VMU plus M8 - M16, brick with perforated sleeve					
Anchor rods; steel: ≥ Strength class 5.8, A4, High cloride reistence: ≥ Strength class 70				M8	M8 / M10		M12 / M16		
Mesh sleeve VM-SH				12 x 80	16 x 85	16 x 130	20 x 85	20 x 130	20 x 200
Anchoring depth	h_{ef}		[mm]	80	85	130	85	130	200
Permissible shear load for stone compressive strength	$f_b \geq 4$ N/mm²	zul V.	[kN]	0.57	0.57	0.57	0.71	0.71	
	$f_b \geq 6$ N/mm²	zul V.	[kN]	0.71	0.71	0.71	0.86	0.86	
	$f_b \geq 10$ N/mm²	zul V.	[kN]	0.86	0.86	1.00	1.14	1.14	
Drilling method				**Rotary drilling**					
Perforated brick HLz-16-DF in accordance with EN 771-1, raw brick density ⍰: 0,8 kg/dm3, minimum brick size: 497x240x238 mm (e.g. Unipor)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	497	497	497	497	497	497
Centre distance perpendicular to the bed joint		$s_{cr,\perp}$	[mm]	238	238	238	238	238	238
Minimum centre distance		s_{min}	[mm]	100	100	100	100	100	100
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120
Minimum edge distance		c_{min} 2)	[mm]	100	100	100	120	120	120
Permissible tensile load for compressive strength	$f_b \geq 6$ N/mm²	zul N.	[kN]	0.71	0.71	1.00	0.71	1.00	1.00
	$f_b \geq 8$ N/mm²	zul N.	[kN]	0.86	0.86	1.29	0.86	1.29	1.29
	$f_b \geq 12$ N/mm²	zul N.	[kN]	1.00	1.00	1.43	1.00	1.43	1.43
	$f_b \geq 14$ N/mm²	zul N.	[kN]	1.14	1.14	1.57	1.14	1.57	1.57
Permissible shear load for stone compressive strength	$f_b \geq 6$ N/mm²	zul V.	[kN]	0.71	1.29	1.29	1.43	1.71	1.71
	$f_b \geq 8$ N/mm²	zul V.	[kN]	0.86	1.57	1.57	1.71	2.00	2.00
	$f_b \geq 12$ N/mm²	zul V.	[kN]	1.14	1.86	1.86	2.00	2.57	2.57
	$f_b \geq 14$ N/mm²	zul V.	[kN]	1.14	1.86	1.86	2.00	2.57	2.57
Perforated brick Doppio Uni accordance with EN 771-1, raw brick density ⍰: 0,9 kg/dm3, minimum brick size: 250x120x120 mm (e.g.Wienerberger)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	250	250	250	250	250	250
Centre distance perpendicular to the bed joint		$s_{cr,\perp}$	[mm]	120	120	120	120	120	120
Min. centre distance parallel to the bearing joint		$s_{min,II}$	[mm]	100	100	100	100	100	100
Min. centre distance perpendicular to the bed joint		$s_{min,\perp}$	[mm]	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120
Minimum edge distance		c_{min} 2)	[mm]	60	60	60	60	60	60
Permissible tensile load for compressive strength	$f_b \geq 10$ N/mm²	zul N.	[kN]	0.17	0.17	0.17	0.17	0.17	0.17
	$f_b \geq 16$ N/mm²	zul N.	[kN]	0.21	0.21	0.21	0.21	0.21	0.21
	$f_b \geq 20$ N/mm²	zul N.	[kN]	0.26	0.26	0.26	0.26	0.26	0.26
	$f_b \geq 28$ N/mm²	zul N.	[kN]	0.34	0.34	0.34	0.34	0.34	0.34
Permissible shear load for stone compressive strength	$f_b \geq 10$ N/mm²	zul V.	[kN]	0.43	0.43	0.43	0.43	0.43	0.43
	$f_b \geq 16$ N/mm²	zul V.	[kN]	0.57	0.57	0.57	0.57	0.57	0.57
	$f_b \geq 20$ N/mm²	zul V.	[kN]	0.57	0.57	0.57	0.57	0.57	0.57
	$f_b \geq 28$ N/mm²	zul V.	[kN]	0.71	0.71	0.71	0.71	0.71	0.71
Drilling method				**Rotary drilling**					
Perforated sand-lime KSL-3DF in accordance with EN 771-2, raw brick density ⍰: 1,4 kg/dm3, minimum brick size: 240x175x113 mm (e.g. Wemding)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	240	240	240	240	240	240
Centre distance perpendicular to the bed joint		$s_{cr,\perp}$	[mm]	120	120	120	120	120	120
Minimum centre distance		s_{min}	[mm]	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120
Minimum edge distance		c_{min} 2)	[mm]	60	60	60	60	60	60
Permissible tensile load for compressive strength	$f_b \geq 8$ N/mm²	zul N.	[kN]	0.43	0.43	0.43	1.29	1.29	1.29
	$f_b \geq 12$ N/mm²	zul N.	[kN]	0.57	0.57	0.71	1.71	1.71	1.71
	$f_b \geq 14$ N/mm²	zul N.	[kN]	0.71	0.71	0.71	1.86	1.86	1.86
Permissible shear load for stone compressive strength	$f_b \geq 8$ N/mm²	zul V.	[kN]	0.71	1.14	1.14	1.14	1.14	1.14
	$f_b \geq 12$ N/mm²	zul V.	[kN]	0.86	1.29	1.29	1.29	1.29	1.29
	$f_b \geq 14$ N/mm²	zul V.	[kN]	1.00	1.71	1.71	1.71	1.71	1.71
Drilling method				**Rotary drilling**					

Technical data				Anchor injection system VMU plus M8 - M16, brick with perforated sleeve					
Anchor rods; steel: ≥ Strength class 5.8, A4, High cloride reistence: ≥ Strength class 70				M8	M8 / M10		M12 / M16		
Mesh sleeve VM-SH				12 x 80	16 x 85	16 x 130	20 x 85	20 x 130	20 x 200
Anchoring depth	h_{ef}		[mm]	80	85	130	85	130	200
Perforated sand-lime KSL-12DF in accordance with EN 771-2, raw brick density ≥: 1,4 kg/dm3 , minimum brick size: 498x175x238 mm (e.g.Wemding)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	498	498	498	498	498	
Centre distance perpendicular to the bed joint		$s_{cr,\_I\_}$	[mm]	238	238	238	238	238	
Minimum centre distance		s_{min}	[mm]	120	120	120	120	120	
Edge distance		c_{cr}	[mm]	100	100	100	120	120	
Minimum edge distance		c_{min} [2)]	[mm]	100	100	100	120	120	
Permissible tensile load for compressive strength	$f_b \geq 8$ N/mm²	zul N.	[kN]	0.17	0.17	0.71	0.43	0.71	
	$f_b \geq 12$ N/mm²	zul N.	[kN]	0.21	0.21	0.86	0.43	0.86	
	$f_b \geq 14$ N/mm²	zul N.	[kN]	0.26	0.26	1.14	0.57	1.14	
Permissible shear load for compressive strength	$f_b \geq 8$ N/mm²	zul V.	[kN]	0.71	1.57	1.57	1.57	1.57	
	$f_b \geq 12$ N/mm²	zul V.	[kN]	0.86	1.86	1.86	1.86	1.86	
	$f_b \geq 14$ N/mm²	zul V.	[kN]	1.00	2.29	2.29	2.29	2.29	
Drilling method				Rotary drilling					
Perforated brick out of lightweight concrete Bloc creux B40 in accordance with EN 771-3, raw brick density ≥: 0,8 kg/dm³, minimum brick size: 494x200x190 mm (e.g. Sepa)									
Centre distance parallel to the bearing joint		$s_{cr,II}$	[mm]	494	494	494	494	494	
Centre distance perpendicular to the bed joint		$s_{cr,\_I\_}$	[mm]	190	190	190	190	190	
Minimum centre distance		s_{min}	[mm]	100	100	100	100	100	
Edge distance		c_{cr}	[mm]	100	100	100	120	120	
Minimum edge distance		c_{min} [2)]	[mm]	100	100	100	120	120	
Permissible tensile load for compressive strength	$f_b \geq 8$ N/mm²	zul N.	[kN]	0.34	0.34	0.34	0.34	0.34	
Permissible shear load for compressive strength	$f_b \geq 8$ N/mm²	zul V.	[kN]	0.86	0.86	0.86	0.86	0.86	
Install. data in perforated brick with perforated sleeve									
Borehole diameter		d_0	[mm]	12	16	16	20	20	20
Borehole depth		h_0	[mm]	85	90	135	90	135	205
Minimum wall thickness		h_{min}	[mm]	115	115	145	115	175	240
Through hole in component to be connected		$d_f \leq$	[mm]	9	9/12	9/12	14 / 18	14 / 18	14
Assembly torque		$T_{inst} \leq$	[Nm]	2					
Resin requirement per 100mm drilling depth			[ml]	11.2	24.9	38	41.1	62.9	96.7
Drill holes per cartridge VMU plus 280			[Stück]	21	9	6	5	3	2
Drill holes per cartridge VMU plus 345			[Stück]	27	12	8	7	4	3
Drilling method				Rotary drilling					

1) Max. Long-term temperature / max. short-term temperature

2) 2) For VRk,c: cmin according to ETAG 029, Annex C

Fire protection						
			Maximum load [kN] in the event of fire for fire resistance classes			
	Size	Mesh sleeve	R30 (30 min)	R60 (60 min)	R90 (90 min)	R120 (120 min)
Perforated bricks and sold bricks	M8 $h_{ef} > 130$	SH 16 x 130	0.21	0.13	0.05	0
	M10 $h_{ef} > 130$	SH 16 x 130	0.21	0.13	0.05	0
	M12 $h_{ef} > 130$	SH 20 x 130	0.21	0.13	0.05	0
	M12 $h_{ef} > 200$	SH 20 x 200	0.21	0.13	0.05	0
Sand-lime perforated brick and sand-lime solid brick	M8 $h_{ef} > 130$	SH 16 x 130	0.21	0.13	0.05	0
	M10 $h_{ef} > 130$	SH 16 x 130	0.21	0.13	0.05	0
	M12 $h_{ef} > 130$	SH 20 x 130	0.21	0.13	0.05	0
	M12 $h_{ef} > 200$	SH 20 x 200	0.21	0.13	0.05	0

Chemical anchor VMH

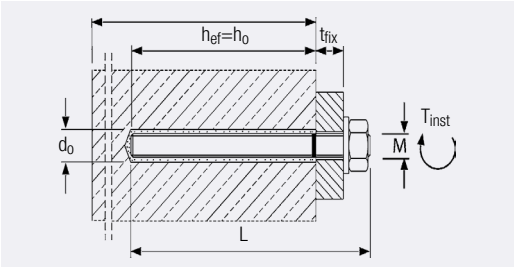
Extract from the conditions of use of the European Technical Assessment ETA-23/0139
Permissible loads in accordance with EN 1992-4 for a service life of up to 50 years without the influence of centre distances and edge distances in dry or damp concrete with compressed air cleaning in temperature range I -40°C to +24°C (briefly up to +40°C) and in temperature range II -40°C to +50°C (briefly up to +80°C). The influence of the permanent load with the factor γsus = 1.0 and the total safety factor (γM and γF) were taken into account. For further details and temperature ranges see ETA. For load-bearing capacities under fire exposure, see www.sikla.com.

Technical data		**Anchor injection system VMH M8-M30**			**Temperature range II -40°C bis + 50°C/+80°C[1])**							
Anchor rods					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Range of anchoring depth	$h_{ef,min}$ - $h_{ef,max}$			**[mm]**	**60 - 160**	**60 - 200**	**70 - 240**	**80 - 320**	**90 - 400**	**96 - 480**	**108 - 540**	**120 - 600**
Anchor injection system VMH, anchor rod steel 5.8												
Permissible tensile load for $h_{ef,min}$ - $h_{ef,max}$												
Cracked concrete		C20/25	zul N.	[kN]	5.0 - 8.6	6.7 - 13.8	9.6 - 20.0	11.7 - 37.1	14.0 - 58.1	15.4 - 83.8	18.4 - 109.5	21.6 - 133.3
Uncracked concrete		C20/25	zul N.	[kN]	8.6	10.9 - 13.8	13.7 - 20.0	16.8 - 37.1	20.0 - 58.1	22.0 - 83.8	26.3 - 109.5	30.8 - 133.3
Permissible shear load for $h_{ef,min}$ - $h_{ef,max}$												
Cracked concrete		C20/25	zul V.	[kN]	6.3	9.7	14.3	23.5 - 26.9	28.0 - 42.3	30.8 - 60.6	36.8 - 78.9	43.1 - 96.0
Uncracked concrete		C20/25	zul V.	[kN]	6.3	9.7	14.3	26.9	40.0 - 42.3	44.1 - 60.6	52.6 - 78.9	61.6 - 96.0
Anchor injection system VMH, anchor rod steel 8.8												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete		C20/25	zul N.	[kN]	5.0 - 13.4	6.7 - 21.9	9.6 - 31.9	11.7 - 59.5	14.0 - 93.3	15.4 - 120.6	18.4 - 152.7	21.6 - 188.5
Uncracked concrete		C20/25	zul N.	[kN]	11.2 - 13.8	11.2 - 21.9	14.1 - 31.9	16.8 - 59.5	20.5 - 93.3	22.0 - 134.4	26.3 - 175.2	30.8 - 213.8
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete		C20/25	zul V.	[kN]	8.6	13.1	19.2 - 19.4	23.5 - 36.0	28.0 - 56.0	30.8 - 80.6	36.8 - 105.1	43.1 - 128.0
Uncracked concrete		C20/25	zul V.	[kN]	8.6	13.1	19.4	33.5 - 36.0	40.0 - 56.0	44.1 - 80.6	52.6 - 105.1	61.6 - 128.0
Anchor injection system VMH, anchor rod stainless steel A4-70, HCR-70												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete		C20/25	zul N.	[kN]	5.0 - 9.9	6.7 - 15.7	9.6 - 22.5	11.7 - 42.0	14.0 - 65.3	15.4 - 94.3	18.4 - 57.4	21.6 - 70.2
Uncracked concrete		C20/25	zul N.	[kN]	9.9	10.9 - 15.7	13.7 - 22.5	16.8 - 42.0	20.0 - 65.3	22.0 - 94.3	26.3 - 57.4	30.8 - 70.2
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete		C20/25	zul V.	[kN]	6.0	9.2	13.7	23.5 - 25.2	28.0 - 39.4	30.8 - 56.8	34.5	42.0
Uncracked concrete		C20/25	zul V.	[kN]	6.0	9.2	13.7	25.2	39.4	44.1 - 56.8	34.5	42.0
Centre and edge distances												
Minimum component thickness $h_{ef,min}$ – $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270	116 - 356	134 - 444	152 - 536	168 - 600	190 - 670
Minimum centre distance			s_{min}	[mm]	40	50	60	75	95	115	125	140
Minimum edge distance			c_{min}	[mm]	35	40	45	50	60	65	75	80
Montagedaten												
Borehole diameter			d_0	[mm]	10	12	14	18	22	28	30	35
Through hole in the attachement part for push-fit installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Through hole in the attachement part for push-through installation			$d_f \leq$	[mm]	12	14	16	20	24	30	33	40
Borehole depth range for $h_{ef,min}$ – $h_{ef,max}$			h_0	[mm]	60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	108 - 540	120 - 600
Torque when anchoring			$T_{inst} \leq$	[Nm]	10	20	40 (FKL4. 6: 35)	60	100	170	250	300
Resin requuirement per 100mm drilling depth				[ml]	6.53	8.16	9.82	13.61	17.89	32.25	30.69	48.67

[1]) Max. Long-term temperature / max. short-term temperature.

Higher concrete strengths can lead to higher permissible loads. Manual cleaning or the use of a suction drill without subsequent cleaning can lead to lower loads. For further information, please refer to the European Technical Assessment ETA-23/0139.

If required: The practical design programme at www.sikla.com.



Chemical anchor VME plus

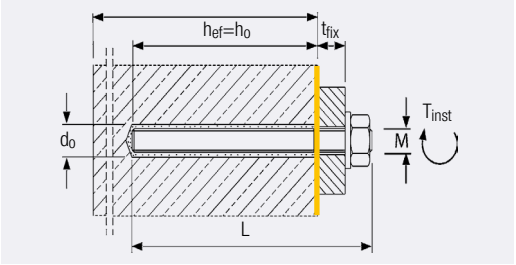
Extract from the conditions of use of the European Technical Assessment ETA-23/0138
Permissible loads in accordance with EN 1992-4 for a service life of up to 50 years without the influence of centre and edge distances in dry or damp concrete with compressed air cleaning in temperature range I -40°C to +24°C (briefly up to +40°C) and in temperature range II -40°C to +50°C (briefly up to +72°C). The influence of the permanent load with the factor γsus = 1.0 and the total safety factor (γM and γF) were taken into account. For further details and temperature ranges see ETA. For load-bearing capacities under fire exposure, see www.sikla.com.

Technical data					Anchor injection system VMH M8-M30							
Anchor rods					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Range of anchoring depth	$h_{ef,min}$ - $h_{ef,max}$			[mm]	**60 - 160**	**60 - 200**	**70 - 240**	**80 - 320**	**90 - 400**	**96 - 480**	**108 - 540**	**120 - 600**
Anchor injection system VME plus, anchor rod steel 5.8												
Permissible tensile load for $h_{ef,min}$ - $h_{ef,max}$												
Cracked concrete 24°C to 72°C		C20/25	zul N.	[kN]	5.0 - 8.6	6.3 - 13.8	9.6 - 20.0	11.7 - 37.1	14.0 - 58.1	15.4 - 83.8	18.4 - 109.5	21.6 - 133.3
Uncracked concrete 24°C to 72°C		C20/25	zul N.	[kN]	8.6	10.9 - 13.8	13.7 - 20.0	16.8 - 37.1	20.0 - 58.1	22.0 - 83.8	26.3 - 109.5	30.8 - 133.3
Permissible shear load for $h_{ef,min}$ - $h_{ef,max}$												
Cracked concrete 24°C to 72°C		C20/25	zul V.	[kN]	6.3	9.7	14.3	23.5 - 26.9	28.0 - 42.3	30.8 - 60.6	36.8 - 78.9	43.1 - 96.0
Uncracked concrete 24°C to 72°C		C20/25	zul V.	[kN]	6.3	9.7	14.3	26.9	40.0 - 42.3	44.1 - 60.6	52.6 - 78.9	61.6 - 96.0
Anchor injection system VME plus, anchor rod steel 8.8												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete 24°C/40°C		C20/25	zul N.	[kN]	5.0 - 13.4	6.3 - 20.9	9.6 - 31.9	11.7 - 59.5	14.0 - 93.3	15.4 - 134.3	18.4 - 175.2	21.6 - 213.8
Uncracked concrete24°C/40°C		C20/25	zul N.	[kN]	10.9 - 13.8	10.9 - 21.9	13.7 - 31.9	16.8 - 59.5	20.0 - 93.3	22.0 - 134.3	26.3 - 175.2	30.8 - 213.8
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete 24°C/40°C		C20/25	zul V.	[kN]	8.6	12.6 - 13.1	19.2 - 19.4	23.5 - 36.0	28.0 - 56.0	30.8 - 80.6	36.8 - 105.1	43.1 - 128.0
Uncracked concrete 24°C/40°C		C20/25	zul V.	[kN]	8.6	13.1	19.4	33.5 - 36.0	40.0 - 56.0	44.1 - 80.6	52.6 - 105.1	61.6 - 128.0
Anchor injection system VME plus, anchor rod stainless steel A4-70, HCR-70												
Permissible tensile load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete 24°C/40°C		C20/25	zul N.	[kN]	5.0 - 9.9	6.3 - 15.7	9.6 - 22.5	11.7 - 42.0	14.0 - 65.3	15.4 - 94.3	18.4 - 57.4	21.6 - 70.2
Uncracked concrete 24°C/40°C		C20/25	zul N.	[kN]	9.9	10.9 - 15.7	13.7 - 22.5	16.8 - 42.0	20.0 - 65.3	22.0 - 94.3	26.3 - 57.4	30.8 - 70.2
Permissible shear load for $h_{ef,min}$ – $h_{ef,max}$												
Cracked concrete 24°C/40°C		C20/25	zul V.	[kN]	6.0	9.2	13.7	23.5 - 25.2	28.0 - 39.4	30.8 - 56.8	34.5	42.0
Uncracked concrete 24°C/40°C		C20/25	zul V.	[kN]	6.0	9.2	13.7	25.2	39.4	44.1 - 56.8	34.5	42.0
Centre and edge distances												
Minimum component thickness $h_{ef,min}$ – $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270	116 - 356	134 - 444	152 - 536	168 - 600	190 - 670
Minimum centre distance			s_{min}	[mm]	40	50	60	75	95	115	125	140
Minimum edge distance			c_{min}	[mm]	35	40	45	50	60	65	75	80
Assembly data												
Borehole diameter			d_0	[mm]	10	12	14	18	22	28	30	35
Through hole in the attachement part for push-fit installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Through hole in the attachement part for push-through installation			$d_f \leq$	[mm]	12	14	16	20	24	30	33	40
Borehole depth range for $h_{ef,min}$ – $h_{ef,max}$			h_0	[mm]	60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	108 - 540	120 - 600
Torque when anchoring			$T_{inst} \leq$	[Nm]	10	20	40 (FKL4. 6: 35)	60	100	170	250	300
Resin requuirement per 100mm drilling depth				[ml]	6.53	8.16	9.82	13.61	17.89	32.25	30.69	48.70

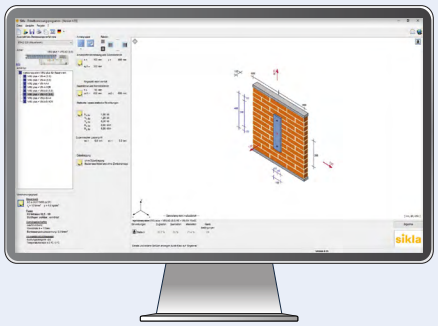
[1] Max. Long-term temperature / max. short-term temperature.

Higher concrete strengths can lead to higher permissible loads. Manual cleaning or the use of a suction drill without subsequent cleaning can lead to lower loads. For further information, please refer to the European Technical Assessment ETA-23/0138 .

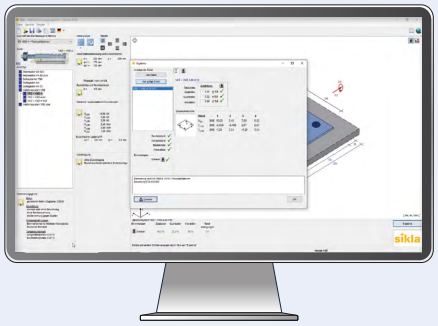
If required: The practical design programme at www.sikla.com.



- Intuitive user interface with clear input
- Calculation of near-edge fixings and anchor groups
- Design in accordance with the European Technical Assessments of Sikla products and the European Design Methods EN 1992-4, ETAG 001 Annex C, ETAG 029 Annex C, ETAG 001 Part 6, Technical Reports TR 020, TR 029, TR 045 and TR 061
- Detailed results display
- Comprehensible printout

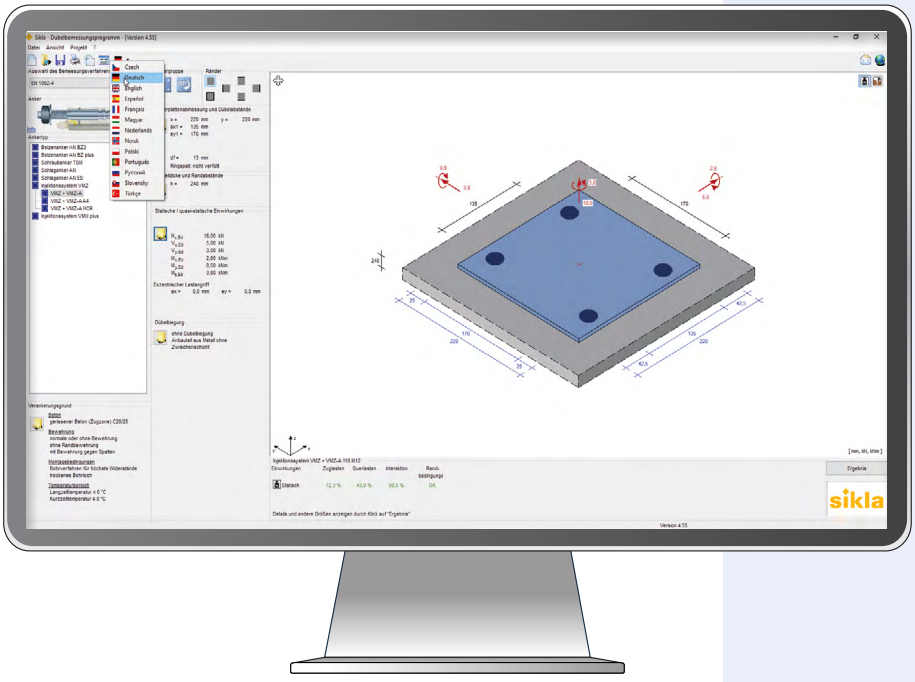


Design in masonry
Design of chemical Sikla anchors in masonry possible without problems



Result of dimensioning in concrete
Clear and detailed presentation of the result of the dimensioning

Surface of the Sikla Anchor measurement programme



Print preview of the results report

Optimised print display for passing on the design

Further information about our metal anchors can be found in a separate brochure.

sikla

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