Product Range
2023/24

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MKT was founded in 1990 as a manufacturer of high-quality, internationally approved fastening systems. In the year 1996 the Quality management system according to ISO 9001 was certified and in the years 2014 and 2015 the environmental management system according to ISO 14001 was added, the energy management system according to ISO 50001 and the occupational health and safety management system according to OHSAS 18001 were established.

In addition to the catalog range, MKT also supplies special anchor sizes and designs, such as custom solutions for tunnel construction as well as stainless steel anchors made of the materials 1.4529, 1.4571 and 1.4462 and some products with fractional thread.

MKT provides customer service on all technical questions.

NEW:

➔ Wedge Anchor BZ3 A4

The new Wedge Anchor BZ3 A4 has among the highest permissible loads of all Wedge Anchors on the market at minimum and standard anchorage depths, which can be further increased by setting deeper. This enables fastenings in the interior and exterior areas that were previously not possible with a Wedge Anchor.

➔ Wedge Anchor BZ3 dynamic A4

The new Wedge Anchor BZ3 dynamic A4 is an economical alternative to injection systems for fastenings under fatigue cyclic loading in interior and exterior areas.

➔ Concrete Screw BSZ2 A4

The new concrete screw BSZ2 A4 with cutting grooves at the screw tip and optimised thread geometry enables easier attachment and easier screwing into concrete.

➔ Asphalt Screw AS

The new Asphalt Screw AS is a problem solver for fastenings in asphalt for absorbing shock loads.

➔ Chemical Anchor VZ-IG

The Chemical Anchor VZ-IG extends the styrene-free Chemical Anchor VZ system to applications with internal threads. This enables a wide range of application and design options, even under high loads.

➔ UKTA Assessment

The UKTA Assessment has already been issued for
- Wedge anchor BZ plus
- Wedge anchor B
- Drop-in anchor E/ES
- Heavy duty anchor SZ and
- Injection system VMZ

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Anchor Selection

	Mechanical Heavy Duty Anchors																
	Wedge Anchor BZ3	Wedge Anchor BZ3 A4 / HCR	Wedge Anchor BZ3 dyn	Wedge Anchor BZ3 dyn A4	Wedge Anchor BZ plus / sh	Wedge Anchor BZ plus A4 / HCR	Wedge Anchor BZ-IG	Wedge Anchor BZ-IG A4/HCR	Wedge Anchor B	Wedge Anchor B feuerverz.	Wedge Anchor B A4 / HCR	Wedge Anchor B-IG / B-IG A4	Nail Anchor N, N-K	Nail Anchor N-M	Drop-in Anchor E, ES	Drop-in Anchor E A4 / E HCR	Hollow Core Anchor Easy / Easy A4
Cracked Concrete	●	●	●	●	●	●	●	●									
Non-cracked Concrete	●	●	●	●	●	●	●	●	●	●	●	●			●	●	
Multiple Use in Concrete[1]											●		●	●	●	●	
Pre-stressed Concrete Hollow Slabs															●		●
Hollow Brick																	
Solid Brick																	
Autoclaved aerated concrete																	
Drywall																	
Asphalt																	
ETA Assessment	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	
DIBT Approval																	●
Fire Resistant	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●
Fire Resistant in Tunnels		●				●							●				
UKTA Assessment	●	●			●	●	●	●	●	●	●				●	●	
ICC Approval																	
Approved for fatigue loading			●	●													
Approved for seismic action	●	●	●	●	●	●											
VdS	●				●	●	●	●						●	●	●	●
FM					●	●			●		●[3]				●	●	
Swiss Shock Approval	●				●	●	●	●									
Steel, Zinc Plated	●		●		●		●		●			●	●	●	●		●
Steel, Hot Dip Galvanized					●[2]					●							
Stainless Steel A4/316		●		●		●		●			●	●	●			●	●
Stainless Steel HCR, 1.4529		●[4]		●[4]		●		●			●		●			●	
Hollow drill bit	●	●	●	●	●	●	●	●	●	●	●				●	●	●
Design Software available	●	●	●	●	●	●	●	●	●	●	●	●			●	●	

[1] In cracked and non-cracked concrete
[2] Steel sherardized
[3] Stainless steel A4
[4] On demand
[5] Steel, zinc flake coated

							Chemical Anchors											Light Duty Anchors				
Highload Anchor SZ / SZ A4	Highload Anchor SLZ	Highload Anchor SL	Highload Anchor SL A4	Concrete Screw BSZ	Concrete Screw BSZ2 A4	Asphalt Screw AS	Injection System VMZ	Injection System VMZ-IG	Injection System VMZ dyn	Injection System VMH	Injection System VMU plus	Injection System VME plus	Injection System VM-EA	Chemical Anchor VZ	Chemical Anchor VZ-IG	Chemical Anchor V	Chemical Anchor V-IG	Nail Plug ND	Universal Plug UD	Nylon-Standard-Plug NSD	Safety Nail TDN	Drywall Plug GKD
●	●			●	●		●	●	●	●	●	●		●	●							
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Approvals and Certificates

European Technical Assessment (ETA) with CE marking.

National approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany.

Identifies anchors that are approved for fatigue loading.

Identifies anchors suitable for use under seismic loading.

The European Technical Assessment of the marked anchors has been supplemented for anchorage in concrete by the working life of 100 years. This makes it possible to design these fastening systems not only for a working life of 50 years, but also for 100 years.

Fire resistance tested according to standard temperature curve considering DIN EN 1363-1 and in dependence of TR 020. For anchors not suitable for tension zones, it has to be verified and assessed depending on the design situation if the design method stated in TR 020 can be applied. See also page 196-199.

Tested according to ZTV-tunnel temperature curve.
See also page 200-201.

Tested according to RWS-tunnel temperature curve.

National general construction technique permission by ‚Deutsches Institut für Bautechnik' in Berlin, Germany.

UKTA Assessment

ICC Evaluation Service listing, USA.

Shock approval by ‚Bundesamt für Bevölkerungsschutz' in Bern, Switzerland.

Factory Mutual (FM), U.S. approval for installation of sprinkler systems.

Suitable for installation of sprinkler systems as per requirements of VdS Schadenverhütung GmbH, Germany.

VdS Schadenverhütung GmbH, Germany, approval for installation of sprinkler systems.

NSF International certification for use in drinking water and food systems.

Indicate the emission-class after the French directive (No. 2011-321 from 2011/03/23) on the labeling of building products for their indoor air emissions. The emissions are rated on a scale of A+ (very low emissions) to C (high emissions).

Material sign for stainless steel (A4 grade 316 or HCR material 1.4529).

Indicates the anchors for which further steps of cleaning after the bore hole drilling can be omitted due to the usage of the Hollow drill bit SB.

Included in MKT Design-Software

Table of Contents

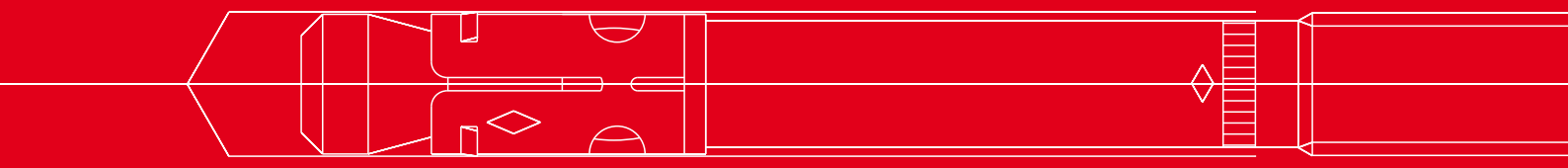
Mechanical Heavy Duty Anchors

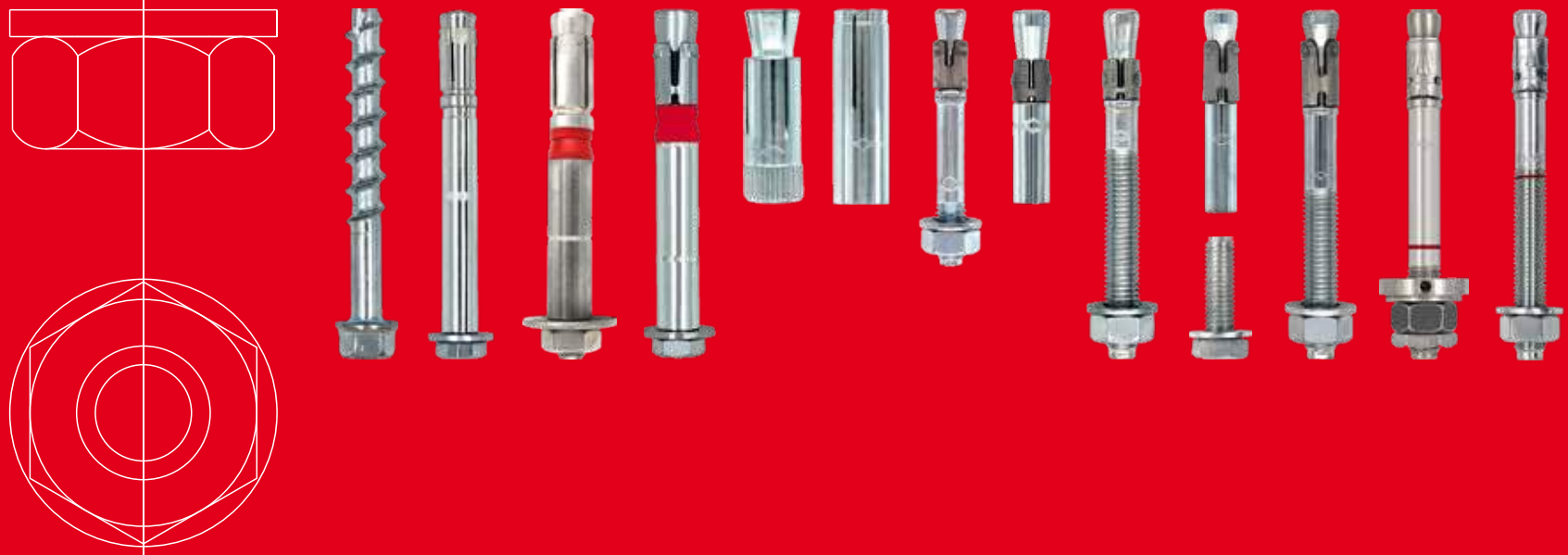
Chemical Anchors

Light Duty Anchors

Service

Mechanical Heavy Duty Anchors





Product Range 2023/24

Service | Light Duty Anchors | Chemical Anchors | Mechanical Heavy Duty Anchors

Wedge Anchor BZ3

Steel, zinc plated

Wedge Anchor BZ3

Range of Loading: **3,4 kN–34,3 kN**
Range of concrete quality: **C20/25–C50/60**

ETA-19/0619 SEISMIC R30 - R120 BBA UKTA - 22/6211 ZIVILSCHUTZ[1)]

Description

Through the combination of the highest approved tensile and shear loads with variable anchorage depths, the newly developed Wedge Anchor BZ3 with European Technical Assessment, sets standards in performance and flexibility of mechanical Expansion anchors.

In many cases, with the same setting depth as before, it allows higher loads, which can be further increased by deeper setting. This can save fixing points or fastenings can be realized, that have not been possible with a wedge anchor. However, setting with a reduced anchorage depth reduces drilling and setting effort and reduces the risk of reinforcement hits. The innovative calculation method in dependence of anchorage depth and concrete thickness, enables smallest spacing and edge distances for the respective application. This flexibility allows a perfect adaptation to the installation situation and allows more economical fastenings. By optimization of the material, the geometry and the manufacturing process, performance under the influence of earthquakes was significantly increased. Fewer turns until the tightening torque is reached and a colored marking of the minimum anchorage depth enable shorter processing times with higher installation safety.

The BZ3 Wedge Anchor also allows the optional use of the HM cap nut. The HM cap nut prevents, due to the closed form, injuries and allows new design possibilities for architecturally demanding applications.

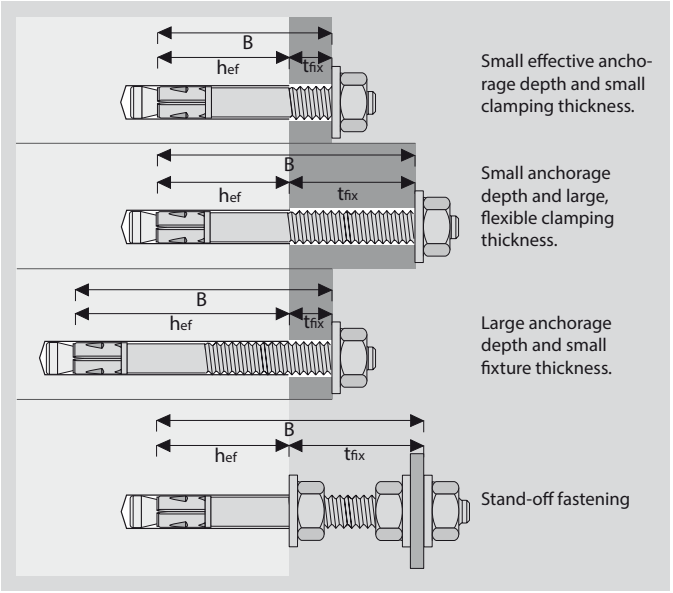
Advantages

- The Wedge Anchor with the highest approved loads and variable anchoring depths
- European Technical Assessment in cracked and non-crackend concrete (Option 1), under seismic action of category C1 and C2 and for use in fire (R30 - R120)
- For higher loads under seismic action, the annular gap between the Wedge Anchor BZ3 and the fixture can be filled with MKT adhesive, by using the Filling Washer VS
- Low minimum anchorage depths
- New calculation method in dependence of the anchorage depth and the thickness of the concrete component
- The high flexibility enables the optimal adaptation to the installation situation for maximum efficiency
- Extra short versions
- Fewer turns until the tightening torque is reached
- Coloured marking of the minimum anchorage depth
- Shock approval by the Swiss Federal Office for Civil Protection[1)]

Applications

Anchoring of medium to heavy loads in cracked and uncracked concrete: columns, steel beams, railings, cable routes, pipe routes, wooden constructions, consoles.
Fastenings in earthquake areas etc.

Examples of Installation BZ3:



[1)]From standard anchorage depth

Wedge Anchor BZ3

- Steel, zinc plated
- Approved for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.	Drill hole-Ø	Standard anchorage depth		Minimum anchorage depth		Variable anchorage depth				Seismic C1 / C2	Anchor length	Thread	Pkg. content	Weight per pkg.
			Fixture thickness	Anchorage depth	Fixture thickness	Anchorage depth	Usable length	Fixture thickness	Depth of drill hole	Setting depth					
		d_0 mm	$t_{fix,std}$ mm	$h_{ef,std}$ mm	$t_{fix,min}$ mm	$h_{ef,min}$ mm	B mm	t_{fix} mm	h_1 mm	h_{nom}		l mm	mm	pcs.	kg
BZ3 M8x60/0-5	20105001	8	-	-	5	35	40	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	- / -	60	M8x18	100	2,55
BZ3 M8x65/0-10	20110001	8	-	-	10	35	45	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	65	M8x23	100	2,71
BZ3 M8x75/0-20	20115001	8	10	45	20	35	55	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	75	M8x33	100	3,01
BZ3 M8x80/0-25	20125001	8	15	45	25	35	60	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	80	M8x38	100	3,17
BZ3 M8x95/0-40	20140001	8	30	45	40	35	75	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	95	M8x53	100	3,64
BZ3 M8x115/5-60	20150001	8	50	45	60	35	95	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	115	M8x73	100	4,36
BZ3 M8x165/55-110	20170001	8	100	45	110	35	145	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1)]	165	M8x123	50	2,96
BZ3 M10x70/0-10	20205001	10	-	-	10	40	50	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	70	M10x25	50	2,58
BZ3 M10x80/0-20	20210001	10	-	-	20	40	60	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	80	M10x35	50	2,80
BZ3 M10x90/0-30	20215001	10	10	60	30	40	70	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	90	M10x45	50	3,05
BZ3 M10x95/0-35	20220001	10	15	60	35	40	75	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	95	M10x50	50	3,16
BZ3 M10x100/0-40	20225001	10	20	60	40	40	80	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	100	M10x55	50	3,31
BZ3 M10x110/0-50	20230001	10	30	60	50	40	90	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	110	M10x65	50	3,55
BZ3 M10x130/10-70	20235001	10	50	60	70	40	110	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	130	M10x85	50	4,07
BZ3 M10x155/35-95	20250001	10	75	60	95	40	135	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	155	M10x110	50	4,73
BZ3 M10x180/60-120	20260001	10	100	60	120	40	160	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	180	M10x135	50	5,34
BZ3 M12x85/0-10	20305001	12	-	-	10	50	60	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	85	M12x29	25	2,16
BZ3 M12x95/0-20	20310001	12	-	-	20	50	70	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	95	M12x39	25	2,34
BZ3 M12x105/0-30	20313001	12	10	70	30	50	80	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	105	M12x49	25	2,53
BZ3 M12x110/0-35	20315001	12	15	70	35	50	85	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	110	M12x54	25	2,61
BZ3 M12x115/0-40	20320001	12	20	70	40	50	90	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	115	M12x59	25	2,69
BZ3 M12x125/0-50	20325001	12	30	70	50	50	100	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	125	M12x69	25	2,89
BZ3 M12x145/0-70	20330001	12	50	70	70	50	120	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	145	M12x89	25	3,24
BZ3 M12x160/10-85	20335001	12	65	70	85	50	135	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	160	M12x104	25	3,50
BZ3 M12x180/30-105	20340001	12	85	70	105	50	155	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	180	M12x124	25	3,86
BZ3 M12x200/50-125	20345001	12	105	70	125	50	175	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	200	M12x134	25	4,22
BZ3 M16x105/0-5	20505001	16	-	-	5	65	70	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	105	M16x29	20	3,62
BZ3 M16x115/0-15	20510001	16	-	-	15	65	80	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	115	M16x39	20	3,88
BZ3 M16x125/0-25	20515001	16	5	85	25	65	90	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	125	M16x49	20	4,14
BZ3 M16x135/0-35	20520001	16	15	85	35	65	100	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	135	M16x59	20	4,41
BZ3 M16x145/0-45	20525001	16	25	85	45	65	110	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	145	M16x69	20	4,65
BZ3 M16x170/0-70	20530001	16	50	85	70	65	135	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	170	M16x94	20	5,38
BZ3 M16x200/5-100	20535001	16	80	85	100	65	165	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	200	M16x124	10	3,08

[1)] Seismic C1 and C2 for anchorage depth $h_{ef} \geq 40$mm

Cap nut HM

- Steel zinc plated, extra high design
- For visually demanding requirements
- Protection against injuries

Description	Ref. No.	Thread	Cap nut height mm	Width across nut SW	Suitable for	Package content pcs.	Weight per pkg. kg
Cap nut HM M10	56102101	M10	22,0	17	BZ3 M10	20	0,48
Cap nut HM M12	56122101	M12	26,5	19	BZ3 M12	20	0,69

Wedge Anchor BZ3-U

- Steel, zinc plated
- With large washer DIN EN ISO 7093-1 (DIN 9021)
- Approved for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Minimum anchorage depth: Fixture thickness $t_{fix,min}$ mm	Minimum anchorage depth: Anchorage depth $h_{ef,min}$ mm	Variable anchorage depth: Usable length B mm	Variable anchorage depth: Fixture thickness t_{fix} mm	Variable anchorage depth: Depth of drill hole h_1 mm	Variable anchorage depth: Setting depth h_{nom}	Seismic C1 / C2	Anchor length l mm	Washer[2]	Thread mm	Pkg. content pcs.	Weight per pkg. kg
BZ3-U M8x65/0-10	20110301	8	-	-	10	35	45	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	65	24x2	M8x23	100	2,71
BZ3-U M8x75/0-20	20115301	8	10	45	20	35	55	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	75	24x2	M8x33	100	3,01
BZ3-U M8x80/0-25	20125301	8	15	45	25	35	60	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	80	24x2	M8x38	100	3,17
BZ3-U M10x70/0-10	20205301	10	-	-	10	40	50	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	70	30x2,5	M10x25	50	2,58
BZ3-U M10x80/0-20	20210301	10	-	-	20	40	60	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	80	30x2,5	M10x35	50	2,80
BZ3-U M10x90/0-30	20215301	10	10	60	30	40	70	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	90	30x2,5	M10x45	50	3,05
BZ3-U M10x95/0-35	20220301	10	15	60	35	40	75	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	95	30x2,5	M10x50	50	3,10
BZ3-U M10x100/0-40	20225301	10	20	60	40	40	80	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	100	30x2,5	M10x55	50	3,31
BZ3-U M10x110/0-50	20230301	10	30	60	50	40	90	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	110	30x2,5	M10x65	50	3,55
BZ3-U M10x130/10-70	20235301	10	50	60	70	40	110	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	130	30x2,5	M10x85	50	4,07
BZ3-U M12x85/0-10	20305301	12	-	-	10	50	60	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	85	37x3	M12x29	25	2,16
BZ3-U M12x95/0-20	20310301	12	-	-	20	50	70	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	95	37x3	M12x39	25	2,34
BZ3-U M12x105/0-30	20313301	12	10	70	30	50	80	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	105	37x3	M12x49	25	2,53
BZ3-U M12x115/0-40	20320301	12	20	70	40	50	90	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	115	37x3	M12x59	25	2,69
BZ3-U M12x125/0-50	20325301	12	30	70	50	50	100	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	125	37x3	M12x69	25	2,89
BZ3-U M16x145/0-45	20525301	16	25	85	45	65	110	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	145	50x3	M16x69	20	4,65
BZ3-U M16x170/0-70	20530301	16	50	85	70	65	135	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	170	50x3	M16x94	20	5,38

[1] Seismic C1 and C2 for anchorage depth $h_{ef} \geq 40$mm

[2] Outer diameter x thickness

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

ETA-19/0619

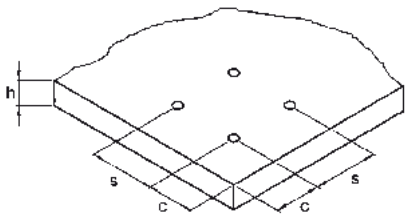
Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0619 for use in cracked and uncracked concrete (Option 1)

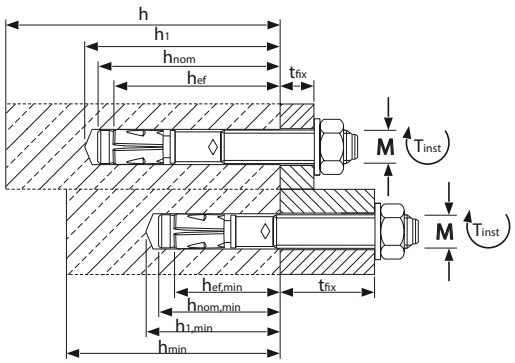
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

Loads and performance data	Wedge Anchor BZ3			M8			M10			M12			M16		
Minimum anchorage depth[1]	$h_{ef,min}$		[mm]	35			40			50			65		
Standard anchorage depth	$h_{ef,std}$		[mm]		45			60			70			85	
Maximum anchorage depth	$h_{ef,max}$		[mm]			90			100			125			160
									cracked concrete						
Mean ultimate loads, tension	C20/25	$N_{Ru,m}$	[kN]	10,0	12,2	-	16,4	21,6	-	18,0	27,0	-	29,4	43,9	-
Mean ultimate loads, shear	C20/25	$V_{Ru,m}$	[kN]	17,4	17,4	-	28,4	28,4	-	40,7	40,7	-	67,2	67,2	-
Approved loads, tension	C20/25	appr. N	[kN]	3,4	4,5	4,5	4,1	7,1	7,1	5,8	9,6	10,5	8,6	12,9	14,3
	C25/30	appr. N	[kN]	3,8	5,0	5,0	4,6	7,6	7,6	6,5	10,7	11,7	9,6	14,4	15,4
	C30/37	appr. N	[kN]	4,2	5,4	5,4	5,1	8,0	8,0	7,1	11,8	12,8	10,5	15,7	16,4
	C40/50	appr. N	[kN]	4,8	6,1	6,1	5,9	8,6	8,6	8,2	13,6	14,8	12,2	18,1	18,1
	C50/60	appr. N	[kN]	5,4	6,8	6,8	6,6	9,1	9,1	9,2	15,2	16,6	13,6	19,5	19,5
									uncracked concrete						
Approved loads, tension[1]	C20/25	appr. N	[kN]	4,9	6,7	6,7	5,9	10,9	11,4	8,3	13,7	14,3	12,3	18,4	23,8
	C25/30	appr. N	[kN]	5,4	7,4	7,4	6,6	12,2	12,6	9,3	15,3	16,0	13,7	20,5	24,9
	C30/37	appr. N	[kN]	5,9	8,1	8,1	7,3	13,3	13,7	10,1	16,8	17,5	15,0	22,5	25,9
	C40/50	appr. N	[kN]	6,9	9,4	9,4	8,4	14,5	14,5	11,7	19,4	20,2	17,4	26,0	27,4
	C50/60	appr. N	[kN]	7,7	9,4	9,4	9,4	14,5	14,5	13,1	21,4	21,4	19,4	28,7	28,7
									cracked concrete						
Approved loads, shear	C20/25	appr. V	[kN]	9,0	9,0	9,0	12,9	15,3	15,3	17,4	21,9	21,9	30,9	34,3	34,3
	≥ C25/30	appr. V	[kN]	9,0	9,0	9,0	14,4	15,3	15,3	19,4	21,9	21,9	34,3	34,3	34,3
									uncracked concrete						
Approved loads, shear	C20/25	appr. V	[kN]	9,0	9,0	9,0	15,3	15,3	15,3	21,9	21,9	21,9	34,3	34,3	34,3
	≥ C25/30	appr. V	[kN]	9,0	9,0	9,0	15,3	15,3	15,3	21,9	21,9	21,9	34,3	34,3	34,3
Approved bending moments		appr. M	[Nm]	17,1	17,1	17,1	34,3	34,3	34,3	60,0	60,0	60,0	137,1	137,1	137,1
Spacing and edge distance[2]															
Effective anchorage depth		h_{ef}	[mm]	35	45	90	40	60	100	50	70	125	65	85	160
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	135	80	90	150	100	105	187,5	120	127,5	240
Minimum spacing		s_{min}	[mm]	35	35	35	40	40	40	50	50	50	65	65	65
Minimum edge distance		c_{min}	[mm]	40	40	40	45	45	45	55	55	55	65	65	65
Installation parameters															
Drill hole diameter		d_o	[mm]	8	8	8	10	10	10	12	12	12	16	16	16
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	9	9	9	12	12	12	14	14	14	18	18	18
Drill hole depth		h_1	[mm]	45	55	100	51	71	111	63	83	138	82	102	177
Installation torque		T_{inst}	[Nm]	15	15	15	40	40	40	60	60	60	110	110	110
Width across nut		SW	[mm]	13	13	13	17	17	17	19	19	19	24	24	24
Height of hexagon nut			[mm]	6,5	6,5	6,5	8	8	8	10	10	10	13	13	13
High of the Cap nut			[mm]	-	-	-	22	22	22	26,5	26,5	26,5	-	-	-
Outer diameter x washer thickness BZ3			[mm]	16x1,6	16x1,6	16x1,6	20x2	20x2	20x2	24x2,5	24x2,5	24x2,5	30x3	30x3	30x3
Outer diameter x washer thickness BZ3-U			[mm]	24x2	24x2	24x2	30x2,5	30x2,5	30x2,5	37x3	37x3	37x3	50x3	50x3	50x3

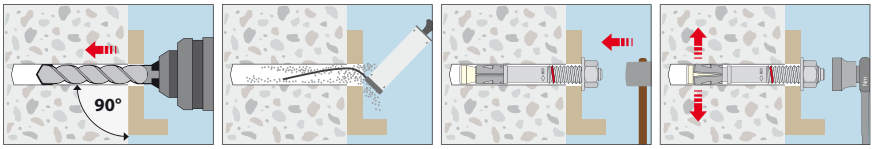
[1]Fastenings with anchorage depths h_{ef} < 40mm are constricted to use of statically indeterminate components under indoor conditions

[2]For anchor groups and near-edge anchorages, the minimum values of thickness, spacing and edge distance cannot be applied simultaneously but have to be determined according to ETA-19/0619, Table B2.





Installation



Wedge Anchor BZ3 A4

Stainless steel A4

NEW

Wedge Anchor BZ3 A4

Range of Loading: **3,4 kN–39,7 kN**
Range of concrete quality: **C20/25–C50/60**

Description

Through the combination of the highest approved tensile and shear loads with variable anchorage depths, the newly developed Wedge Anchor BZ3 A4 with European Technical Assessment, sets standards in performance and flexibility of mechanical Expansion anchors.

In many cases, with the same setting depth as before, it allows higher loads, which can be further increased by deeper setting. This can save fixing points or fastenings can be realized, that have not been possible with a wedge anchor. However, setting with a reduced anchorage depth reduces drilling and setting effort and reduces the risk of reinforcement hits. The innovative calculation method in dependence of anchorage depth and concrete thickness, enables smallest spacing and edge distances for the respective application. This flexibility allows a perfect adaptation to the installation situation and allows more economical fastenings. By optimization of the material, the geometry and the manufacturing process, performance under the influence of earthquakes was significantly increased. Fewer turns until the tightening torque is reached and a colored marking of the minimum anchorage depth enable shorter processing times with higher installation safety.

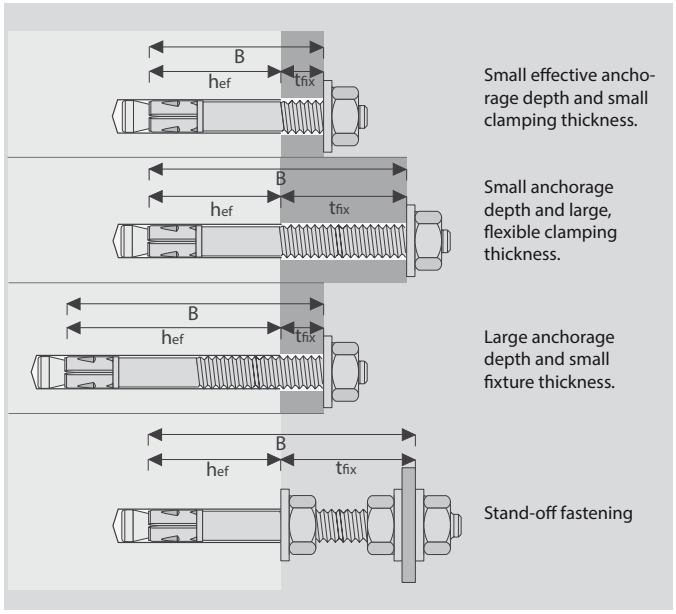
Advantages

- The Wedge Anchor with the highest approved loads and variable anchoring depths
- European Technical Assessment in cracked and non-crackend concrete (option 1), under seismic action of category C1 and C2 and for use in fire (R30 - R120)
- For higher loads under seismic action, the annular gap between the Wedge Anchor BZ3 A4 and the fixture can be filled with adhesive, by using the Filling Washer VS A4
- Low minimum anchorage depths
- New calculation method in dependence of the anchorage depth and the thickness of the concrete component
- The high flexibility enables the optimal adaptation to the installation situation for maximum efficiency
- Extra short versions
- Fewer turns until the tightening torque is reached
- Coloured marking of the minimum anchorage depth
- Shock approval by „Bundesamt für Bevölkerungsschutz“ in Bern, Switzerland[1)]

Applications

Anchoring of medium to heavy loads in cracked and non-cracked concrete: columns, steel beams, railings, cable routes, pipe routes, wooden constructions, consoles, facades.
Fastenings in earthquake areas etc.

Examples of Installation BZ3 A4:



Wedge Anchor BZ3 A4

- Stainless steel A4
- Approved for cracked and non-cracked concrete
- Variable anchorage depths

NEW

Description	Ref. No.	Drill hole-Ø	Standard anchorage depth		Minimum anchorage depth		Variable anchorage depth				Seismic C1 / C2	Anchor length	Thread	Pkg. content	Weight per pkg.
		d_0 mm	Fixture thickness $t_{fix,std}$ mm	Anchorage depth $h_{ef,std}$ mm	Fixture thickness $t_{fix,min}$ mm	Anchorage depth $h_{ef,min}$ mm	Usable length B mm	Fixture thickness t_{fix} mm	Depth of drill hole h_1 mm	Setting depth h_{nom}		l mm	mm	pcs.	kg
BZ3 M8x60/0-5 A4	19105001	8	-	-	5	35	40	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	- / -	60	M8x18	100	2,57
BZ3 M8x65/0-10 A4	19110001	8	-	-	10	35	45	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	65	M8x23	100	2,73
BZ3 M8x75/0-20 A4	19115001	8	10	45	20	35	55	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	75	M8x33	100	3,05
BZ3 M8x80/0-25 A4	19125001	8	15	45	25	35	60	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	80	M8x38	100	3,22
BZ3 M8x95/0-40 A4	19140001	8	30	45	40	35	75	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	95	M8x53	100	3,68
BZ3 M8x115/5-60 A4	19150001	8	50	45	60	35	95	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	115	M8x73	100	4,41
BZ3 M8x165/55-110 A4	19170001	8	100	45	110	35	145	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	165	M8x123	50	3,00
BZ3 M10x70/0-10 A4	19205001	10	-	-	10	40	50	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	70	M10x25	50	2,64
BZ3 M10x80/0-20 A4	19210001	10	-	-	20	40	60	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	80	M10x35	50	2,82
BZ3 M10x90/0-30 A4	19215001	10	10	60	30	40	70	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	90	M10x45	50	3,13
BZ3 M10x95/0-35 A4	19220001	10	15	60	35	40	75	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	95	M10x50	50	3,19
BZ3 M10x100/0-40 A4	19225001	10	20	60	40	40	80	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	100	M10x55	50	3,13
BZ3 M10x110/0-50 A4	19230001	10	30	60	50	40	90	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	110	M10x65	50	3,60
BZ3 M10x130/10-70 A4	19235001	10	50	60	70	40	110	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	130	M10x85	50	4,09
BZ3 M10x155/35-95 A4	19250001	10	75	60	95	40	135	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	155	M10x110	50	4,82
BZ3 M10x180/60-120 A4	19260001	10	100	60	120	40	160	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	180	M10x135	50	5,41
BZ3 M12x85/0-10 A4	19305001	12	-	-	10	50	60	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	85	M12x29	25	2,17
BZ3 M12x95/0-20 A4	19310001	12	-	-	20	50	70	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	95	M12x39	25	2,36
BZ3 M12x105/0-30 A4	19313001	12	10	70	30	50	80	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	105	M12x49	25	2,55
BZ3 M12x110/0-35 A4	19315001	12	15	70	35	50	85	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	110	M12x54	25	2,65
BZ3 M12x115/0-40 A4	19320001	12	20	70	40	50	90	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	115	M12x59	25	2,71
BZ3 M12x125/0-50 A4	19325001	12	30	70	50	50	100	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	125	M12x69	25	2,91
BZ3 M12x145/0-70 A4	19330001	12	50	70	70	50	120	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	145	M12x89	25	3,28
BZ3 M12x160/10-85 A4	19335001	12	65	70	85	50	135	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	160	M12x104	25	3,55
BZ3 M12x180/30-105 A4	19340001	12	85	70	105	50	155	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	180	M12x124	25	3,91
BZ3 M12x200/50-125 A4	19345001	12	105	70	125	50	175	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	200	M12x134	25	4,27
BZ3 M16x115/0-15 A4	19510001	16	-	-	15	65	80	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	115	M16x39	20	3,91
BZ3 M16x125/0-25 A4	19515001	16	5	85	25	65	90	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	125	M16x49	20	4,18
BZ3 M16x135/0-35 A4	19520001	16	15	85	35	65	100	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	135	M16x59	20	4,44
BZ3 M16x145/0-45 A4	19525001	16	25	85	45	65	110	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	145	M16x69	20	4,71
BZ3 M16x170/0-70 A4	19530001	16	50	85	70	65	135	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	170	M16x94	20	5,43
BZ3 M16x200/5-100 A4	19535001	16	80	85	100	65	165	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	200	M16x124	10	3,11

[1] Seismic C1 and C2 for anchorage depth $h_{ef} \geq 40$mm

BZ3 HCR on demand

Hutmutter HM A4

- Stainless steel A4, extra high design
- For visually demanding requirements
- Protection against injuries

NEW

Description	Ref. No.	Thread	Cap nut hight	Width across nut	Suitable for	Package content	Weight per pkg.
			mm	SW		pcs	kg
Hutmutter HM M10 A4	56102501	M10	22,5	17	BZ3 M10 A4	20	0,52
Hutmutter HM M12 A4	56122501	M12	26,5	19	BZ3 M12 A4	20	0,73

Wedge Anchor BZ3 A4

- Stainless steel A4
- With large washer DIN EN ISO 7093-1 (DIN 9021)
- Approved for cracked and non-cracked concrete
- Variable anchorage depths

NEW

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Minimum anchorage depth: Fixture thickness $t_{fix,min}$ mm	Minimum anchorage depth: Anchorage depth $h_{ef,min}$ mm	Variable anchorage depth: Usable length B mm	Variable anchorage depth: Fixture thickness t_{fix} mm	Variable anchorage depth: Depth of drill hole h_1 mm	Variable anchorage depth: Setting depth h_{nom}	Seismic C1 / C2	Anchor length l mm	Washer[2]	Thread mm	Pkg. content pcs.	Weight per pkg. kg
BZ3-U M8x75/0-20 A4	19115301	8	10	45	20	35	55	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	75	24x2	M8x33	100	3,49
BZ3-U M8x80/0-25 A4	19125301	8	15	45	25	35	60	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	80	24x2	M8x38	100	3,66
BZ3-U M8x95/0-40 A4	19140301	8	30	45	40	35	75	B -h_{ef}	h_{ef} + 10	h_{ef} + 8	✓ / ✓[1]	95	24x2	M8x53	100	4,12
BZ3-U M10x90/0-30 A4	19215301	10	10	60	30	40	70	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	90	30x2,5	M10x45	50	3,56
BZ3-U M10x95/0-35 A4	19220301	10	15	60	35	40	75	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	95	30x2,5	M10x50	50	3,62
BZ3-U M10x110/0-50 A4	19230301	10	30	60	50	40	90	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	110	30x2,5	M10x65	50	4,03
BZ3-U M10x130/10-70 A4	19235301	10	50	60	70	40	110	B -h_{ef}	h_{ef} + 11	h_{ef} + 9	✓ / ✓	130	30x2,5	M10x85	50	4,52
BZ3-U M12x110/0-35 A4	19315301	12	15	70	35	50	85	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	110	37x3	M12x54	25	3,05
BZ3-U M12x125/0-50 A4	19325301	12	30	70	50	50	100	B -h_{ef}	h_{ef} + 13	h_{ef} + 10	✓ / ✓	125	37x3	M12x69	25	3,31
BZ3-U M16x145/0-45 A4	19525301	16	25	85	45	65	110	B -h_{ef}	h_{ef} + 17	h_{ef} + 14	✓ / ✓	145	50x3	M16x69	20	5,23

[1] Seismic C1 and C2 for anchorage depth $h_{ef} \geq 40$mm [2] Outer diameter x height BZ3-U HCR on demand.

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

ETA-19/0619

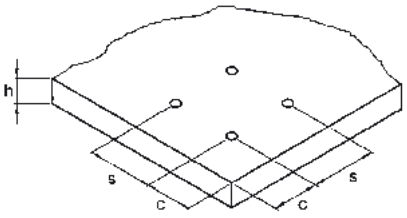
Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0619 for use in cracked and uncracked concrete (Option 1)

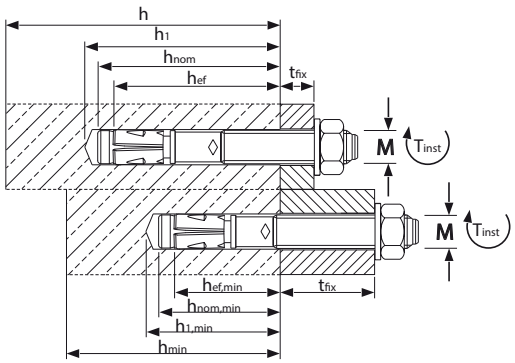
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F). Load capacities under fire exposure see page 196.

Loads and performance data	Wedge Anchor BZ3 A4			M8			M10			M12			M16		
Minimum anchorage depth[1]		$h_{ef,min}$	[mm]	35			40			50			65		
Standard anchorage depth		$h_{ef,std}$	[mm]		45			60			70			85	
Maximum anchorage depth		$h_{ef,max}$	[mm]			90			100			125			160
									cracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	3,4	4,5	4,5	4,1	7,6	8,1	5,8	9,6	10,5	8,6	12,9	16,7
	C25/30	appr. N	[kN]	3,8	5,0	5,0	4,6	8,5	9,1	6,5	10,7	11,5	9,6	14,4	18,0
	C30/37	appr. N	[kN]	4,2	5,5	5,5	5,1	9,3	9,9	7,1	11,8	12,5	10,5	15,7	19,2
	C40/50	appr. N	[kN]	4,8	6,3	6,3	5,9	10,8	11,4	8,2	13,6	14,2	12,2	18,2	21,2
	C50/60	appr. N	[kN]	5,4	7,1	7,1	6,6	12,0	12,8	9,2	15,2	15,6	13,6	20,3	23,0
									non-cracked concrete						
Approved loads, tension[1]	C20/25	appr. N	[kN]	4,9	7,1	9,4	5,9	10,9	11,9	8,3	13,7	20,0	12,3	18,4	23,8
	C25/30	appr. N	[kN]	5,4	7,9	9,4	6,6	12,2	12,9	9,3	15,3	21,0	13,7	20,5	24,9
	C30/37	appr. N	[kN]	5,9	8,7	9,4	7,3	13,3	13,8	10,1	16,8	21,4	15,0	22,5	25,8
	C40/50	appr. N	[kN]	6,9	9,4	9,4	8,4	14,5	14,5	11,7	19,4	21,4	17,4	26,0	27,3
	C50/60	appr. N	[kN]	7,7	9,4	9,4	9,4	14,5	14,5	13,1	21,4	21,4	19,4	28,5	28,5
									cracked concrete						
Approved loads, shear	C20/25	appr. V	[kN]	9,2	9,6	9,6	11,6	15,9	15,9	19,1	22,7	22,7	29,2	39,7	39,7
	≥ C25/30	appr. V	[kN]	9,6	9,6	9,6	13,0	15,9	15,9	21,4	22,7	22,7	32,7	39,7	39,7
									non-cracked concrete						
Approved loads, shear	C20/25	appr. V	[kN]	9,6	9,6	9,6	15,9	15,9	15,9	22,7	22,7	22,7	39,7	39,7	39,7
	≥ C25/30	appr. V	[kN]	9,6	9,6	9,6	15,9	15,9	15,9	22,7	22,7	22,7	39,7	39,7	39,7
Approved bending moments		appr. M	[Nm]	15,4	15,4	15,4	31,4	31,4	31,4	56,6	56,6	56,6	127,4	127,4	127,4
Spacing and edge distance[2]															
Effective anchorage depth		h_{ef}	[mm]	35	45	90	40	60	100	50	70	125	65	85	160
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	135	80	90	150	100	105	187,5	120	127,5	240
Minimum spacing		s_{min}	[mm]	35	35	35	40	40	40	50	50	50	65	65	65
Minimum edge distance		c_{min}	[mm]	40	40	40	45	45	45	55	55	55	65	65	65
Installation parameters															
Drill hole diameter		d_o	[mm]	8	8	8	10	10	10	12	12	12	16	16	16
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	9	9	9	12	12	12	14	14	14	18	18	18
Drill hole depth		h_1	[mm]	45	55	100	51	71	111	63	83	138	82	102	177
Installation torque		T_{inst}	[Nm]	15	15	15	40	40	40	55	55	55	100	100	100
Width across nut		SW	[mm]	13	13	13	17	17	17	19	19	19	24	24	24
Height of hexagon nut			[mm]	6,5	6,5	6,5	8	8	8	10	10	10	13	13	13
High of the Cap nut HM A4			[mm]	-	-	-	22	22	22	26,5	26,5	26,5	-	-	-
Outer diameter x Washer height BZ3 A4			[mm]	16x1,6	16x1,6	16x1,6	20x2	20x2	20x2	24x2,5	24x2,5	24x2,5	30x3	30x3	30x3
Outer diameter x Washer height BZ3-U A4			[mm]	24x2	24x2	24x2	30x2,5	30x2,5	30x2,5	37x3	37x3	37x3	50x3	50x3	50x3

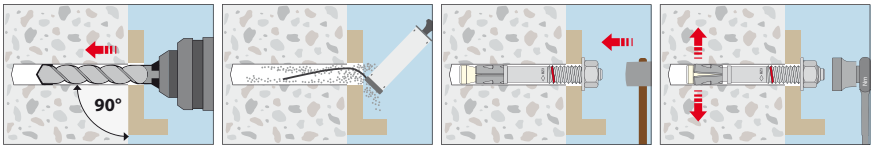
[1] Fastenings with anchorage depths h_{ef} < 40mm are constricted to use of statically indeterminate components under indoor conditions.

[2] For anchor groups and near-edge anchorages, the minimum values of thickness, spacing and edge distance cannot be applied simultaneously but have to be determined according to ETA-19/0619, Table B2.





Installation



Wedge Anchor BZ3 dynamic

Steel, zinc plated

Wedge Anchor BZ3 dynamic

Range of Loading: **0,9 kN – 7,2 kN**
Range of concrete quality: **C20/25–C50/60**

ETA-20/0117 ETA-19/0619 DYNAMIC SEISMIC C1 + C2 R30 - R120

Description

The new Wedge Anchor BZ3 dynamic is the first mechanical expansion anchor with ETA for fatigue cyclic loading. It can be used in through-setting and pre-setting installation. The red color marking makes it easy to visually check the required anchorage depth. To fill the annular gap between the attachment and the Wedge Anchor BZ3 dynamic, the mortar is injected through the hole in the filling washer using a reducing adapter on the static mixer.

The quick and easy installation of the Wedge Anchor BZ3 dynamic significantly improves the economic efficiency and makes it the ideal anchor for the fastening of light to medium fatigue cyclic loads.

Advantages

- European Technical Assessment in cracked and uncrackend concrete under fatigue loading
- Approved also for use under seismic loading, performance categories C1 and C2 and under fire exposure (R30-R120)
- Quick and easy installation, immediately statically loadable
- Coloured marking of the minimum anchorage depth
- Through-setting and pre-setting installation for flexible application
- When using the hollow drill bit SB, the subsequent cleaning of the borehole can be omitted and the development of drilling dust is avoided
- Very low anchorage depths and minimum component thicknesses
- Small spacings and edge distances
- Economical alternative to injection- and undercutting systems

Applications

Fastening of light to medium fatigue cyclic loads in cracked and uncracked concrete: crane systems, industrial robots, elevator guides, conveyor systems, etc.

Wedge Anchor BZ3 dynamic

- Steel, zinc plated
- Approved for loads with fatigue cyclic loading
- There are 5 mixer tips per 25-pack and 2 mixer tips per 10-pack in each assembly package

Description	Ref. No.	Fixture thickness		Anchorage depth	Drill hole-Ø	Depth of drill hole	Bohrlochtiefe durch Anbauteil	Anchor length	Thread	Pkg. content	Weight per pkg.	Amount of adhesive per anchor[1]
		$t_{fix,min}$ mm	$t_{fix,max}$ mm	h_{ef} mm	d_0 mm	$h_1 \geq$ mm	h_d mm	l mm	mm	pcs.	kg	ml
BZ3 dyn M10x100/5-10	18210001	5	10	60	10	71	81	100	M10x26	25	2,07	2,7
BZ3 dyn M10x120/10-30	18220001	10	30	60	10	71	101	120	M10x31	25	2,33	3,8
BZ3 dyn M10x140/30-50	18230001	30	50	60	10	71	121	140	M10x51	25	2,64	4,9
BZ3 dyn M12x115/6-10	18310001	6	10	70	12	83	93	115	M12x31	25	3,17	2,9
BZ3 dyn M12x135/10-30	18320001	10	30	70	12	83	113	135	M12x35	25	3,73	4,3
BZ3 dyn M12x155/30-50	18330001	30	50	70	12	83	133	155	M12x55	25	4,01	5,7
BZ3 dyn M16x155/8-25	18520001	8	25	85	16	102	127	155	M16x37	10	2,77	4,7
BZ3 dyn M16x180/25-50	18530001	25	50	85	16	102	152	180	M16x54	10	3,17	7,2

[1] Injection Cartridge VMH for annular gap filling see page 116

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

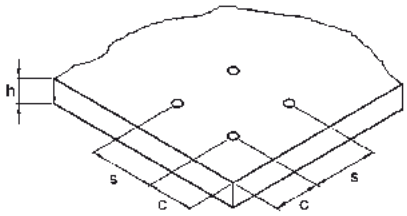
Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

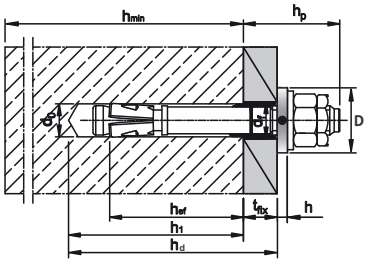
ETA-20/0117

Extract from Permissible Service Conditions of European Technical Assessment ETA-20/0117 for use under fatigue cyclic loading in cracked and uncracked concrete

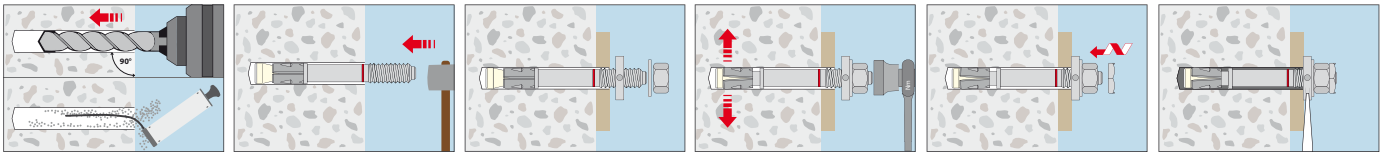
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

Loads and performance data	Wedge Anchor BZ3 dynamic		M10	M12	M16
Single fixing				cracked and uncracked concrete	
Approved loads, tension	≥ C20/25 appr. N	[kN]	3,4	4,6	7,2
Approved loads, shear	≥ C20/25 appr. V	[kN]	1,9	3,0	5,6
Multiple use (per anchor)				cracked and uncracked concrete	
Approved loads, tension	≥ C20/25 appr. N	[kN]	1,7	2,3	3,6
Approved loads, shear	≥ C20/25 appr. V	[kN]	0,9	1,5	2,8
Spacing and edge distance					
Effective anchorage depth	h_{ef}	[mm]	60	70	85
Minimum thickness of concrete slab	h_{min}	[mm]	90	105	127,5
Minimum spacing	s_{min}	[mm]	40	50	65
Minimum edge distance	c_{min}	[mm]	45	55	65
Installation parameters					
Drill hole diameter	d_o	[mm]	10	12	16
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	12	14	18
Drill hole depth	$h_1 \geq$	[mm]	71	83	102
Installation torque	T_{inst}	[Nm]	40	60	110
Width across nut	SW	[mm]	17	19	24
Outer diameter x thickness of filling washer	D x h	[mm]	26x5	28x5	34x5
Overstand	h_p	[mm]	21,5 + t_{fix}	25,5 + t_{fix}	29,5 + t_{fix}

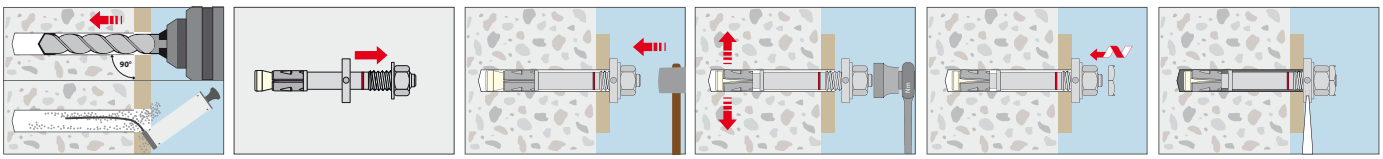




Pre-setting installation



Through-setting installation



Wedge Anchor BZ3 dynamic A4

Stainless steel A4

NEW

Wedge Anchor BZ3 dynamic A4

Range of Loading: **0,55 kN– 6,8 kN**
Range of concrete quality: **C20/25–C50/60**

ETA-20/0117 ETA-19/0619 DYNAMIC SEISMIC C1 + C2 R30 - R120 EDELSTAHL Rost frei

Description

The new Wedge Anchor BZ3 dynamic A4 in stainless steel is the first mechanical expansion anchor with ETA for fatigue cyclic loading. It can be used in through-setting and pre-setting installation. The red color marking makes it easy to visually check the required anchorage depth. To fill the annular gap between the attachment and the Wedge Anchor BZ3 dynamic A4, the mortar is injected through the hole in the filling washer using a reducing adapter on the static mixer.

The quick and easy installation of the Wedge Anchor BZ3 dynamic A4 significantly improves the economic efficiency and makes it the ideal anchor for the fastening of light to medium fatigue cyclic loads.

Advantages

- European Technical Assessment in cracked and uncrackend concrete under fatigue loading
- Approved also for use under seismic loading, performance categories C1 and C2 and under fire exposure (R30-R120)
- Quick and easy installation, immediately statically loadable
- Coloured marking of the minimum anchorage depth
- Through-setting and pre-setting installation for flexible application
- When using the hollow drill bit SB, the subsequent cleaning of the borehole can be omitted and the development of drilling dust is avoided
- Very low anchorage depths and minimum component thicknesses
- Small spacings and edge distances
- Economical alternative to injection- and undercutting systems

Applications

Fastening of light to medium fatigue cyclic loads in cracked and uncracked concrete, as well as indoors and outdoors: crane systems, industrial robots, elevator guides, antenna masts, conveyor systems, as well as tunnel fixings such as railings, signs, lights, etc.

Wedge Anchor BZ3 dynamic A4

- Stainless steel A4
- Approved for loads with fatigue cyclic loading
- There are 5 mixer tips per 25-pack and 2 mixer tips per 10-pack in each assembly package

NEW

Description	Ref. No.	Fixture thickness		Anchorage depth	Drill hole-Ø	Depth of drill hole	Bohrlochtiefe durch Anbauteil	Anchor length	Thread	Pkg. content	Weight per pkg.	Amount of adhesive per anchor[1]
		$t_{fix,min}$ mm	$t_{fix,max}$ mm	h_{ef} mm	d_0 mm	$h_1 \geq$ mm	h_d mm	l mm	mm	pcs.	kg	ml
BZ3 dyn M10x100/5-10 A4	18210501	5	10	60	10	71	81	100	M10x26	25	2,07	2,7
BZ3 dyn M10x120/10-30 A4	18220501	10	30	60	10	71	101	120	M10x31	25	2,33	3,8
BZ3 dyn M10x140/30-50 A4	18230501	30	50	60	10	71	121	140	M10x51	25	2,64	4,9
BZ3 dyn M12x115/6-10 A4	18310501	6	10	70	12	83	93	115	M12x31	25	3,17	2,9
BZ3 dyn M12x135/10-30 A4	18320501	10	30	70	12	83	113	135	M12x35	25	3,73	4,3
BZ3 dyn M12x155/30-50 A4	18330501	30	50	70	12	83	133	155	M12x55	25	4,01	5,7
BZ3 dyn M16x155/8-25 A4	18520501	8	25	85	16	102	127	155	M16x37	10	2,77	4,7
BZ3 dyn M16x180/25-50 A4	18530501	25	50	85	16	102	152	180	M16x54	10	3,17	7,2

BZ3 dynamic HCR on demand.

[1] Injection Cartridge VMH for annular gap filling see page 116

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

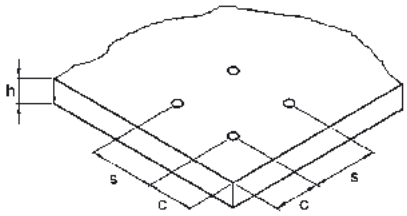
Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

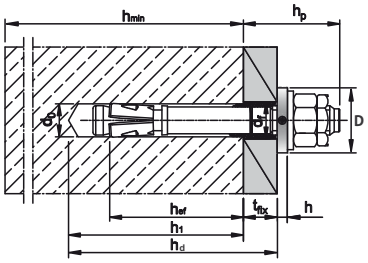
ETA-20/0117

Extract from Permissible Service Conditions of European Technical Assessment ETA-20/0117 for use under fatigue cyclic loading in cracked and uncracked concrete

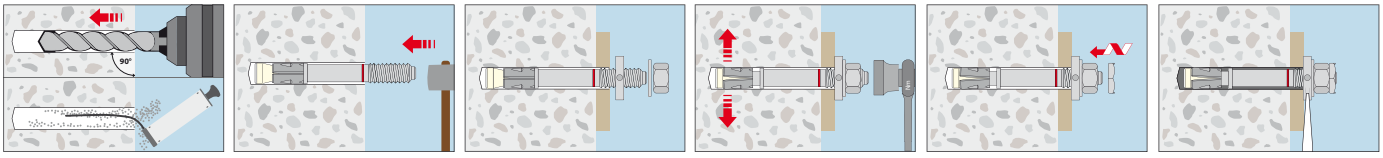
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

Loads and performance data	Wedge Anchor BZ3 dynamic A4			M10	M12	M16
Single fixing					cracked and uncracked concrete	
Approved loads, tension	≥ C20/25	appr. N	[kN]	2,4	3,9	6,8
Approved loads, shear	≥ C20/25	appr. V	[kN]	1,1	2,1	4,4
Multiple use (per anchor)					cracked and uncracked concrete	
Approved loads, tension	≥ C20/25	appr. N	[kN]	1,2	1,96	3,4
Approved loads, shear	≥ C20/25	appr. V	[kN]	0,55	1,04	2,2
Spacing and edge distance						
Effective anchorage depth		h_{ef}	[mm]	60	70	85
Minimum thickness of concrete slab		h_{min}	[mm]	90	105	127,5
Minimum spacing		s_{min}	[mm]	40	50	65
Minimum edge distance		c_{min}	[mm]	45	55	65
Installation parameters						
Drill hole diameter		d_o	[mm]	10	12	16
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	12	14	18
Drill hole depth		$h_1 \geq$	[mm]	71	83	102
Installation torque		T_{inst}	[Nm]	40	55	100
Width across nut		SW	[mm]	17	19	24
Outer diameter x thickness of filling washer		D x h	[mm]	26x5	28x5	34x5
Overstand		h_p	[mm]	21,5 + t_{fix}	25,5 + t_{fix}	29,5 +t_{fix}

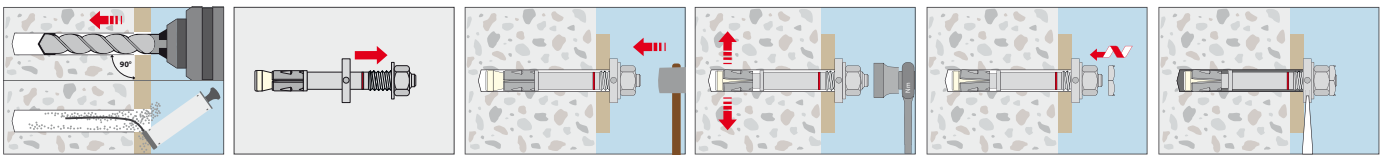




Pre-setting installation



Through-setting installation



Wedge Anchor BZ plus

Steel, zinc plated

Wedge Anchor BZ plus s

Wedge Anchor BZ plus

Wedge Anchor BZ-U plus /
Wedge Anchor BZ-UH plus

Wedge Anchor BZ plus
M24/M27

ETA-99/0010 · SEISMIC[1] · R30-R120 · BBA UKTA - 22/6212 · ZIVILSCHUTZ[1] · FM APPROVED M10-M16 · M8-M16

Range of Loading: **2,4 kN–96,8 kN**
Range of concrete quality: **C20/25–C50/60**

Description

Due to its high performance as well as its easy and quick installation, the wedge anchor BZ plus with European Technical Assessment can be used for a wide variety of applications. The long thread length and two approved anchorage depths allow the BZ plus wedge anchor greater flexibility of use. The option for reduced anchorage depth saves time during drilling and reduces the installation effort. Using a suction drill also eliminates the need for blowing out the drilled hole.

The wedge anchors BZ plus M8–M20 are also approved for use under seismic loading C1 and C2 up to an anchor length of 210 mm[1]. By using the new VS[2] filling washer, the permissible seismic loads can be increased even further.

The sherardized wedge anchor BZ plus sh version with a zinc thickness of more than 40 µm offers increased corrosion protection compared to zinc electroplating.

For timber construction, the BZ-UH-plus version is available packaged with the washer DIN EN ISO 7094 (DIN 440).

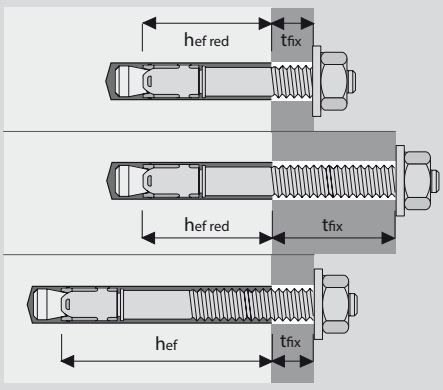
Advantages

- Approved for use in cracked and uncracked concrete (Option 1)
- Approved for seismic loads, performance categories C1 and C2 (M8 to M20, maximum anchor length 210 mm)
- Approved for use under fire exposure. Fire resistance ratings R30–R120
- Suitable for use in compression resistant natural stone (without approval)
- Two effective anchorage depths for greater flexibility (M8 to M16, maximum anchor length 210 mm)
- Anchoring with shorter effective anchorage depth reduces drilling and installation time.
- Anchoring with the standard effective anchorage depth is suitable for the highest load limits
- Particularly cost effective: the short "s" versions with only one effective anchorage depth in the sizes M8 to M16
- Suitable for surface, through, and stand-off fastening
- Suitable for sprinkler system installations complying with VdS requirements
- FM approval for the installation of sprinkler systems (M10 to M16)
- Shock approval by the Swiss Federal Office for Civil Protection

Applications

Medium to heavy duty anchorage in cracked and uncracked concrete: Steel beams, base plates, channels, tracks, wood structures.

Example of Installation



BZ plus s
Anchoring at reduced effective anchorage depth and minimum thickness fastened.

BZ plus
Anchoring at reduced effective anchorage depth and increased thickness fastened.

BZ plus
Anchoring at standard anchorage depth and minimum thickness fastened.

[1]Only standard anchorage depth

[2]see page 95

Wedge Anchor BZ plus

- Steel, zinc plated
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth					Reduced anchorage depth				Anchor length	Thread	Pkg. content	Weight per pkg.
		Max. Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Max. Fixture thickness $t_{fix,red}$ mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	mm	mm	pcs.	kg
BZ 8-6/60 s	06105001	-	-	-	-	- / -	6	8x49	41	35	60	M8x17	100	2,54
BZ 8-11/65 s	06110001	-	-	-	-	- / -	11	8x49	41	35	65	M8x22	100	2,69
BZ 8-10-21/75	06115001	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	100	2,99
BZ 8-15-26/80	06125001	15	8x60	52	46	✓ / ✓	26	8x49	41	35	80	M8x37	100	3,14
BZ 8-30-41/95	06140001	30	8x60	52	46	✓ / ✓	41	8x49	41	35	95	M8x52	100	3,60
BZ 8-50-61/115	06150001	50	8x60	52	46	✓ / ✓	61	8x49	41	35	115	M8x72	100	4,24
BZ 8-100-111/165	06170001	100	8x60	52	46	✓ / ✓	111	8x49	41	35	165	M8x122	50	2,94
BZ 10-10/70 s	06205001	-	-	-	-	- / -	10	10x55	48	40	70	M10x22	50	2,44
BZ 10-20/80 s	06210001	-	-	-	-	- / -	20	10x55	48	40	80	M10x32	50	2,69
BZ 10-10-30/90	06215001	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	50	2,94
BZ 10-15-35/95	06220001	15	10x75	68	60	✓ / ✓	35	10x55	48	40	95	M10x47	50	3,06
BZ 10-20-40/100	06225001	20	10x75	68	60	✓ / ✓	40	10x55	48	40	100	M10x52	50	3,18
BZ 10-30-50/110	06230001	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	50	3,44
BZ 10-50-70/130	06235001	50	10x75	68	60	✓ / ✓	70	10x55	48	40	130	M10x82	50	3,95
BZ 10-75-95/155	06250001	75	10x75	68	60	✓ / ✓	95	10x55	48	40	155	M10x107	50	4,55
BZ 10-100-120/180	06260001	100	10x75	68	60	✓ / ✓	120	10x55	48	40	180	M10x132	50	5,16
BZ 10-150/230	06270001	150	10x75	68	60	- / -	-	-	-	-	230	M10x80	25	3,49
BZ 12-10/85 s	06305001	-	-	-	-	- / -	10	12x70	60	50	85	M12x26	25	2,10
BZ 12-20/95 s	06310001	-	-	-	-	- / -	20	12x70	60	50	95	M12x36	25	2,28
BZ 12-10-30/105	06313001	10	12x90	80	70	✓ / ✓	30	12x70	60	50	105	M12x46	25	2,49
BZ 12-15-35/110	06315001	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	25	2,55
BZ 12-20-40/115	06320001	20	12x90	80	70	✓ / ✓	40	12x70	60	50	115	M12x56	25	2,66
BZ 12-30-50/125	06325001	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	25	2,84
BZ 12-50-70/145	06330001	50	12x90	80	70	✓ / ✓	70	12x70	60	50	145	M12x86	25	3,23
BZ 12-65-85/160	06335001	65	12x90	80	70	✓ / ✓	85	12x70	60	50	160	M12x101	25	3,49
BZ 12-85-105/180	06340001	85	12x90	80	70	✓ / ✓	105	12x70	60	50	180	M12x121	25	3,84
BZ 12-105-125/200	06345001	105	12x90	80	70	✓ / ✓	125	12x70	60	50	200	M12x135	25	4,21
BZ 12-125/220	06350001	125	12x90	80	70	- / -	-	-	-	-	220	M12x80	25	4,93
BZ 12-145/240	06355001	145	12x90	80	70	- / -	-	-	-	-	240	M12x80	20	4,32
BZ 12-160/255	06360001	160	12x90	80	70	- / -	-	-	-	-	255	M12x80	20	4,59
BZ 12-190/285	06370001	190	12x90	80	70	- / -	-	-	-	-	285	M12x80	20	4,99
BZ 16-5/105 s	06505001	-	-	-	-	- / -	5	16x90	77	65	105	M16x26	20	3,48
BZ 16-15/115 s	06510001	-	-	-	-	- / -	15	16x90	77	65	115	M16x36	20	3,76
BZ 16-15-35/135	06520001	15	16x110	97	85	✓ / ✓	35	16x90	77	65	135	M16x56	20	4,32
BZ 16-25-45/145	06525001	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	20	4,60
BZ 16-50-70/170	06530001	50	16x110	97	85	✓ / ✓	70	16x90	77	65	170	M16x91	20	5,26
BZ 16-80-100/200	06535001	80	16x110	97	85	✓ / ✓	100	16x90	77	65	200	M16x121	10	3,20
BZ 16-100/220	06540001	100	16x110	97	85	- / -	-	-	-	-	220	M16x80	10	3,50
BZ 16-140/260	06550001	140	16x110	97	85	- / -	-	-	-	-	260	M16x80	10	4,12
BZ 16-180/300	06560001	180	16x110	97	85	- / -	-	-	-	-	300	M16x80	10	4,74
BZ 20-30/165	06615101	30	20x125	114	100	✓ / ✓	-	-	-	-	165	M20x50	10	4,41
BZ 20-60/195	06625101	60	20x125	114	100	✓ / ✓	-	-	-	-	195	M20x70	10	5,05
BZ 20-100/235	06630101	100	20x125	114	100	- / -	-	-	-	-	235	M20x80	5	3,04
BZ 20-130/265	06635101	130	20x125	114	100	- / -	-	-	-	-	265	M20x80	5	3,43
BZ 20-150/285	06640101	150	20x125	114	100	- / -	-	-	-	-	285	M20x80	5	3,66
BZ 24-30/190	06715101	30	24x145	133	115	- / -	-	-	-	-	190	M24x55	10	6,85
BZ 24-60/220	06725101	60	24x145	133	115	- / -	-	-	-	-	220	M24x85	5	3,93
BZ 24-75/235	06735101	75	24x145	133	115	- / -	-	-	-	-	235	M24x100	5	4,15
BZ 24-100/260	06745101	100	24x145	133	115	- / -	-	-	-	-	260	M24x125	5	4,52
BZ 27-30/210	06815101	30	28x160	146	125	- / -	-	-	-	-	210	M27x62	5	5,10
BZ 27-60/240	06825101	60	28x160	146	125	- / -	-	-	-	-	240	M27x92	5	5,60
BZ 27-100/280	06845101	100	28x160	146	125	- / -	-	-	-	-	280	M27x132	5	6,40

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

Wedge Anchor BZ plus sh

- Steel sherardized
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth: Max. Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Reduced anchorage depth: Max. Fixture thickness $t_{fix,red}$ mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Thread mm	Pkg. content pcs.	Weight per pkg. kg
BZ 10-10-30/90 sh	06215601	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	50	2,94
BZ 10-20-40/100 sh	06225601	20	10x75	68	60	✓ / ✓	40	10x55	48	40	100	M10x52	50	3,18
BZ 10-30-50/110 sh	06230601	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	50	3,44
BZ 12-15-35/110 sh	06315601	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	25	2,55
BZ 12-30-50/125 sh	06325601	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	25	2,84
BZ 16-25-45/145 sh	06525601	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	20	4,60

Other lengths on demand.

Wedge Anchor BZ-U plus

- Steel, zinc plated
- With large washer DIN EN ISO 7093-1 (DIN 9021)
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth: Max. Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Reduced anchorage depth: Max. Fixture thickness $t_{fix,red}$ mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Thread mm	Washer[1] mm	Pkg. content pcs.	Weight per pkg. kg
BZ-U 8-10-21/75	06115301	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	24x2	100	3,46
BZ-U 8-15-26/80	06125301	15	8x60	52	46	✓ / ✓	26	8x49	41	35	80	M8x37	24x2	100	3,52
BZ-U 8-30-41/95	06140301	30	8x60	52	46	✓ / ✓	41	8x49	41	35	95	M8x52	24x2	100	4,01
BZ-U 10-10-30/90	06215301	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	30x2,5	50	3,30
BZ-U 10-15-35/95	06220301	15	10x75	68	60	✓ / ✓	35	10x55	48	40	95	M10x47	30x2,5	50	3,45
BZ-U 10-30-50/110	06230301	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	30x2,5	50	3,95
BZ-U 10-50-70/130	06235301	50	10x75	68	60	✓ / ✓	70	10x55	48	40	130	M10x82	30x2,5	50	4,31
BZ-U 10-100-120/180	06260301	100	10x75	68	60	✓ / ✓	120	10x55	48	40	180	M10x132	30x2,5	50	6,02
BZ-U 10-150/230	06270301	150	10x75	68	60	- / -	-	-	-	-	230	M10x80	30x2,5	25	3,73
BZ-U 12-15-35/110	06315301	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	37x3	25	2,86
BZ-U 12-30-50/125	06325301	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	37x3	25	3,26
BZ-U 12-50-70/145	06330301	50	12x90	80	70	✓ / ✓	70	12x70	60	50	145	M12x86	37x3	25	3,68
BZ-U 12-105-125/200	06345301	105	12x90	80	70	✓ / ✓	125	12x70	60	50	200	M12x135	37x3	25	4,21
BZ-U 12-125/220	06350301	125	12x90	80	70	- / -	-	-	-	-	220	M12x80	37x3	25	5,47
BZ-U 12-145/240	06355301	145	12x90	80	70	- / -	-	-	-	-	240	M12x80	37x3	20	4,50
BZ-U 12-160/255	06360301	160	12x90	80	70	- / -	-	-	-	-	255	M12x80	37x3	20	4,91
BZ-U 12-190/285	06370301	190	12x90	80	70	- / -	-	-	-	-	285	M12x80	37x3	20	5,50
BZ-U 12-230/325	06380301	230	12x90	80	70	- / -	-	-	-	-	325	M12x80	37x3	20	6,12
BZ-U 16-25-45/145	06525301	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	50x3	20	5,15
BZ-U 16-50-70/170	06530301	50	16x110	97	85	✓ / ✓	70	16x90	77	65	170	M16x91	50x3	20	5,76

[1]Outer diameter x thickness Other lengths on demand.

Wedge Anchor BZ-UH plus

- Steel, zinc plated
- With large washer DIN EN ISO 7094 (DIN 440)
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth: Max. Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Reduced anchorage depth: Max. Fixture thickness $t_{fix,red}$ mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Thread mm	Washer[1] mm	Pkg. content pcs.	Weight per pkg. kg
BZ-UH 12-85-105/180	06340401	85	12x90	80	70	✓ / ✓	105	12x70	60	50	180	M12x121	44x4	25	4,60
BZ-UH 12-105-125/200	06345401	105	12x90	80	70	✓ / ✓	125	12x70	60	50	200	M12x141	44x4	25	4,95
BZ-UH 12-125/220	06350401	125	12x90	80	70	- / -	-	-	-	-	220	M12x80	44x4	25	5,77
BZ-UH 12-145/240	06355401	145	12x90	80	70	- / -	-	-	-	-	240	M12x80	44x4	20	4,97
BZ-UH 12-160/255	06360401	160	12x90	80	70	- / -	-	-	-	-	255	M12x80	44x4	20	5,23
BZ-UH 12-190/285	06370401	190	12x90	80	70	- / -	-	-	-	-	285	M12x80	44x4	20	5,64
BZ-UH 12-230/325	06380401	230	12x90	80	70	- / -	-	-	-	-	325	M12x80	44x4	20	6,19
BZ-UH 12-260/355	06385401	260	12x90	80	70	- / -	-	-	-	-	355	M12x80	44x4	20	6,60
BZ-UH 16-100/220	06540401	100	16x110	97	85	- / -	-	-	-	-	220	M16x80	56x5	10	4,18
BZ-UH 16-140/260	06550401	140	16x110	97	85	- / -	-	-	-	-	260	M16x80	56x5	10	4,79
BZ-UH 16-180/300	06560401	180	16x110	97	85	- / -	-	-	-	-	300	M16x80	56x5	10	5,39

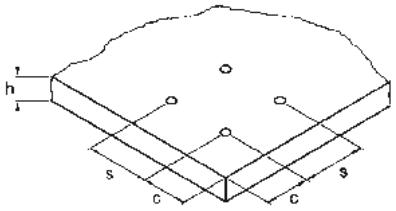
[1]Outer diameter x thickness Other lengths on demand.

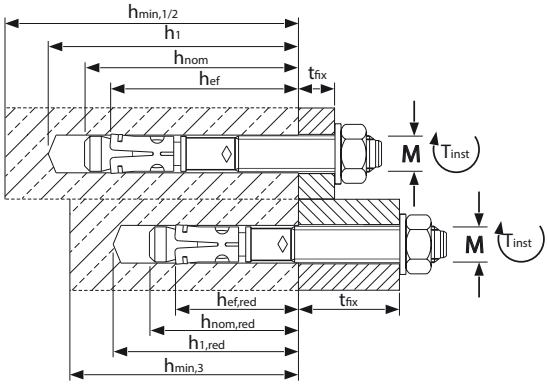
Extract from Permissible Service Conditions of European Technical Assessment ETA-99/0010 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

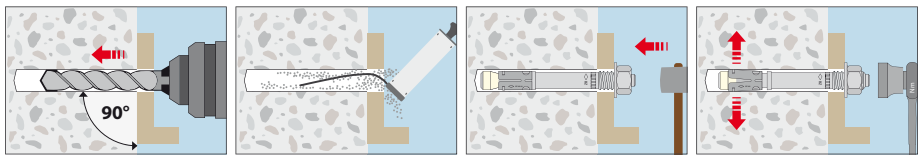
Loads and performance data		Wedge Anchor BZ plus		M8		M10		M12		M16		M20	M24	M27
Standard anchorage depth		h_{ef}	[mm]	**46**	**-**	**60**	**-**	**70**	**-**	**85**	**-**	**100**	**115**	**125**
Reduced anchorage depth		$h_{ef,red}$	[mm]	**-**	**35**	**-**	**40**	**-**	**50**	**-**	**65**	**-**	**-**	**-**
								cracked concrete						
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	10,5	8,8	14,9	12,4	28,1	17,6	35,5	30,1	54,3	79,8	80,0
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	16,4	14,5	24,2	24,0	38,4	36,1	65,1	60,0	89,0	131,8	181,7
Approved loads, tension	C20/25	appr. N	[kN]	2,4	2,4	4,3	3,6	7,6	5,8	11,9	8,6	16,4	20,2	22,9
	C25/30	appr. N	[kN]	2,7	2,7	4,8	4,0	8,5	6,5	13,3	9,6	18,3	22,6	25,6
	C30/37	appr. N	[kN]	2,9	2,9	5,2	4,4	9,3	7,1	14,6	10,5	20,1	24,8	28,1
	C40/50	appr. N	[kN]	3,4	3,4	6,1	5,1	10,8	8,2	16,8	12,2	23,2	28,6	32,4
	C50/60	appr. N	[kN]	3,8	3,8	6,8	5,6	12,0	9,2	18,8	13,6	25,9	32,0	36,2
								uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	5,7	3,6	7,6	4,3	11,9	8,3	16,7	12,3	23,4	28,9	32,7
	C25/30	appr. N	[kN]	6,4	4,0	8,5	4,8	13,3	9,3	18,6	13,7	26,2	32,3	36,6
	C30/37	appr. N	[kN]	7,0	4,4	9,3	5,2	14,6	10,1	20,4	15,0	28,7	35,4	40,1
	C40/50	appr. N	[kN]	7,5	5,1	10,8	6,1	16,8	11,7	23,6	17,4	33,1	40,9	46,3
	C50/60	appr. N	[kN]	7,5	5,6	12,0	6,8	18,8	13,1	26,4	19,4	37,0	45,7	51,8
								cracked / uncracked concrete						
Approved loads, shear	C20/25	appr. V	[kN]	7,0	7,0	11,5	10,0/11,5	17,1	13,9/17,1	30,8/31,4	20,6/29,5	37,1	56,6/65,1	64,2/91,7
	≥ C25/30	appr. V	[kN]	7,0	7,0	11,5	11,1/11,5	17,1	15,6/17,1	31,4	23,1/31,4	37,1	63,3/65,1	71,7/96,8
Approved bending moments		appr. M	[Nm]	13,1	13,1	26,9	26,9	46,9	46,9	123,4	123,4	195	513,1	760,9
Spacing and edge distance														
Effective anchorage depth		h_{ef}	[mm]	46	35	60	40	70	50	85	65	100	115	125
Characteristic spacing		$s_{cr,N}$	[mm]	138	105	180	120	210	150	255	195	300	345	375
Characteristic edge distance		$c_{cr,N}$	[mm]	69	52,5	90	60	105	75	127,5	97,5	150	172,5	187,5
Minimum spacing and edge distance for standard thickness of concrete member														
								cracked concrete						
Standard thickness		$h_{min,1}$	[mm]	100	-	120	-	140	-	170	-	200	230	250
Minimum spacing / for edge distance c		s_{min} / c	[mm]	40/70	-	45/70	-	60/100	-	60/100	-	95/150	100/180	125/300
Minimum edge distance / for spacing s		c_{min} / s	[mm]	40/80	-	45/90	-	60/140	-	60/180	-	95/200	100/220	180/540
								uncracked concrete						
Minimum spacing / for edge distance c		s_{min} / c	[mm]	40/80	-	45/70	-	60/120	-	65/120	-	90/180	100/180	125/300
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50/100	-	50/100	-	75/150	-	80/150	-	130/240	100/220	180/540
Minimum spacing and edge distance for minimum thickness of concrete member														
								cracked concrete						
Standard thickness		$h_{min,2}$ / $h_{min,3}$	[mm]	80	80	100	80	120	100	140	140	-	-	-
Minimum spacing / for edge distance c		s_{min} / c	[mm]	40/70	50/60	45/90	50/100	60/100	50/160	70/160	65/170	-	-	-
Minimum edge distance / for spacing s		c_{min} / s	[mm]	40/80	40/185	50/115	65/180	60/140	65/250	80/180	100/250	-	-	-
								uncracked concrete						
Minimum spacing / for edge distance c		s_{min} / c	[mm]	40/80	50/60	60/140	50/100	60/120	50/160	80/180	65/170	-	-	-
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50/100	40/185	90/140	65/180	75/150	100/185	90/200	170/65	-	-	-
Installation parameters														
Drill hole diameter		d_o	[mm]	8	8	10	10	12	12	16	16	20	24	28
Diameter of clearance hole in the fixture		d_f	[mm]	9	9	12	12	14	14	18	18	22	26	30
Depth of drill hole		h_1	[mm]	60	49	75	55	90	70	110	90	125	145	160
Installation torque, steel galvanized		T_{inst}	[Nm]	20	20	25	25	45	45	90	90	160	200	300
Installation torque, steel sherardized		T_{inst}	[Nm]	16	16	22	22	40	40	90	90	160	260	300
Width across nut		SW	[mm]	13	13	17	17	19	19	24	24	30	36	41

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





Installation



Wedge Anchor BZ plus A4

Stainless steel A4/316

Wedge Anchor BZ plus s A4

Wedge Anchor BZ plus A4

Wedge Anchor BZ-U plus A4

Wedge Anchor BZ plus A4 M24

Range of Loading: 2,4 kN–70,6 kN

Range of concrete quality: C20/25–C50/60

Description

Due to its high performance as well as its easy and quick installation, the wedge anchor BZ plus A4 with European Technical Assessment can be used for a wide variety of applications.

The long thread length and two approved anchorage depths allow the wedge anchor BZ plus A4 greater flexibility of use. The option for reduced anchorage depth saves time during drilling and reduces the installation effort. Using a suction drill also eliminates the need for blowing out the drilled hole.

The wedge anchors BZ plus M8–M20 are also approved for use under seismic loading C1 and C2 up to an anchor length of 210 mm[1]. By using the new VS filling washer, the permissible seismic loads can be increased even further.

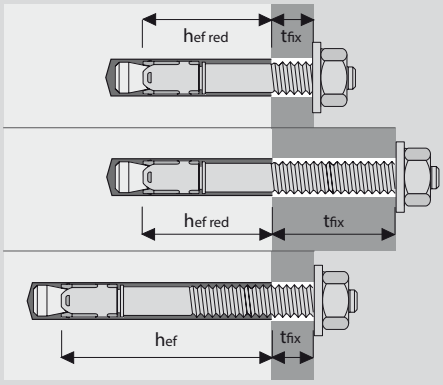
Advantages

- Approved for use in cracked and uncracked concrete (Option 1)
- Approved for use under seismic loading, performance categories C1 and C2 (M8 to M20, maximum anchor length 210 mm)
- Approved for use under fire exposure. Fire resistance ratings R30–R120
- Suitable for use in compression resistant natural stone (without approval)
- Two effective anchorage depths for greater flexibility (M8 to M16, maximum anchor length 210 mm)
- Anchoring with the smaller effective anchorage depth reduces drilling and installation time.
- Anchoring with the standard effective anchorage depth is suitable for the highest load limits
- Particularly cost effective: the short "s" versions with only one effective anchorage depth in the sizes M8 to M16
- Suitable for surface, through, and stand-off fastening
- Suitable for sprinkler system installations complying with VdS requirements
- FM approval for the installation of sprinkler systems (M10 to M16)
- Shock approval by the Swiss Federal Office for Civil Protection

Applications

Medium to heavy duty anchorage in cracked and uncracked concrete: Supports, steel beams, facade substructures, railing fixings, gates, pipe trays, wooden structures, brackets, stadium seating, fastenings in earthquake zones, etc.

Example of Installation



BZ plus s A4
Anchoring at reduced effective anchorage depth and minimum thickness fastened.

BZ plus A4
Anchoring at reduced effective anchorage depth and increased thickness fastened.

BZ plus A4
Anchoring at standard anchorage depth and minimum thickness fastened.

[1]Only standard anchorage depth

[2]see page 95

Wedge Anchor BZ plus A4

- Stainless steel A4/316
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth					Reduced anchorage depth				Anchor length	Thread	Pkg. content	Weight per pkg.
		Max. Fixture thickness tfix mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Max. Fixture thickness tfix,red mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	mm	mm	pcs.	kg
BZ 8-6/60 s A4	02105001	-	-	-	-	- / -	6	8x49	41	35	60	M8x17	100	2,54
BZ 8-11/65 s A4	02110001	-	-	-	-	- / -	11	8x49	41	35	65	M8x22	100	2,69
BZ 8-10-21/75 A4	02115001	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	100	2,99
BZ 8-15-26/80 A4	02125001	15	8x60	52	46	✓ / ✓	26	8x49	41	35	80	M8x37	100	3,14
BZ 8-30-41/95 A4	02140001	30	8x60	52	46	✓ / ✓	41	8x49	41	35	95	M8x52	100	3,60
BZ 8-50-61/115 A4	02150001	50	8x60	52	46	✓ / ✓	61	8x49	41	35	115	M8x72	100	4,24
BZ 8-100-111/165 A4	02170001	100	8x60	52	46	✓ / ✓	111	8x49	41	35	165	M8x122	50	2,94
BZ 10-10/70 s A4	02205001	-	-	-	-	- / -	10	10x55	48	40	70	M10x22	50	2,44
BZ 10-20/80 s A4	02210001	-	-	-	-	- / -	20	10x55	48	40	80	M10x32	50	2,69
BZ 10-10-30/90 A4	02215001	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	50	2,94
BZ 10-15-35/95 A4	02220001	15	10x75	68	60	✓ / ✓	35	10x55	48	40	95	M10x47	50	3,06
BZ 10-20-40/100 A4	02225001	20	10x75	68	60	✓ / ✓	40	10x55	48	40	100	M10x52	50	3,18
BZ 10-30-50/110 A4	02230001	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	50	3,44
BZ 10-50-70/130 A4	02235001	50	10x75	68	60	✓ / ✓	70	10x55	48	40	130	M10x82	50	3,95
BZ 10-75-95/155 A4	02250001	75	10x75	68	60	✓ / ✓	95	10x55	48	40	155	M10x107	50	4,55
BZ 10-100-120/180 A4	02260001	100	10x75	68	60	✓ / ✓	120	10x55	48	40	180	M10x132	50	5,16
BZ 10-150/230 A4	02270001	150	10x75	68	60	- / -	-	-	-	-	230	M10x80	25	3,49
BZ 12-10/85 s A4	02305001	-	-	-	-	- / -	10	12x70	60	50	85	M12x26	25	2,10
BZ 12-20/95 s A4	02310001	-	-	-	-	- / -	20	12x70	60	50	95	M12x36	25	2,28
BZ 12-10-30/105 A4	02313001	10	12x90	80	70	✓ / ✓	30	12x70	60	50	105	M12x46	25	3,48
BZ 12-15-35/110 A4	02315001	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	25	2,55
BZ 12-20-40/115 A4	02320001	20	12x90	80	70	✓ / ✓	40	12x70	60	50	115	M12x56	25	2,66
BZ 12-30-50/125 A4	02325001	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	25	2,84
BZ 12-50-70/145 A4	02330001	50	12x90	80	70	✓ / ✓	70	12x70	60	50	145	M12x86	25	3,23
BZ 12-65-85/160 A4	02335001	65	12x90	80	70	✓ / ✓	85	12x70	60	50	160	M12x101	25	3,48
BZ 12-85-105/180 A4	02340001	85	12x90	80	70	✓ / ✓	105	12x70	60	50	180	M12x121	25	3,84
BZ 12-105-125/200 A4	02345001	105	12x90	80	70	✓ / ✓	125	12x70	60	50	200	M12x135	25	4,21
BZ 12-125/220 A4	02350001	125	12x90	80	70	- / -	-	-	-	-	220	M12x80	25	4,93
BZ 12-160/255 A4	02360001	160	12x90	80	70	- / -	-	-	-	-	255	M12x80	20	4,59
BZ 12-190/285 A4	02370001	190	12x90	80	70	- / -	-	-	-	-	285	M12x80	20	4,99
BZ 12-230/325 A4	02380001	230	12x90	80	70	- / -	-	-	-	-	325	M12x80	20	5,84
BZ 16-15/115 s A4	02510001	-	-	-	-	- / -	15	16x90	77	65	115	M16x36	20	3,76
BZ 16-5-25/125 A4	02515001	5	16x110	97	85	✓ / ✓	25	16x90	77	65	125	M16x46	20	4,15
BZ 16-15-35/135 A4	02520001	15	16x110	97	85	✓ / ✓	35	16x90	77	65	135	M16x56	20	4,32
BZ 16-25-45/145 A4	02525001	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	20	4,68
BZ 16-50-70/170 A4	02530001	50	16x110	97	85	✓ / ✓	70	16x90	77	65	170	M16x91	20	5,36
BZ 16-80-100/200 A4	02535001	80	16x110	97	85	✓ / ✓	100	16x90	77	65	200	M16x121	10	3,20
BZ 16-100/220 A4	02540001	100	16x110	97	85	- / -	-	-	-	-	220	M16x80	10	3,59
BZ 16-160/280 A4	02553001	160	16x110	97	85	- / -	-	-	-	-	280	M16x80	10	4,50
BZ 20-30/165 A4	02615501	30	20x125	114	100	✓ / ✓	-	-	-	-	165	M20x50	10	4,51
BZ 20-60/195 A4	02625501	60	20x125	114	100	✓ / ✓	-	-	-	-	195	M20x70	10	5,14
BZ 20-100/235 A4	02630501	100	20x125	114	100	- / -	-	-	-	-	235	M20x80	5	3,09
BZ 20-130/265 A4	02635501	130	20x125	114	100	- / -	-	-	-	-	265	M20x80	5	3,48
BZ 20-150/285 A4	02640501	150	20x125	114	100	- / -	-	-	-	-	285	M20x80	5	3,73
BZ 24-30/200 A4	02717501	30	24x155	140	125	- / -	-	-	-	-	200	M24x58	10	7,25
BZ 24-60/230 A4	02727501	60	24x155	140	125	- / -	-	-	-	-	230	M24x88	5	4,12
BZ 24-75/245 A4	02737501	75	24x155	140	125	- / -	-	-	-	-	245	M24x103	5	4,34

Other lengths on demand.

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

Wedge Anchor BZ-U plus A4

- Stainless steel A4
- With large washer DIN EN ISO 7093-1 (DIN 9021)
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth					Reduced anchorage depth				Anchor length	Thread	Washer[1)]	Pkg. content	Weight per pkg.
		Max. Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Max. Fixture thickness $t_{fix,red}$ mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	l mm	mm	mm	pcs.	kg
BZ-U 8-10-21/75 A4	02115301	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	24x2	100	3,46
BZ-U 8-15-26/80 A4	02125301	15	8x60	52	46	✓ / ✓	26	8x49	41	35	80	M8x37	24x2	100	3,52
BZ-U 8-30-41/95 A4	02140301	30	8x60	52	46	✓ / ✓	41	8x49	41	35	95	M8x52	24x2	100	4,01
BZ-U 8-50-61/115 A4	02150301	50	8x60	52	46	✓ / ✓	61	8x49	41	35	115	M8x72	24x2	100	4,63
BZ-U 10-10-30/90 A4	02215301	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	30x2,5	50	3,30
BZ-U 10-15-35/95 A4	02220301	15	10x75	68	60	✓ / ✓	35	10x55	48	40	95	M10x47	30x2,5	50	3,45
BZ-U 10-30-50/110 A4	02230301	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	30x2,5	50	3,95
BZ-U 10-50-70/130 A4	02235301	50	10x75	68	60	✓ / ✓	70	10x55	48	40	130	M10x82	30x2,5	50	4,31
BZ-U 12-15-35/110 A4	02315301	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	37x3	25	2,86
BZ-U 12-20-40/115 A4	02320301	20	12x90	80	70	✓ / ✓	40	12x70	60	50	115	M12x56	37x3	25	3,06
BZ-U 12-30-50/125 A4	02325301	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	37x3	25	3,26
BZ-U 12-50-70/145 A4	02330301	50	12x90	80	70	✓ / ✓	70	12x70	60	50	145	M12x86	37x3	25	3,68
BZ-U 16-25-45/145 A4	02525301	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	50x3	20	5,15

[1)] Outer diameter x thickness

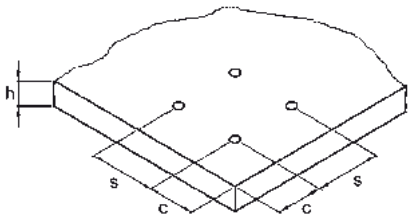
Other lengths on demand.

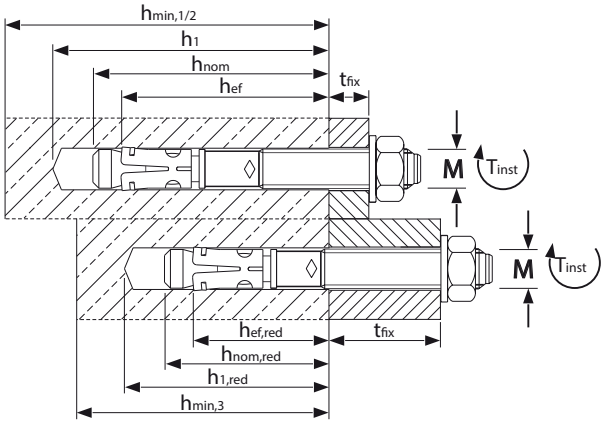
Extract from Permissible Service Conditions of European Technical Assessment ETA-99/0010 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

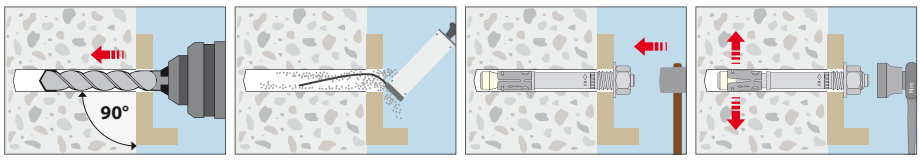
Loads and performance data	Wedge Anchor BZ plus A4		M8		M10		M12		M16		M20	M24
Standard anchorage depth	h_{ef}	[mm]	**46**	**-**	**60**	**-**	**70**	**-**	**85**	**-**	**100**	**125**
Reduced anchorage depth	$h_{ef,red}$	[mm]	**-**	**35**	**-**	**40**	**-**	**50**	**-**	**65**	**-**	**-**
							cracked concrete					
Mean ultimate loads, tension	C25/30	[kN]	10,8	8,8	16,7	12,4	27,5	17,6	40,0	30,1	54,3	68,8
Mean ultimate loads, shear	C25/30	[kN]	19,0	16,3	28,5	25,5	35,8	40,8	70,3	60,5	108,4	149,5
Approved loads, tension	C20/25 appr. N	[kN]	2,4	2,4	4,3	3,6	7,6	5,8	11,9	8,6	16,4	19,0
	C25/30 appr. N	[kN]	2,7	2,7	4,8	4,0	8,5	6,5	13,3	9,6	18,3	21,3
	C30/37 appr. N	[kN]	2,9	2,9	5,2	4,4	9,3	7,1	14,6	10,5	20,1	23,3
	C40/50 appr. N	[kN]	3,4	3,4	6,1	5,1	10,8	8,2	16,8	12,2	23,2	26,9
	C50/60 appr. N	[kN]	3,8	3,8	6,8	5,6	12,0	9,2	18,8	13,6	25,9	30,1
							uncracked concrete					
Approved loads, tension	C20/25 appr. N	[kN]	5,7	3,6	7,6	4,3	11,9	8,3	16,7	12,3	23,4	32,7
	C25/30 appr. N	[kN]	6,4	4,0	8,5	4,8	13,3	9,3	18,6	13,7	26,2	36,6
	C30/37 appr. N	[kN]	7,0	4,4	9,3	5,2	14,6	10,1	20,4	15,0	28,7	40,1
	C40/50 appr. N	[kN]	7,6	5,1	10,8	6,1	16,8	11,7	23,6	17,4	33,1	46,3
	C50/60 appr. N	[kN]	7,6	5,6	12,0	6,8	18,8	13,1	26,4	19,4	37,0	51,8
							cracked / uncracked concrete					
Approved loads, shear	C20/25 appr. V	[kN]	7,4	7,4	11,4	10,0/11,4	17,1	13,9/17,1	30,8/31,4	20,6/29,5	43,9	64,2/70,6
	≥ C25/30 appr. V	[kN]	7,4	7,4	11,4	11,1/11,4	17,1	15,6/17,1	31,4	23,1/31,4	43,9	70,6
Approved bending moments	appr. M	[Nm]	14,9	14,9	29,7	29,7	52,6	52,6	114,3	114,3	231,6	448,8
Spacing and edge distance												
Effective anchorage depth	h_{ef}	[mm]	46	35	60	40	70	50	85	65	100	125
Characteristic spacing	$s_{cr,N}$	[mm]	138	105	180	120	210	150	255	195	300	375
Characteristic edge distance	$c_{cr,N}$	[mm]	69	52,5	90	60	105	75	127,5	97,5	150	187,5
Minimum spacing and edge distance for standard thickness of concrete member												
							cracked concrete					
Standard thickness	$h_{min,1}$	[mm]	100	-	120	-	140	-	160	-	200	250
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/70	-	50/75	-	60/100	-	60/100	-	95/150	125/125
Minimum edge distance / for spacing s	c_{min} / s	[mm]	40/80	-	55/90	-	60/140	-	60/180	-	95/200	125/125
							uncracked concrete					
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/80	-	50/75	-	60/120	-	65/120	-	90/180	125/125
Minimum edge distance / for spacing s	c_{min} / s	[mm]	50/100	-	60/120	-	75/150	-	80/150	-	130/240	125/125
Minimum spacing and edge distance for minimum thickness of concrete member												
							cracked concrete					
Standard thickness	$h_{min,2}$ / $h_{min,3}$	[mm]	80	80	100	80	120	100	140	140	-	-
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/70	50/60	45/90	50/100	60/100	50/160	70/160	65/170	-	-
Minimum edge distance / for spacing s	c_{min} / s	[mm]	40/80	40/185	50/115	65/180	60/140	65/250	80/180	100/250	-	-
							uncracked concrete					
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/80	50/60	60/140	50/100	60/120	50/160	80/180	65/170	-	-
Minimum edge distance / for spacing s	c_{min} / s	[mm]	50/100	40/185	90/140	65/180	75/150	100/185	90/200	170/65	-	-
Installation parameters												
Drill hole diameter	d_o	[mm]	8	8	10	10	12	12	16	16	20	24
Diameter of clearance hole in the fixture	d_f	[mm]	9	9	12	12	14	14	18	18	22	26
Depth of drill hole	h_1	[mm]	60	49	75	55	90	70	110	90	125	155
Installation torque	T_{inst}	[Nm]	20	20	35	35	50	50	110	110	200	290
Installation torque	SW	[mm]	13	13	17	17	19	19	24	24	30	36

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





Installation



Wedge Anchor BZ plus HCR

High corrosion resistant steel 1.4529 (HCR)

Wedge Anchor BZ plus s HCR

Wedge Anchor BZ plus HCR

Wedge Anchor BZ-U plus HCR

Range of Loading: 2,4 kN–70,6 kN

Range of concrete quality: C20/25–C50/60

Description

Due to its high performance, its easy and quick installation, as well as its superior corrosion protection, the wedge anchor BZ plus HCR with European Technical Assessment can be used in the broadest range of applications. This includes installations in particularly aggressive environmental conditions, which can for example develop in swimming pools, roadway tunnels or in contact with seawater.

The long thread length and two approved anchorage depths allow the wedge anchor BZ plus HCR allow greater flexibility of use. The option for reduced anchorage depth saves time during drilling and reduces the installation effort. Using a suction drill also eliminates the need for blowing out the drilled hole.

The wedge anchors BZ plus M8 - M20 are also approved for use under seismic loading C1 and C2 up to an anchor length of 210 mm[1)].

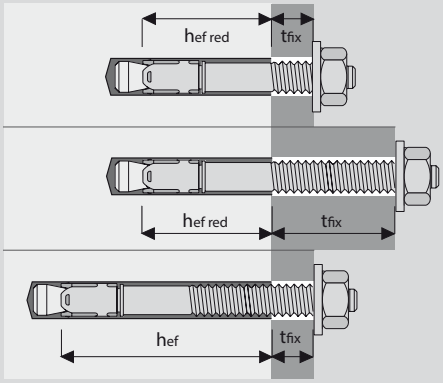
Advantages

- Approved for use in cracked and uncracked concrete (Option 1)
- Approved for use under seismic loading, performance categories C1 and C2 (on demand for M8 to M20, maximum anchor length 210 mm)
- Suitable for use in compression resistant natural stone (without approval)
- Two effective anchorage depths for greater flexibility (on demand for M8 to M16, maximum anchor length 210 mm)
- Anchoring with the smaller effective anchorage depth reduces drilling and installation time.
- Anchoring with the standard effective anchorage depth is suitable for the highest load limits
- Particularly cost effective: the short "s" versions with only one effective anchorage depth in the sizes M8 to M16
- Suitable for surface, through, and stand-off fastening
- Approved for use under fire exposure. Fire resistance ratings R30–R120
- Suitable for sprinkler system installations complying with VdS requirements
- FM approval for the installation of sprinkler systems (M10 to M16)
- Shock approval by the Swiss Federal Office for Civil Protection

Applications

Medium to heavy duty anchorages which are exposed to highly corrosive atmospheres with high concentration of sulphur dioxides, chlorides, humidity: attaching brackets, ventilation systems, suspended ceilings, cable trays, in road tunnels, indoor swimming pools, etc.

Example of Installation



BZ plus s HCR
Anchoring at reduced effective anchorage depth and minimum thickness fastened.

BZ plus HCR
Anchoring at reduced effective anchorage depth and increased thickness fastened.

BZ plus HCR
Anchoring at standard anchorage depth and minimum thickness fastened.

[1)]Only standard anchorage depth

Wedge Anchor BZ plus HCR

- High corrosion resistant steel 1.4529 (HCR)
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth					Reduced anchorage depth				Anchor length l	Thread	Pkg. content	Weight per pkg.
		Max. Fixture thickness tfix mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Max. Fixture thickness tfix,red mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	mm	mm	pcs.	kg
BZ 8-11/65 s HCR[1)]	07110001	-	-	-	-	- / -	11	8x49	41	35	65	M8x22	100	2,74
BZ 8-10-21/75 HCR	07115001	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	100	3,08
BZ 8-15-26/80 HCR	07125001	15	8x60	52	46	✓ / ✓	26	8x49	41	35	80	M8x37	100	3,22
BZ 8-30-41/95 HCR	07140001	30	8x60	52	46	✓ / ✓	41	8x49	41	35	95	M8x52	100	3,72
BZ 8-50-61/115 HCR	07150001	50	8x60	52	46	✓ / ✓	61	8x49	41	35	115	M8x72	100	4,35
BZ 10-10/70 s HCR[1)]	07205001	-	-	-	-	- / -	10	10x55	48	40	70	M10x22	50	2,44
BZ 10-10-30/90 HCR	07215001	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	50	3,02
BZ 10-15-35/95 HCR	07220001	15	10x75	68	60	✓ / ✓	35	10x55	48	40	95	M10x47	50	3,14
BZ 10-30-50/110 HCR	07230001	30	10x75	68	60	✓ / ✓	50	10x55	48	40	110	M10x62	50	3,90
BZ 10-50-70/130 HCR	07235001	50	10x75	68	60	✓ / ✓	70	10x55	48	40	130	M10x82	50	4,31
BZ 12-10/85 s HCR[1)]	07305001	-	-	-	-	- / -	10	12x70	60	50	85	M12x26	25	2,51
BZ 12-15-35/110 HCR	07315001	15	12x90	80	70	✓ / ✓	35	12x70	60	50	110	M12x51	25	2,55
BZ 12-20-40/115 HCR	07320001	20	12x90	80	70	✓ / ✓	40	12x70	60	50	115	M12x56	25	2,66
BZ 12-30-50/125 HCR	07325001	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	25	2,88
BZ 12-50-70/145 HCR	07330001	50	12x90	80	70	✓ / ✓	70	12x70	60	50	145	M12x86	25	3,23
BZ 16-25-45/145 HCR	07525001	25	16x110	97	85	✓ / ✓	45	16x90	77	65	145	M16x66	20	4,90
BZ 16-50-70/170 HCR	07530001	50	16x110	97	85	✓ / ✓	70	16x90	77	65	170	M16x91	20	5,80
BZ 16-100/220 HCR	07540001	100	16x110	97	85	- / -	-	-	-	-	220	M16x80	10	3,70
BZ 20-30/165 HCR	07615001	30	20x125	114	100	- / -[2)]	-	-	-	-	165	M20x50	10	4,95

[1)]Delivery time on request.
[2)]Seismic C1/C2 on request
Other lengths and BZ plus M24 HCR on demand.

Wedge Anchor BZ-U plus HCR

- High corrosion resistant steel 1.4529 (HCR)
- With large washer DIN EN ISO 7093-1 (DIN 9021)
- Approved for cracked and uncracked concrete

Description	Ref. No.	Standard anchorage depth					Reduced anchorage depth				Anchor length l	Thread	Washer[2)]	Pkg. content	Weight per pkg.
		Max. Fixture thickness tfix mm	Drill hole Ø x depth mm	Setting depth h_{nom} mm	Anchorage depth h_{ef} mm	Seismic C1 / C2	Max. Fixture thickness tfix,red mm	Drill hole Ø x depth mm	Setting depth $h_{nom,red}$ mm	Anchorage depth $h_{ef,red}$ mm	mm	mm	mm	pcs.	kg
BZ-U 8-10-21/75 HCR	07115301	10	8x60	52	46	✓ / ✓	21	8x49	41	35	75	M8x32	24x2	100	3,46
BZ-U 10-10-30/90 HCR	07215301	10	10x75	68	60	✓ / ✓	30	10x55	48	40	90	M10x42	30x2,5	50	3,30
BZ-U 12-30-50/125 HCR	07325301	30	12x90	80	70	✓ / ✓	50	12x70	60	50	125	M12x66	37x3	25	3,26

[2)]Outer diameter x thickness
Other lengths on demand.

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

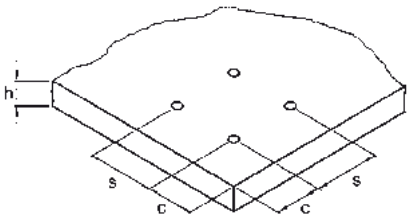
ETA-99/0010

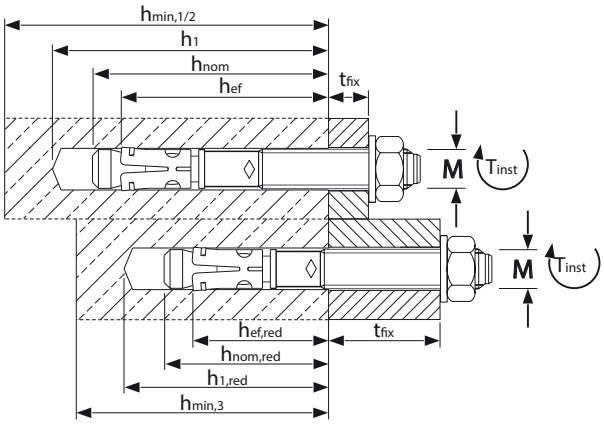
Extract from Permissible Service Conditions of European Technical Assessment ETA-99/0010 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

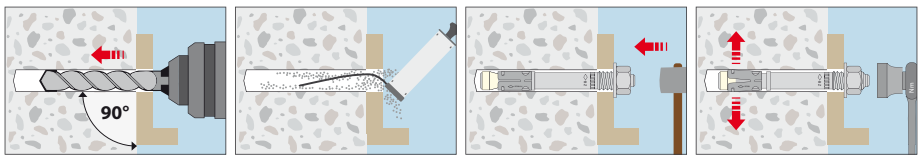
Loads and performance data	Wedge Anchor BZ plus HCR		M8		M10		M12		M16		M20	M24
Standard anchorage depth	h_{ef}	[mm]	**46**	**-**	**60**	**-**	**70**	**-**	**85**	**-**	**100**	**125**
Reduced anchorage depth	$h_{ef,red}$	[mm]	**-**	**35**	**-**	**40**	**-**	**50**	**-**	**65**	**-**	**-**
							cracked concrete					
Mean ultimate loads, tension	C25/30	[kN]	10,8	8,8	16,7	12,4	27,5	17,6	40,0	30,1	54,3	68,8
Mean ultimate loads, shear	C25/30	[kN]	19,0	16,3	28,5	25,5	35,8	40,8	70,3	60,5	108,4	149,5
Approved loads, tension	C20/25 appr. N	[kN]	2,4	2,4	4,3	3,6	7,6	5,8	11,9	8,6	16,4	19,0
	C25/30 appr. N	[kN]	2,7	2,7	4,8	4,0	8,5	6,5	13,3	9,6	18,3	21,3
	C30/37 appr. N	[kN]	2,9	2,9	5,2	4,4	9,3	7,1	14,6	10,5	20,1	23,3
	C40/50 appr. N	[kN]	3,4	3,4	6,1	5,1	10,8	8,2	16,8	12,2	23,2	26,9
	C50/60 appr. N	[kN]	3,8	3,8	6,8	5,6	12,0	9,2	18,8	13,6	25,9	30,1
							uncracked concrete					
Approved loads, tension	C20/25 appr. N	[kN]	5,7	3,6	7,6	4,3	11,9	8,3	16,7	12,3	23,4	32,7
	C25/30 appr. N	[kN]	6,4	4,0	8,5	4,8	13,3	9,3	18,6	13,7	26,2	36,6
	C30/37 appr. N	[kN]	7,0	4,4	9,3	5,2	14,6	10,1	20,4	15,0	28,7	40,1
	C40/50 appr. N	[kN]	7,6	5,1	10,8	6,1	16,8	11,7	23,6	17,4	33,1	46,3
	C50/60 appr. N	[kN]	7,6	5,6	12,0	6,8	18,8	13,1	26,4	19,4	37,0	51,8
							cracked / uncracked concrete					
Approved loads, shear	C20/25 appr. V	[kN]	7,4	7,4	11,4	10,0/11,4	17,1	13,9/17,1	30,8/31,4	20,6/29,5	43,9	64,2/70,6
	≥ C25/30 appr. V	[kN]	7,4	7,4	11,4	11,1/11,4	17,1	15,6/17,1	31,4	23,1/31,4	43,9	70,6
Approved bending moments	appr. M	[Nm]	14,9	14,9	29,7	29,7	52,6	52,6	114,3	114,3	231,6	448,8
Spacing and edge distance												
Effective anchorage depth	h_{ef}	[mm]	46	35	60	40	70	50	85	65	100	125
Characteristic spacing	$s_{cr,N}$	[mm]	138	105	180	120	210	150	255	195	300	375
Characteristic edge distance	$c_{cr,N}$	[mm]	69	52,5	90	60	105	75	127,5	97,5	150	187,5
Minimum spacing and edge distance for standard thickness of concrete member												
							cracked concrete					
Standard thickness	$h_{min,1}$	[mm]	100	-	120	-	140	-	160	-	200	250
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/70	-	50/75	-	60/100	-	60/100	-	95/150	125/125
Minimum edge distance / for spacing s	c_{min} / s	[mm]	40/80	-	55/90	-	60/140	-	60/180	-	95/200	125/125
							uncracked concrete					
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/80	-	50/75	-	60/120	-	65/120	-	90/180	125/125
Minimum edge distance / for spacing s	c_{min} / s	[mm]	50/100	-	60/120	-	75/150	-	80/150	-	130/240	125/125
Minimum spacing and edge distance for minimum thickness of concrete member												
							cracked concrete					
Minimum thickness	$h_{min,2}$ / $h_{min,3}$	[mm]	80	80	100	80	120	100	140	140	-	-
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/70	50/60	45/90	50/100	60/100	50/160	70/160	65/170	-	-
Minimum edge distance / for spacing s	c_{min} / s	[mm]	40/80	40/185	50/115	65/180	60/140	65/250	80/180	100/250	-	-
							uncracked concrete					
Minimum spacing / for edge distance c	s_{min} / c	[mm]	40/80	50/60	60/140	50/100	60/120	50/160	80/180	65/170	-	-
Minimum edge distance / for spacing s	c_{min} / s	[mm]	50/100	40/185	90/140	65/180	75/150	100/185	90/200	170/65	-	-
Installation parameters												
Drill hole diameter	d_o	[mm]	8	8	10	10	12	12	16	16	20	24
Diameter of clearance hole in the fixture	d_f	[mm]	9	9	12	12	14	14	18	18	22	26
Depth of drill hole	h_1	[mm]	60	49	75	55	90	70	110	90	125	155
Installation torque	T_{inst}	[Nm]	20	20	35	35	50	50	110	110	200	290
Width across nut	SW	[mm]	13	13	17	17	19	19	24	24	30	36

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





Installation



Wedge Anchor BZ-IG

Steel, zinc plated

Range of Loading: **2,0 kN–18,8 kN**

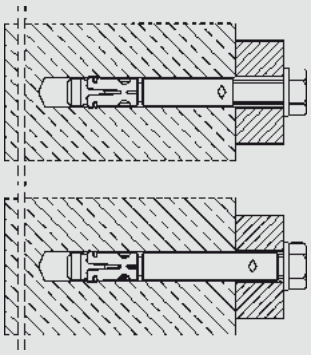
Range of concrete quality: **C20/25–C50/60**

Description

The fastening system BZ-IG is the first approved (ETA-99/0010) wedge anchor for cracked concrete with internal thread. It combines the benefits of a mechanical anchor with an easy installation and the flexibility of an internal thread. For the first time it is possible to fasten balcony and stair railings or stadium seats using a countersunk head screw at favourable costs. Since this anchor system is also approved for use with hexagon head screws and standard threaded rods a wide range of applications is possible. Compared to a drop in anchor the fastening system BZ-IG can carry significant higher loads, even in cracked concrete. The versatility of the MKT Fastening System BZ-IG breaks new gro in design and application.

Applications:

Medium to heavy duty fastenings in cracked and uncracked concrete: Railings, suspended ceilings, ladders, doors, sprinkler systems, pipe hangers and all kinds of temporary fastenings.



Pre-installation:
For pre-installation the anchor gets installed below the concrete surface. When the coated screw gets removed the anchor leaves flush with the concrete surface. So it´s excellent for temporary fastenings.

Through fastening:
If through-fastening is used the fixture can be used as drilling template. Afterwards the anchor can be installed through the clearance hole in the fixture. So it combines easy installation with the aesthetics of a screw head.

Pre-Installation

Wedge Anchor BZ-IG[1)]

- Steel, zinc plated; Pre-Installation
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth	Anchor length	Thread Ø x length	Pkg. content.	Weight per pkg.
		mm	mm	mm	pcs.	kg
BZ-IG M 6-0	03600101	8 x 60	50	M6x20	100	1,42
BZ-IG M 8-0	03610101	10 x 75	62	M8x22	50	1,31
BZ-IG M 10-0	03620101	12 x 90	70	M10x23	25	1,08
BZ-IG M 12-0	03630101	16 x 105	86	M12x27	20	2,03

Coated Screw DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1)]

Description	Ref. No.	Fixture thickn. t_{fix} mm	Pkg. content pcs.	Weight per pkg. kg
S-IG 6x25	54010101	4-12	100	0,80
S-IG 8x25	54110101	2-8	50	0,79
S-IG 10x40	54210101	15-19	25	0,90
S-IG 12x45	54310101	16-21	20	1,13

Coated Hex Nut DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1)]

Description	Ref. No.	Pkg. content pcs	Weight per pkg. kg
MU-IG 6	56005101	100	0,32
MU-IG 8	56105101	50	0,35
MU-IG 10	56205101	25	0,36
MU-IG 12	56305101	20	0,45

[1)]Screws (Strength class 8.8) or hex nuts and washers to be ordered separately.
Other screw lengths on demand.
Threaded stud must have at least the strength of 8.8. Threaded studs with the certificate see page 174.

Coated Countersunk Screw DIN 7991 with Countersunk Washer[1]

Description	Ref. No.	Fixture thickn. tfix mm	Pkg. content pcs.	Wght. per pkg. kg
SK-IG 6x25[2]	55013101	6-14	100	0,78
SK-IG 8x30[2]	55112101	9-15	50	0,59
SK-IG 10x30	55211101	8-11	25	0,48
SK-IG 12x35	55311101	9-14	20	0,64

[1]Screws (Strength class 8.8) or hex nuts and washers to be ordered separately.
[2]Screw similar to DIN 7991 with Torx®-drive. Size see page 33.
Other screw lengths on demand.
Threaded stud must have at least the strength of 8.8. Threaded studs with the certificate see page 174.

Setting Tool BZ-IG for Pre-Installation

Description	Ref. No.	Weight per pcs. kg
BZ-IGS M 6V	43005150	0,43
BZ-IGS M 8V	43100150	0,44
BZ-IGS M 10V	43200150	0,46
BZ-IGS M 12V	43300150	0,56

Through Fastening

Wedge Anchor BZ-IG[1]

- Steel, zinc plated; Through Fastening
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth mm	Drill hole depth through fixture mm	Fixture thickness t_{fix} mm		Anchor length l mm	Thread Ø x length mm	Pkg. content pcs	Weight per pkg. kg
				Typ S-IG	Typ SK-IG				
BZ-IG M 6-10	03602101	8 x 60	74	10	14	60	M6 x 20	100	1,80
BZ-IG M 6-20	03604101	8 x 60	84	20	24	70	M6 x 20	100	2,20
BZ-IG M 6-30	03606101	8 x 60	94	30	34	80	M6 x 20	100	2,60
BZ-IG M 8-10	03611101	10 x 75	90	10	15	72	M8 x 22	50	1,65
BZ-IG M 8-20	03612101	10 x 75	100	20	25	82	M8 x 22	50	1,95
BZ-IG M 8-30	03613101	10 x 75	110	30	35	92	M8 x 22	50	2,25
BZ-IG M 10-10	03621101	12 x 90	106	10	16	80	M10 x 23	25	1,32
BZ-IG M 10-20	03622101	12 x 90	116	20	26	90	M10 x 23	25	1,48
BZ-IG M 10-30	03623101	12 x 90	126	30	36	100	M10 x 23	25	1,76
BZ-IG M 12-10	03631101	16 x 105	122	10	17	96	M12 x 27	20	2,34
BZ-IG M 12-20	03632101	16 x 105	132	20	27	106	M12 x 27	20	2,66
BZ-IG M 12-30	03633101	16 x 105	142	30	37	116	M12 x 27	20	2,97

Coated Screw DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1]

Description	Ref. No.	Pkg. content pcs	Weight per pcs. kg
S-IG 6x16	54020101	100	0,64
S-IG 8x18	54120101	50	0,68
S-IG 10x20	54220101	25	0,64
S-IG 12x25	54320101	20	0,67

[1]Screws (Strength class 8.8) to be ordered separately.

Coated Countersunk Screw DIN 7991 with Countersunk Washer[1]

Description	Ref. No.	Pkg. content pcs	Weight per pcs. kg
SK-IG 6x16[2]	55010101	100	0,64
SK-IG 8x20[2]	55110101	50	0,60
SK-IG 10x25	55210101	25	0,62
SK-IG 12x30	55310101	20	0,80

[2]Screw similar to DIN 7991 with Torx®-drive. Size see page 33.

Setting Tool BZ-IG for Through Fastening

Description	Ref. No.	Weight per pcs. kg
BZ-IGS M 6D	43005155	0,32
BZ-IGS M 8D	43100155	0,33
BZ-IGS M 10D	43200155	0,33
BZ-IGS M 12D	43300155	0,35

ETA-99/0010

Extract from Permissible Service Conditions of European Technical Assessment ETA-99/0010 for use in cracked and uncracked concrete (Option 1)

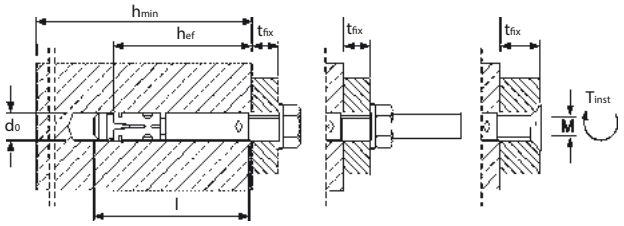
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 196.

Loads and performance data	Wedge Anchor BZ-IG			M 6	M 8	M 10	M 12
					cracked concrete		
Mean ultimate loads, tension	C25/30	Num	[kN]	14,1	19,8	28,3	45,9
Mean ultimate loads, shear	C25/30	Vum	[kN]	8,7	11,4	14,8	33,9
Approved loads, tension	C20/25	appr. N	[kN]	2,0	3,6	4,8	7,9
	C25/30	appr. N	[kN]	2,2	4,0	5,3	8,9
	C30/37	appr. N	[kN]	2,4	4,4	5,8	9,7
	C40/50	appr. N	[kN]	2,8	5,1	6,7	11,2
	C50/60	appr. N	[kN]	3,1	5,6	7,5	12,5
					uncracked concrete		
Approved loads, tension	C20/25	appr. N	[kN]	4,8	6,3	7,9	11,9
	C25/30	appr. N	[kN]	5,3	7,1	8,9	13,3
	C30/37	appr. N	[kN]	5,8	7,8	9,7	14,6
	C40/50	appr. N	[kN]	6,7	9,0	11,2	16,8
	C50/60	appr. N	[kN]	7,5	10,0	12,4	18,8
					cracked / uncracked concrete		
Approved loads, shear (Pre-Installation)	≥ C20/25	appr. V	[kN]	3,3	3,9	5,9	14,7
Approved loads, shear (Through Fastening)	≥ C20/25	appr. V	[kN]	2,9	4,3	6,2	13,9
Approved bending moments (Pre-Installation)		appr. M	[Nm]	7,0	17,1	34,2	59,8
Approved bending moments (Through Fastening)		appr. M	[Nm]	20,6	30,4	43,4	118,3
Spacing and edge distance							
Effective anchorage depth		h_{ef}	[mm]	45	58	65	80
Characteristic spacing		$s_{cr,N}$	[mm]	135	174	195	240
Characteristic edge distance		$c_{cr,N}$	[mm]	67,5	87	97,5	120
					cracked concrete		
Minimum spacing / for edge distance c		s_{min} / c	[mm]	50 / 60	60 / 80	70 / 100	80 / 120
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50 / 75	60 / 100	70 / 100	80 / 120
					uncracked concrete		
Minimum spacing / for edge distance c		s_{min} / c	[mm]	50 / 80	60 / 100	65 / 120	80 / 160
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50 / 115	60 / 155	70 / 170	100 / 210
Minimum thickness		h_{min}	[mm]	100	120	130	160
Installation parameters							
Drill hole diameter		d_o	[mm]	8	10	12	16
Diameter of clearance hole in the fixture - Pre-Installation		d_f	[mm]	7	9	12	14
Diameter of clearance hole in the fixture - Through Fastening		d_f	[mm]	9	12	14	18
Depth of drill hole		h_1	[mm]	60	75	90	105
Installation torque	Screw DIN 933	T_{inst}	[Nm]	10	30	30	55
	Countersunk screw	T_{inst}	[Nm]	10	25	40	50
	Threaded rod	T_{inst}	[Nm]	8	25	30	45
Width across nut	Screw DIN 933	SW	[mm]	10	13	17	19
Internal hexagon size	Countersunk screw	SW	[mm]	-	-	6	8
Torx® size	Countersunk screw			T30	T45	-	-
Min. thickness of fixture	Screw DIN 933 or Threaded rod	t_{fix} ≥	[mm]	1 / 5[1)]	1 / 7[1)]	1 / 8[1)]	1 / 9[1)]
Min. thickness of fixture	Countersunk screw	t_{fix} ≥	[mm]	5 / 9[1)]	7 / 12[1)]	8 / 14[1)]	9 / 16[1)]

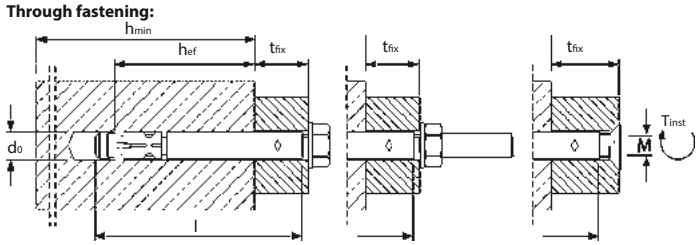
[1)]Pre-Installation / Through Installation.

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

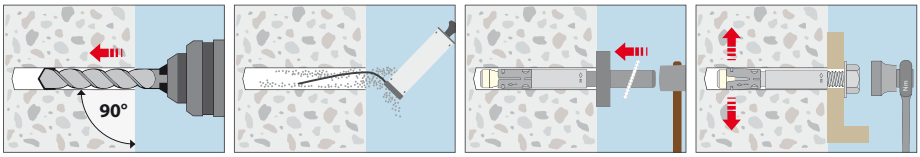
Pre-installation:



Through fastening:



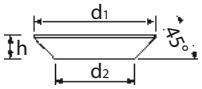
Installation (Pre-installation)



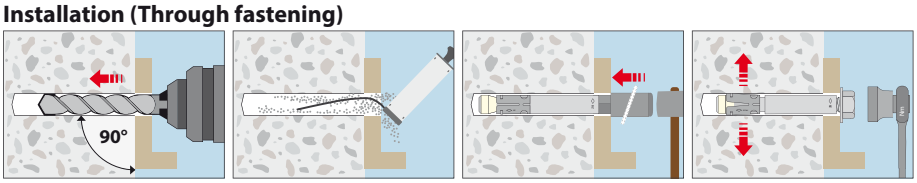
Dimension countersunk washer [mm]

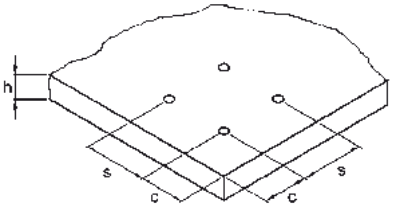
	d1	d2	h
SK M 6	16,5	9,5	3,9
SK M 8	20,5	11,5	5,0
SK M 10	24,5	14,5	5,7
SK M 12	29,5	17,5	6,7

Countersunk head



Installation (Through fastening)





Wedge Anchor BZ-IG A4

Stainless Steel A4/316

Range of Loading: **2,0 kN–18,8 kN**

Range of concrete quality: **C20/25–C50/60**

R30-R120

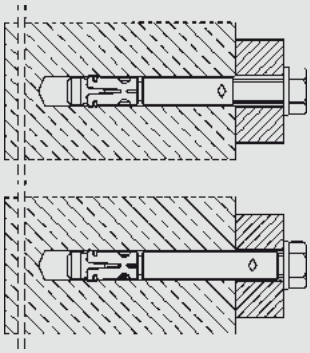
M8-M12

Description

The fastening system BZ-IG A4 is the first approved (ETA-99/0010) wedge anchor for cracked concrete with internal thread. It combines the benefits of a mechanical anchor with an easy installation and the flexibility of an internal thread. For the first time it is possible to fasten balcony and stair railings or stadium seats using a countersunk head screw at favourable costs. Since this anchor system is also approved for use with hexagon head screws and standard threaded rods a wide range of applications is possible. Compared to a drop in anchor the fastening system BZ-IG A4 can carry significant higher loads, even in cracked concrete. The versatility of the MKT Fastening System BZ-IG breaks new ground in design and application.

Applications

Medium to heavy duty fastenings in cracked and uncracked concrete: Railings, chairs in sports arenas, facade substructures, suspended ceilings, ladders, doors, sprinkler systems, pipe hangers and all kinds of temporary fastenings.



Pre-installation:
For pre-installation the Anchor gets installed below the concrete surface. When the coated screw gets removed the anchor leaves flush with the concrete surface. So it´s excellent for temporary fastenings.

Through fastening:
If through-fastening is used the fixture can be used as drilling template. Afterwards the Anchor can be installed through the clearance hole in the fixture. So it combines easy installation with the aesthetics of a screw head.

Pre-Installation

Wedge Anchor BZ-IG A4[1)]

- Stainless steel A4/316; Pre-Installation
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth mm	Anchor length mm	Thread Ø x length mm	Pkg. content pcs.	Weight per pkg. kg
BZ-IG M 6-0 A4	03600501	8 x 60	50	M6x20	100	1,42
BZ-IG M 8-0 A4	03610501	10 x 75	62	M8x22	50	1,31
BZ-IG M 10-0 A4	03620501	12 x 90	70	M10x23	25	1,08
BZ-IG M 12-0 A4	03630501	16 x 105	86	M12x27	20	2,03

Coated Screw DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1)]

Description	Ref. No.	Fixture thickn. t_{fix} mm	Pkg. content pcs.	Weight per pkg. kg
S-IG 6x25 A4	54010501	4-12	100	0,80
S-IG 8x25 A4	54110501	2-8	50	0,79
S-IG 10x40 A4	54210501	15-19	25	0,90
S-IG 12x45 A4	54310501	16-21	20	1,13

Coated Hex Nut DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1)]

Description	Ref. No.	Pkg. content pcs	Weight per pkg. kg
MU-IG 6 A4	56005501	100	0,32
MU-IG 8 A4	56105501	50	0,35
MU-IG 10 A4	56205501	25	0,36
MU-IG 12 A4	56305501	20	0,45

[1)]Screws or hex nuts and washers to be ordered separately.

Coated Countersunk Screw ISO 10642 with Countersunk Washer[1)]

Description	Ref. No.	Fixture thickn. t_{fix} mm	Pkg. content pcs.	Wght. per pkg. kg
SK-IG 6x25 A4[2)]	55013501	6-14	100	0,53
SK-IG 8x30 A4[2)]	55112501	9-15	50	0,59
SK-IG 10x30 A4	55211501	8-11	25	0,48
SK-IG 12x35 A4	55311501	9-14	20	0,64

[1)]Screws or hex nuts and washers to be ordered separately.
[2)]Screw similar to ISO 10642 with Torx®-drive. Size see page 36.
Anchor system in high corossion restistant steel grade 1.4529 on demand. Other screw lengths on demand.

Setting Tool BZ-IG for Pre-Installation

Description	Ref. No.	Weight per pcs. kg
BZ-IGS M 6V	43005150	0,43
BZ-IGS M 8V	43100150	0,44
BZ-IGS M 10V	43200150	0,46
BZ-IGS M 12V	43300150	0,56

Through Fastening

Wedge Anchor BZ-IG A4[1)]

- Stainless steel A4/316; Through Fastening
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth mm	Drill hole depth through fixture mm	Fixture thickness t_{fix} mm		Anchor length l mm	Thread Ø x length mm	Pkg. content pcs	Weight per pkg. kg
				Typ S-IG	Typ SK-IG				
BZ-IG M 6-10 A4	03602501	8 x 60	74	10	14	60	M6 x 20	100	1,80
BZ-IG M 6-20 A4	03604501	8 x 60	84	20	24	70	M6 x 20	100	2,20
BZ-IG M 6-30 A4	03606501	8 x 60	94	30	34	80	M6 x 20	100	2,60
BZ-IG M 8-10 A4	03611501	10 x 75	90	10	15	72	M8 x 22	50	1,65
BZ-IG M 8-20 A4	03612501	10 x 75	100	20	25	82	M8 x 22	50	1,95
BZ-IG M 8-30 A4	03613501	10 x 75	110	30	35	92	M8 x 22	50	2,25
BZ-IG M 10-10 A4	03621501	12 x 90	106	10	16	80	M10 x 23	25	1,32
BZ-IG M 10-20 A4	03622501	12 x 90	116	20	26	90	M10 x 23	25	1,48
BZ-IG M 10-30 A4	03623501	12 x 90	126	30	36	100	M10 x 23	25	1,76
BZ-IG M 12-10 A4	03631501	16 x 105	122	10	17	96	M12 x 27	20	2,34
BZ-IG M 12-20 A4	03632501	16 x 105	132	20	27	106	M12 x 27	20	2,66
BZ-IG M 12-30 A4	03633501	16 x 105	142	30	37	116	M12 x 27	20	2,97

[1)]Screws to be ordered separately. Anchor system in high corossion restistant steel grade 1.4529 on demand.

Coated Screw DIN 933 with Washer DIN EN ISO 7089 (DIN 125)[1)]

Description	Ref. No.	Pkg. content pcs	Weight per pcs. kg
S-IG 6x16 A4	54020501	100	0,64
S-IG 8x18 A4	54120501	50	0,68
S-IG 10x20 A4	54220501	25	0,64
S-IG 12x25 A4	54320501	20	0,67

[1)]Screws to be ordered separately. Anchor system in high corossion restistant steel grade 1.4529 on demand.

Coated Countersunk Screw ISO 10642 with Countersunk Washer[1)]

Description	Ref. No.	Pkg. content pcs	Weight per pcs. kg
SK-IG 6x16 A4[2)]	55010501	100	0,64
SK-IG 8x20 A4[2)]	55110501	50	0,60
SK-IG 10x25 A4	55210501	25	0,62
SK-IG 12x30 A4	55310501	20	0,80

[1)]Screws or hex nuts and washers to be ordered separately.
[2)]Screw similar to ISO 10642 with Torx®-drive. Size see page 36.
Anchor system in high corossion restistant steel grade 1.4529 on demand.
Other screw lengths on demand.

Setting Tool BZ-IG for Through Fastening

Description	Ref. No.	Weight per pcs. kg
BZ-IGS M 6D	43005155	0,32
BZ-IGS M 8D	43100155	0,33
BZ-IGS M 10D	43200155	0,33
BZ-IGS M 12D	43300155	0,35

Extract from Permissible Service Conditions of European Technical Assessment ETA-99/0010 for use in cracked and uncracked concrete (Option 1)

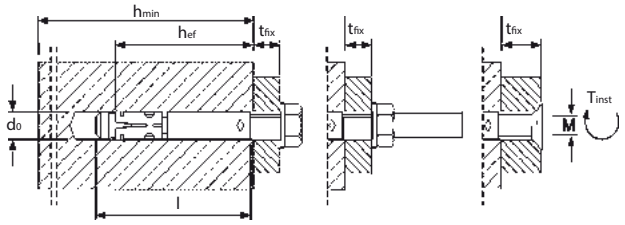
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data	Wedge Anchor BZ-IG A4			M 6	M 8	M 10	M 12
					cracked concrete		
Mean ultimate loads, tension	C25/30	Num	[kN]	14,1	19,8	28,3	45,9
Mean ultimate loads, shear	C25/30	Vum	[kN]	12,0	12,2	14,9	45,4
Approved loads, tension	C20/25	appr. N	[kN]	2,0	3,6	4,8	7,9
	C25/30	appr. N	[kN]	2,2	4,0	5,3	8,9
	C30/37	appr. N	[kN]	2,4	4,4	5,8	9,7
	C40/50	appr. N	[kN]	2,8	5,1	6,7	11,2
	C50/60	appr. N	[kN]	3,1	5,6	7,5	12,5
					uncracked concrete		
Approved loads, tension	C20/25	appr. N	[kN]	4,8	6,3	7,9	11,9
	C25/30	appr. N	[kN]	5,3	7,1	8,9	13,3
	C30/37	appr. N	[kN]	5,4	7,8	9,7	14,6
	C40/50	appr. N	[kN]	5,4	9,0	11,2	16,8
	C50/60	appr. N	[kN]	5,4	9,8	12,5	18,8
					cracked / uncracked concrete		
Approved loads, shear (Pre-Installation)	≥ C20/25	appr. V	[kN]	3,3	5,3	6,1	13,5
Approved loads, shear (Through Fastening)	≥ C20/25	appr. V	[kN]	4,2	4,3	5,5	16,9
Approved bending moments (Pre-Installation)		appr. M	[Nm]	4,9	12,0	23,9	41,9
Approved bending moments (Through Fastening)		appr. M	[Nm]	16,1	25,3	39,9	109,3
Spacing and edge distance							
Effective anchorage depth		h_{ef}	[mm]	45	58	65	80
Characteristic spacing		$s_{cr,N}$	[mm]	135	174	195	240
Characteristic edge distance		$c_{cr,N}$	[mm]	67,5	87	97,5	120
					cracked concrete		
Minimum spacing / for edge distance c		s_{min} / c	[mm]	50 / 60	60 / 80	70 / 100	80 / 120
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50 / 75	60 / 100	70 / 100	80 / 120
					uncracked concrete		
Minimum spacing / for edge distance c		s_{min} / c	[mm]	50 / 80	60 / 100	65 / 120	80 / 160
Minimum edge distance / for spacing s		c_{min} / s	[mm]	50 / 115	60 / 155	70 / 170	100 / 210
Minimum thickness		h_{min}	[mm]	100	120	130	160
Installation parameters							
Drill hole diameter		d_o	[mm]	8	10	12	16
Diameter of clearance hole in the fixture - Pre-Installation		d_f	[mm]	7	9	12	14
Diameter of clearance hole in the fixture - Through Fastening		d_f	[mm]	9	12	14	18
Depth of drill hole		h_1	[mm]	60	75	90	105
Installation torque	Screw DIN 933	T_{inst}	[Nm]	15	40	50	100
	Countersunk screw	T_{inst}	[Nm]	12	25	45	60
	Threaded rod	T_{inst}	[Nm]	8	25	40	80
Width across nut	Screw DIN 933	SW	[mm]	10	13	17	19
Internal hexagon size	Countersunk screw	SW	[mm]	-	-	6	8
Torx® size	Countersunk screw			T30	T40	-	-
Min. thickness of fixture		t_{fix} ≥	[mm]	1 / 5[1)]	1 / 7[1)]	1 / 8[1)]	1 / 9[1)]
Min. thickness of fixture	Countersunk screw	t_{fix} ≥	[mm]	5 / 9[1)]	7 / 12[1)]	8 / 14[1)]	9 / 16[1)]

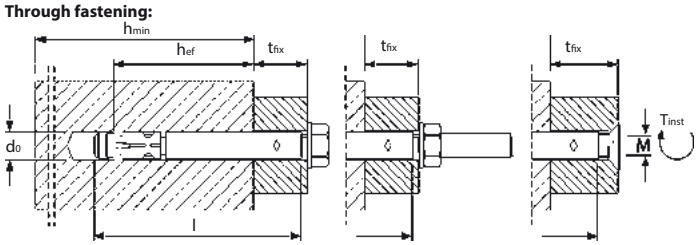
[1)] Pre-Installation / Through Installation.

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

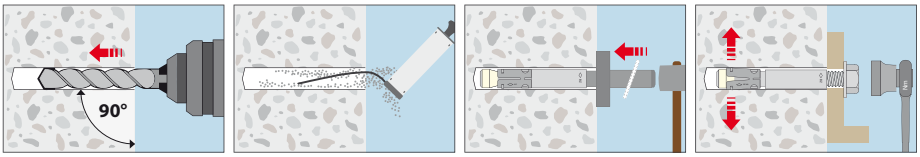
Pre-installation:



Through fastening:



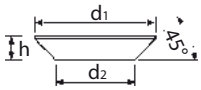
Installation (Pre-installation)



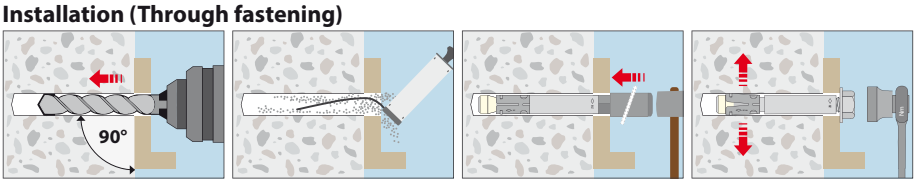
Dimension countersunk washer [mm]

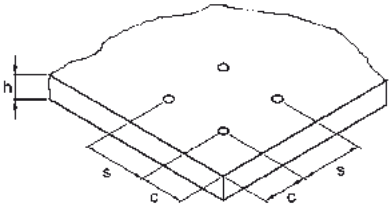
	d1	d2	h
SK M 6	16,5	9,5	3,9
SK M 8	20,5	11,5	5,0
SK M 10	24,5	14,5	5,7
SK M 12	29,5	17,5	6,7

Countersunk head



Installation (Through fastening)





Mechanical Heavy Duty Anchors

Wedge Anchor B

Steel, zinc plated

Range of loading: **2,9 kN–41,4 kN**
Range of concrete quality: **C20/25–C50/60**

F30-F120

M10 - M16

Description

The tried and tested wedge anchor B with European Technical Assessment, Option 7, is ideal for time-saving through fastenings in uncracked concrete.

Thanks to its three anchorage depths, it adapts flexibly to the respective installation requirement. The use with minimum anchorage depth reduces the drilling and installation effort as well as the risk of reinforcement hits. When using a suction drill, the need for blowing out the drill hole is eliminated.

The long thread also makes stand-off fastenings possible. The hot dip galvanised version is also included in the European Technical Assessment, like the B-U version with the extra large washer for timber structures.

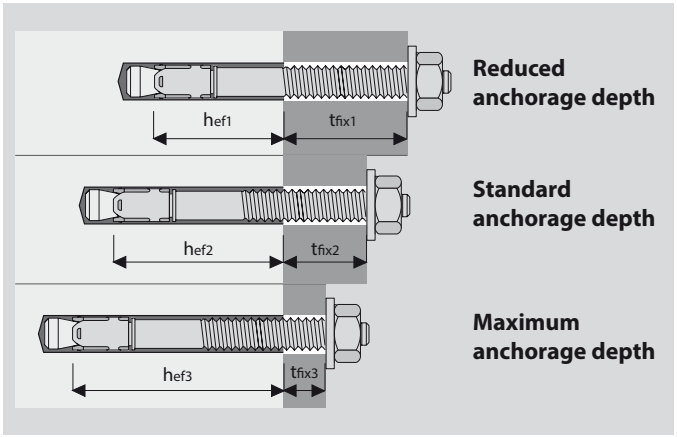
Advantages

- Approved for use in uncracked concrete
- Very high load limits and small spacings and edge distances
- Three anchorage depths for optimal flexibility
- The smaller effective anchorage depth helps to reduce drilling and installation time
- Mounting with maximum anchorage depth for for maximum, permissible loads
- Particularly cost effective: shorter lengths with only one (smaller) anchorage depth
- Suitable for surface, through and stand-off fastenings
- All sizes covered by the European Technical Assessment are assembled with a stainless steel expansion clip
- Fire tested for fire resistance ratings F30–F120
- US approval (FM) for the installation of sprinkler systems (M10 to M16)
- An impact head protects the thread from damage when it is driven into the drilled hole

Applications

Medium to heavy-duty fastenings indoors: Wood and Metal constructions, channels, brackets, supports, hand rails, cable trays, ducts, shelf bases.

Example of Installation



Wedge Anchor B

- Steel, zinc plated
- Approved for uncracked concrete
- Three anchorage depths for optimal flexibility

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Reduced anchorage depth: Fixture thickness $t_{fix,min}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,min}$ mm	Maximum anchorage depth: Fixture thickness $t_{fix,max}$ mm	Maximum anchorage depth: Anchorage depth $h_{ef,max}$ mm	Setting depth h_1 mm	Anchor length l mm	Thread ØxL mm	Pkg. content pcs.	Weight per pkg. kg
B 6-5/40[1)]	01005101	6	-	-	5	18	-	-	$h_{ef}+9$	40	M6x16	100	1,05
B 6-5/52	01006101	6	-	-	5	30	-	-	$h_{ef}+9$	52	M6x20	100	1,26
B 6-10-20/67	01010101	6	10	40	20	30	-	-	$h_{ef}+9$	67	M6x30	100	1,55
B 6-15-25/72	01013101	6	15	40	25	30	-	-	$h_{ef}+9$	72	M6x35	100	1,63
B 6-25-35/82	01015101	6	25	40	35	30	5	60	$h_{ef}+9$	82	M6x35	100	1,81
B 6-40-50/97	01025101	6	40	40	50	30	20	60	$h_{ef}+9$	97	M6x35	100	2,07
B 8-5/50[1)]	01105101	8	-	-	5	24	-	-	$h_{ef}+11$	50	M8x22	100	2,32
B 8-4/60	01110101	8	-	-	4	35	-	-	$h_{ef}+12$	60	M8x25	100	2,62
B 8-10-19/75	01115101	8	10	44	19	35	-	-	$h_{ef}+12$	75	M8x40	100	3,10
B 8-15-24/80	01120101	8	15	44	24	35	-	-	$h_{ef}+12$	80	M8x45	100	3,26
B 8-20-29/85	01125101	8	20	44	29	35	-	-	$h_{ef}+12$	85	M8x50	100	3,40
B 8-25-34/90	01130101	8	25	44	34	35	-	-	$h_{ef}+12$	90	M8x55	100	3,59
B 8-30-39/95	01135101	8	30	44	39	35	4	70	$h_{ef}+12$	95	M8x60	100	3,72
B 8-35-44/100	01140101	8	35	44	44	35	9	70	$h_{ef}+12$	100	M8x65	100	3,89
B 8-45-54/110	01145101	8	45	44	54	35	19	70	$h_{ef}+12$	110	M8x75	100	4,22
B 8-55-64/120	01150101	8	55	44	64	35	29	70	$h_{ef}+12$	120	M8x85	100	4,54
B 8-100-109/165	01158101	8	100	44	109	35	74	70	$h_{ef}+12$	165	M8x85	50	2,99
B 10-10/60[1)]	01205101	10	-	-	10	25	-	-	$h_{ef}+15$	60	M10x25	50	2,29
B 10-10-16/85	01210101	10	10	48	16	42	-	-	$h_{ef}+14$	85	M10x40	50	2,83
B 10-15-21/90	01215101	10	15	48	21	42	-	-	$h_{ef}+14$	90	M10x45	50	2,94
B 10-20-26/95	01220101	10	20	48	26	42	-	-	$h_{ef}+14$	95	M10x50	50	3,06
B 10-30-36/105	01225101	10	30	48	36	42	-	-	$h_{ef}+14$	105	M10x60	50	3,32
B 10-45-51/120	01230101	10	45	48	51	42	13	80	$h_{ef}+14$	120	M10x75	50	3,72
B 10-50-56/125	01235101	10	50	48	56	42	18	80	$h_{ef}+14$	125	M10x80	50	3,85
B 10-70-76/145	01240101	10	70	48	76	42	38	80	$h_{ef}+14$	145	M10x80	50	4,35
B 10-100-106/175	01245101	10	100	48	106	42	68	80	$h_{ef}+14$	175	M10x80	50	5,10
B 10-140-146/215	01250101	10	140	48	146	42	108	80	$h_{ef}+14$	215	M10x80	25	3,06
B 12-5/75[1)]	01305101	12	-	-	5	38	-	-	$h_{ef}+17$	75	M12x30	25	1,98
B 12-13/95	01310101	12	-	-	13	50	-	-	$h_{ef}+17$	95	M12x50	25	2,33
B 12-10-25/105	01312101	12	10	65	25	50	-	-	$h_{ef}+17$	105	M12x60	25	2,55
B 12-15-30/110	01315101	12	15	65	30	50	-	-	$h_{ef}+17$	110	M12x65	25	2,60
B 12-20-35/115	01320101	12	20	65	35	50	-	-	$h_{ef}+17$	115	M12x70	25	2,70
B 12-30-45/125	01325101	12	30	65	45	50	-	-	$h_{ef}+17$	125	M12x80	25	2,88
B 12-50-65/145	01330101	12	50	65	65	50	15	100	$h_{ef}+17$	145	M12x100	25	3,26
B 12-65-80/160	01335101	12	65	65	80	50	30	100	$h_{ef}+17$	160	M12x100	25	3,49
B 12-85-100/180	01340101	12	85	65	100	50	50	100	$h_{ef}+17$	180	M12x100	25	3,90
B 12-105-120/200	01345101	12	105	65	120	50	70	100	$h_{ef}+17$	200	M12x100	25	4,22
B 12-125-140/220	01350101	12	125	65	140	50	90	100	$h_{ef}+17$	220	M12x80	25	5,04
B 12-145-160/240	01355101	12	145	65	160	50	110	100	$h_{ef}+17$	240	M12x80	20	4,38
B 12-160-175/255	01365101	12	160	65	175	50	125	100	$h_{ef}+17$	255	M12x80	20	4,68
B 12-190-205/285	01370101	12	190	65	205	50	155	100	$h_{ef}+17$	285	M12x80	20	5,21
B 12-230-245/325	01375101	12	230	65	245	50	195	100	$h_{ef}+17$	325	M12x80	20	5,90
B 12-260-275/355	01380101	12	260	65	275	50	225	100	$h_{ef}+17$	355	M12x80	20	6,53
B 16-5/90[1)]	01505101	16	-	-	5	47	-	-	$h_{ef}+18$	90	M16x35	20	3,32
B 16-13/115	01510101	16	-	-	13	64	-	-	$h_{ef}+20$	115	M16x60	20	3,98
B 16-10-28/130	01512101	16	10	82	28	64	-	-	$h_{ef}+20$	130	M16x70	20	4,50
B 16-30-48/150	01515101	16	30	82	48	64	-	-	$h_{ef}+20$	150	M16x90	20	4,87
B 16-60-78/180	01520101	16	60	82	78	64	22	120	$h_{ef}+20$	180	M16x110	20	5,66
B 16-80-98/200	01525101	16	80	82	98	64	42	120	$h_{ef}+20$	200	M16x110	10	3,12
B 16-100-118/220	01530101	16	100	82	118	64	62	120	$h_{ef}+20$	220	M16x80	10	3,64
B 16-130-148/250	01535101	16	130	82	148	64	92	120	$h_{ef}+20$	250	M16x80	10	4,10
B 16-165-183/285	01540101	16	165	82	183	64	127	120	$h_{ef}+20$	285	M16x80	10	4,68
B 16-200-218/320	01545101	16	200	82	218	64	162	120	$h_{ef}+20$	320	M16x80	10	5,23
B 20-10/120[1)]	01604101	20	-	-	10	67	-	-	$h_{ef}+23$	120	M20x50	10	3,17
B 20-5-27/150	01605101	20	5	100	27	78	-	-	$h_{ef}+21$	150	M20x70	10	3,78
B 20-20-42/165	01607101	20	20	100	42	78	5	115	$h_{ef}+21$	165	M20x70	10	4,12
B 20-35-57/180	01610101	20	35	100	57	78	20	115	$h_{ef}+21$	180	M20x70	10	4,44
B 20-60-82/205	01612101	20	60	100	82	78	45	115	$h_{ef}+21$	205	M20x70	10	4,94
B 20-95-117/240	01615101	20	95	100	117	78	80	115	$h_{ef}+21$	240	M20x70	10	6,10
B 20-120-142/265	01622101	20	120	100	142	78	105	115	$h_{ef}+21$	265	M20x70	10	6,65

[1)]Not part of assessment.

Wedge Anchor B-U

- Steel, zinc plated
- Large washer DIN EN ISO 7094 (formerly DIN 440)
- Approved for uncracked concrete
- Three anchorage depths for optimal flexibility

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Reduced anchorage depth: Fixture thickness $t_{fix,min}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,min}$ mm	Maximum anchorage depth: Fixture thickness $t_{fix,max}$ mm	Maximum anchorage depth: Anchorage depth $h_{ef,max}$ mm	Setting depth h_1 mm	Anchor length l mm	Thread ØxL mm	Washer[1] d2xs mm	Pkg. content pcs.	Weight per pkg. kg
B-U 12-85-100/180	01340701	12	85	65	100	50	50	100	h_{ef} + 17	180	M12x100	44x4	25	4,74
B-U 12-105-120/200	01345701	12	105	65	120	50	70	100	h_{ef} + 17	200	M12x100	44x4	25	5,05
B-U 12-125-140/220	01350701	12	125	65	140	50	90	100	h_{ef} + 17	220	M12x80	44x4	25	5,90
B-U 12-145-160/240	01355701	12	145	65	160	50	110	100	h_{ef} + 17	240	M12x80	44x4	20	5,09
B-U 12-160-175/255	01365701	12	160	65	175	50	125	100	h_{ef} + 17	255	M12x80	44x4	20	5,36
B-U 12-190-205/285	01370701	12	190	65	205	50	155	100	h_{ef} + 17	285	M12x80	44x4	20	5,88
B-U 12-230-245/325	01375701	12	230	65	245	50	195	100	h_{ef} + 17	325	M12x80	44x4	20	6,56
B-U 12-260-275/355	01380701	12	260	65	275	50	225	100	h_{ef} + 17	355	M12x80	44x4	10	3,48
B-U 12-300-315/395	01385701	12	300	65	315	50	265	100	h_{ef} + 17	395	M12x80	44x4	20	7,80
B-U 12-335-350/430	01390701	12	335	65	350	50	300	100	h_{ef} + 17	430	M12x80	44x4	20	8,00
B-U 16-80-98/200	01525701	16	80	82	98	64	42	120	h_{ef} + 20	200	M16x110	56x5	10	3,75
B-U 16-100-118/220	01530701	16	100	82	118	64	62	120	h_{ef} + 20	220	M16x80	56x5	10	4,25
B-U 16-130-148/250	01535701	16	130	82	148	64	92	120	h_{ef} + 20	250	M16x80	56x5	10	4,72
B-U 16-165-183/285	01540701	16	165	82	183	64	127	120	h_{ef} + 20	285	M16x80	56x5	10	5,32
B-U 16-200-218/320	01545701	16	200	82	218	64	162	120	h_{ef} + 20	320	M16x80	56x5	10	5,95
B-U 16-220-238/340	01550701	16	220	82	238	64	182	120	h_{ef} + 20	340	M16x80	56x5	10	6,16
B-U 16-260-278/380	01557701	16	260	82	278	64	222	120	h_{ef} + 20	380	M16x80	56x5	10	6,75
B-U 16-300-318/420	01560701	16	300	82	318	64	262	120	h_{ef} + 20	420	M16x80	56x5	10	7,35

[1]Outer diameter x thickness

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

ETA-01/0013

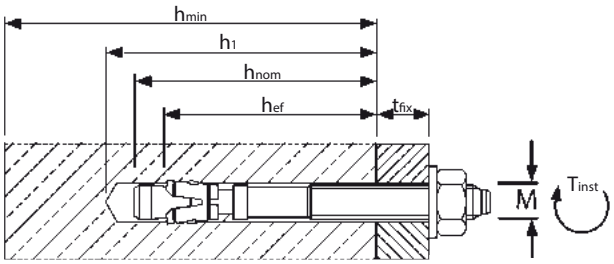
Extract from Permissible Service Conditions of European Technical Assessment ETA-01/0013 for use in uncracked concrete (Option 7)

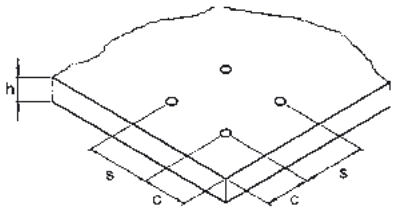
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data	**Wedge Anchor B**			**M 6**			**M8**			**M 10**			**M 12**			**M 16**			**M 20**		
Reduced anchorage depth		h_{ef1}	**[mm]**	**30**[1]			**35**[1]			**42**			**50**			**64**			**78**		
Standard anchorage depth		h_{ef2}	**[mm]**		**40**			**44**			**48**			**65**			**82**			**100**	
Maximum anchorage depth		h_{ef3}	**[mm]**			**60**			**70**			**80**			**100**			**120**			**115**
				uncracked concrete																	
Mean ultimate loads, tension	C25/30	Num	[kN]	9,6	12	12	12,3	18,7	18,7	19,2	23,6	23,6	26,1	34,5	34,5	43,6	51,4	51,4	53,6	70,0	70,0
Mean ultimate loads, shear	C25/30	Vum	[kN]	7,3	7,3	7,3	19,3	19,3	19,3	28,1	28,1	28,1	41,3	41,3	41,3	73,0	73,0	73,0	103,6	103,6	103,6
Approved loads, tension	C20/25	appr. N	[kN]	3,1	4,1	4,1	4,9	6,2	6,2	6,4	7,8	7,8	8,3	12,3	12,4	12,0	17,4	19,0	16,1	23,4	26,2
	C25/30	appr. N	[kN]	3,5	4,1	4,1	5,4	6,9	6,9	7,1	8,7	8,7	9,3	13,7	13,8	12,9	18,7	20,5	18,0	26,2	29,3
	C30/37	appr. N	[kN]	3,8	4,1	4,1	5,9	7,3	7,3	7,8	9,5	9,6	10,1	15,0	15,2	13,7	19,9	21,8	19,8	28,7	32,1
	C40/50	appr. N	[kN]	4,1	4,1	4,1	6,9	7,3	7,3	9,0	11,0	11,0	11,7	16,7	16,7	15,1	21,8	23,9	22,8	33,1	37,0
	C50/60	appr. N	[kN]	4,1	4,1	4,1	7,3	7,3	7,3	10,1	12,3	12,3	13,1	16,7	16,7	16,2	23,5	25,8	25,5	37,0	41,4
Approved loads, shear	≥ C20/25	appr. V	[kN]	2,9	2,9	2,9	6,3	6,3	6,3	9,7	9,7	9,7	14,3	14,3	14,3	23,6	23,6	23,6	37,1	37,1	37,1
Approved bending moments		appr. M	[Nm]	5,1	5,1	5,1	13,1	13,1	13,1	25,7	25,7	25,7	44,6	44,6	44,6	99,9	99,9	99,9	195,0	195,0	195,0
Spacing and edge distance																					
Effective anchorage depth		h_{ef}	[mm]	30	40	60	35	44	70	42	48	80	50	65	100	64	82	120	78	100	115
Minimum thickness		h_{min}	[mm]	80	100	120	80	100	126	100	100	132	100	130	165	130	170	208	160	200	215
Characteristic spacing		$s_{cr,N}$	[mm]	90	120	180	105	132	210	126	144	240	150	195	300	192	246	360	234	300	345
Characteristic edge distance		$c_{cr,N}$	[mm]	45	60	90	52,5	66	105	63	72	120	75	97,5	150	96	123	180	117	150	172,5
Minimum spacing		s_{min}	[mm]	35	35	35	40	40	40	55	55	55	100	75	75	100	90	90	140	105	105
Minimum edge distance		c_{min}	[mm]	40	40	40	45	45	45	65	65	65	100	90	90	100	105	105	140	125	125
Installation parameters																					
Drill hole diameter		d_o	[mm]	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	7	7	7	9	9	9	12	12	12	14	14	14	18	18	18	22	22	22
Depth of drill hole		$h_1 \geq$	[mm]	45	55	75	55	65	91	65	70	102	75	90	125	95	110	148	110	130	145
Installation torque		T_{inst}	[Nm]	8	8	8	15	15	15	30	30	30	50	50	50	100	100	100	200	200	200
Width across nut		SW	[mm]	10	10	10	13	13	13	17	17	17	19	19	19	24	24	24	30	30	30
Height of the hexagon nut			[mm]	5	5	5	6,5	6,5	6,5	8	8	8	10	10	10	13	13	13	16	16	16
Outer diameter x washer thickness B		d2 x s	[mm]	12 x 1,6	12 x 1,6	12 x 1,6	16 x 1,6	16 x 1,6	16 x 1,6	20 x 2	20 x 2	20 x 2	24 x 2,5	24 x 2,5	24 x 2,5	30 x 3	30 x 3	30 x 3	37 x 3	37 x 3	37 x 3
Outer diameter x washer thickness B-U		d2 x s	[mm]	-	-	-	-	-	-	-	-	-	44 x 4	44 x 4	44 x 4	56 x 5	56 x 5	56 x 5	-	-	-

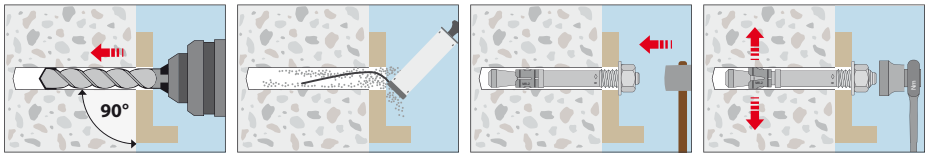
[1] Application limited to statically indeterminated systems.

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





Installation



Wedge Anchor B

Hot dip galvanized

Range of loading: **4,9 kN–41,4 kN**

Range of concrete quality: **C20/25–C50/60**

ETA-01/0013

F30-F120

UKTA - 22/6207

Description

The hot-dip galvanized Wedge Anchor B fvz with European Technical Assessment, option 7, combines the advantages of the galvanized version with additional corrosion protection.

This means that the B fvz can also be used in uncracked concrete for pre-placement and time-saving push-through installations, and thanks to its three anchorage, it can be flexibly adapted to the respective installation requirements.

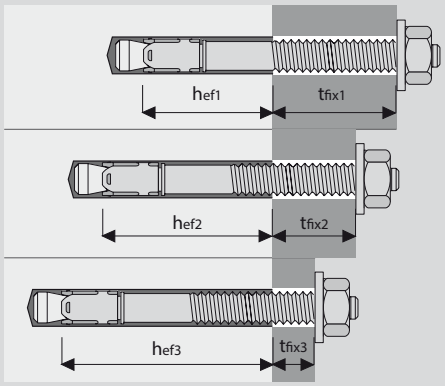
Advantages

– Approved for use in uncracked concrete (option 7)
– Very high permissible loads and small edge and center distances
– Hot-dip galvanizing ≥ 50 µm[1)] for increased corrosion protection vs. Wedge anchor B
– Three anchorage depths for optimum flexibility
– Installation with minimum anchorage depth saves drilling effort and time
– Installation with maximum anchorage depth for maximum, high-permissible loads
– Suitable for push-in, push-through and spaced installation
– Particularly economical: The short versions with minimum anchorage depth
– Stainless steel expansion sleeve
– Fire tested F30-F120
– An impact cap prevents damage to the thread during hammering into the drill hole

Applications

Indoor medium to heavy duty applications: metal constructions, channels, brackets, supports, cladding systems, hand rails, cable trays, ducts.

Example of Installation



[1)] Applies to average plating thickness according to EN ISO 10684

Wedge Anchor B fvz

- Steel, hot dip galvanized ≥ 50 µm (average plating thickness according to EN ISO 10684)
- Improved corrosion protection
- Approved for uncracked concrete
- Three anchorage depths

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Reduced anchorage depth: Fixture thickness $t_{fix,min}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,min}$ mm	Maximum anchorage depth: Fixture thickness $t_{fix,max}$ mm	Maximum anchorage depth: Anchorage depth $h_{ef,max}$ mm	Setting depth h_1 mm	Anchor length l mm	Thread ØxL mm	Pkg. content pcs.	Weight per pkg. kg
B 6-5/40 fvz[1)]	01005201	6	-	-	5	18	-	-	h_{ef} + 9	40	M6x16	100	1,06
B 6-10-20/67 fvz[1)]	01010201	6	10	40	20	30	-	-	h_{ef} + 9	67	M6x30	100	1,57
B 6-25-35/82 fvz[1)]	01015201	6	25	40	35	30	5	60	h_{ef} + 9	82	M6x35	100	1,90
B 6-40-50/97 fvz[1)]	01025201	6	40	40	50	30	20	60	h_{ef} + 9	97	M6x35	100	2,09
B 8-5/50 fvz[1)]	01105201	8	-	-	5	35	-	-	h_{ef} + 11	50	M8x22	100	2,36
B 8-4/60 fvz	01110201	8	-	-	4	35	-	-	h_{ef} + 12	60	M8x25	100	2,76
B 8-10-19/75 fvz	01115201	8	10	44	19	35	-	-	h_{ef} + 12	75	M8x40	100	3,17
B 8-15-24/80 fvz	01120201	8	15	44	24	35	-	-	h_{ef} + 12	80	M8x45	100	3,36
B 8-20-29/85 fvz	01125201	8	20	44	29	35	-	-	h_{ef} + 12	85	M8x50	100	3,50
B 8-30-39/95 fvz	01135201	8	30	44	39	35	4	70	h_{ef} + 12	95	M8x60	100	3,83
B 8-45-54/110 fvz	01145201	8	45	44	54	35	19	70	h_{ef} + 12	110	M8x75	100	4,29
B 8-55-64/120 fvz	01150201	8	55	44	64	35	29	70	h_{ef} + 12	120	M8x85	100	4,59
B 10-10/60 fvz[1)]	01205201	10	-	-	10	24	-	-	h_{ef} + 15	60	M10x25	50	2,32
B 10-10-16/85 fvz	01210201	10	10	48	16	42	-	-	h_{ef} + 14	85	M10x40	50	2,90
B 10-15-21/90 fvz	01215201	10	15	48	21	42	-	-	h_{ef} + 14	90	M10x45	50	3,01
B 10-20-26/95 fvz	01220201	10	20	48	26	42	-	-	h_{ef} + 14	95	M10x50	50	3,15
B 10-30-36/105 fvz	01225201	10	30	48	36	42	-	-	h_{ef} + 14	105	M10x60	50	3,35
B 10-45-51/120 fvz	01230201	10	45	48	51	42	13	80	h_{ef} + 14	120	M10x75	50	3,77
B 10-50-56/125 fvz	01235201	10	50	48	56	42	18	80	h_{ef} + 14	125	M10x80	50	3,93
B 10-70-76/145 fvz	01240201	10	70	48	76	42	38	80	h_{ef} + 14	145	M10x80	50	4,50
B 10-100-106/175 fvz	01245201	10	100	48	106	42	68	80	h_{ef} + 14	175	M10x80	50	4,93
B 10-140-146/215 fvz	01250201	10	140	48	146	42	108	80	h_{ef} + 14	215	M10x80	25	3,10
B 12-5/75 fvz[1)]	01305201	12	-	-	5	25	-	-	h_{ef} + 17	75	M12x30	25	1,99
B 12-13/95 fvz	01310201	12	-	-	13	50	-	-	h_{ef} + 17	95	M12x50	25	2,38
B 12-15-30/110 fvz	01315201	12	15	65	30	50	-	-	h_{ef} + 17	110	M12x65	25	2,66
B 12-20-35/115 fvz	01320201	12	20	65	35	50	-	-	h_{ef} + 17	115	M12x70	25	2,71
B 12-30-45/125 fvz	01325201	12	30	65	45	50	-	-	h_{ef} + 17	125	M12x80	25	2,92
B 12-50-65/145 fvz	01330201	12	50	65	65	50	15	100	h_{ef} + 17	145	M12x100	25	3,25
B 12-65-80/160 fvz	01335201	12	65	65	80	50	30	100	h_{ef} + 17	160	M12x100	25	3,54
B 12-85-100/180 fvz	01340201	12	85	65	100	50	50	100	h_{ef} + 17	180	M12x100	25	3,85
B 12-105-120/200 fvz	01345201	12	105	65	120	50	70	100	h_{ef} + 17	200	M12x100	25	4,28
B 16-13/115 fvz	01510201	16	-	-	13	38	-	-	h_{ef} + 20	115	M16x60	20	3,96
B 16-10-28/130 fvz	01512201	16	10	82	28	64	-	-	h_{ef} + 20	130	M16x70	20	4,41
B 16-30-48/150 fvz	01515201	16	30	82	48	64	-	-	h_{ef} + 20	150	M16x90	20	4,92
B 20-5-27/150 fvz	01605201	20	5	100	27	78	-	-	h_{ef} + 21	150	M20x70	10	3,84
B 20-35-57/180 fvz	01610201	20	35	100	57	78	20	115	h_{ef} + 21	180	M20x70	10	4,44
B 20-60-82/205 fvz	01612201	20	60	100	82	78	45	115	h_{ef} + 21	205	M20x70	10	5,00
B 20-95-117/240 fvz	01615201	20	95	100	117	78	80	115	h_{ef} + 21	240	M20x70	10	6,26

[1)]Not part of assessment. [2)]Layer thickness: 8-10 µm

Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

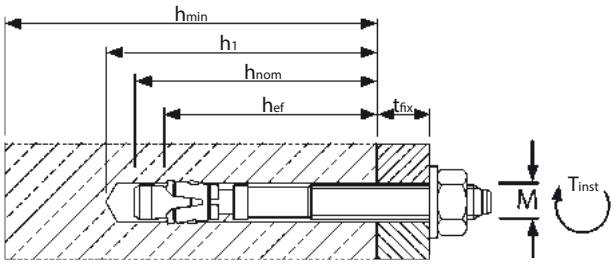
Extract from Permissible Service Conditions of European Technical Assessment ETA-01/0013 for use in uncracked concrete (Option 7)

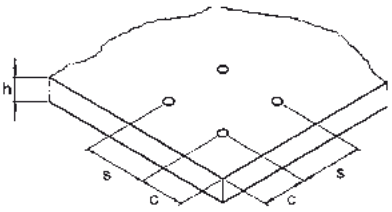
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data	Wedge Anchor B fvz			M8			M 10			M 12			M 16			M 20		
Reduced anchorage depth		h_{ef1}	**[mm]**	**35**[1]			**42**			**50**			**64**			**78**		
Standard anchorage depth		h_{ef2}	**[mm]**		**44**			**48**			**65**			**82**			**100**	
Maximum anchorage depth		h_{ef3}	**[mm]**			**70**			**80**			**100**			**120**			**115**
									non-crackend concrete									
Mean ultimate loads, tension	C25/30	Num	[kN]	12,3	18,7	18,7	19,2	23,6	23,6	26,1	34,5	34,5	43,6	51,4	51,4	53,6	70,0	70,0
Mean ultimate loads, shear	C25/30	Vum	[kN]	19,3	19,3	19,3	28,1	28,1	28,1	41,3	41,3	41,3	73,0	73,0	73,0	103,6	103,6	103,6
Approved loads, tension	C20/25	appr. N	[kN]	4,9	6,2	6,2	6,4	7,8	7,8	8,3	12,3	12,4	12,0	17,4	19,0	16,1	23,4	26,2
	C25/30	appr. N	[kN]	5,4	6,9	6,9	7,1	8,7	8,7	9,3	13,7	13,8	12,9	18,7	20,5	18,0	26,2	29,3
	C30/37	appr. N	[kN]	5,9	7,3	7,3	7,8	9,5	9,6	10,1	15,0	15,2	13,7	19,9	21,8	19,8	28,7	32,1
	C40/50	appr. N	[kN]	6,9	7,3	7,3	9,0	11,0	11,0	11,7	16,7	16,7	15,1	21,8	23,9	22,8	33,1	37,0
	C50/60	appr. N	[kN]	7,3	7,3	7,3	10,1	12,3	12,3	13,1	16,7	16,7	16,2	23,5	25,8	25,5	37,0	41,4
Approved loads, shear	≥ C20/25	appr. V	[kN]	6,3	6,3	6,3	9,7	9,7	9,7	14,3	14,3	14,3	23,6	23,6	23,6	37,1	37,1	37,1
Approved bending moments		appr. M	[Nm]	13,1	13,1	13,1	25,7	25,7	25,7	44,6	44,6	44,6	99,9	99,9	99,9	195,0	195,0	195,0
Spacing and edge distance																		
Effective anchorage depth			[mm]	35	44	70	42	48	80	50	65	100	64	82	120	78	100	115
Minimum thickness		h_{min}	[mm]	80	100	126	100	100	132	100	130	165	130	170	208	160	200	215
Characteristic spacing		$s_{cr,N}$	[mm]	105	132	210	126	144	240	150	195	300	192	246	360	234	300	345
Characteristic edge distance		$c_{cr,N}$	[mm]	52,5	66	105	63	72	120	75	97,5	150	96	123	180	117	150	172,5
Minimum spacing		s_{min}	[mm]	40	40	40	55	55	55	100	75	75	100	90	90	140	105	105
Minimum edge distance		c_{min}	[mm]	45	45	45	65	65	65	100	90	90	100	105	105	140	125	125
Installation parameters																		
Drill hole diameter		d_o	[mm]	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	9	9	9	12	12	12	14	14	14	18	18	18	22	22	22
Depth of drill hole		$h_1 \geq$	[mm]	55	65	91	65	70	102	75	90	125	95	110	148	110	130	145
Installation torque		T_{inst}	[Nm]	15	15	15	30	30	30	40	40	40	90	90	90	120	120	120
Width across nut		SW	[mm]	13	13	13	17	17	17	19	19	19	24	24	24	30	30	30
Height of the hexagon nut			[mm]	6,5	6,5	6,5	8	8	8	10	10	10	13	13	13	16	16	16
Outer diameter x washer thickness		d2 x s	[mm]	16 x 1,6	16 x 1,6	16 x 1,6	20 x 2	20 x 2	20 x 2	24 x 2,5	24 x 2,5	24 x 2,5	30 x 3	30 x 3	30 x 3	37 x 3	37 x 3	37 x 3

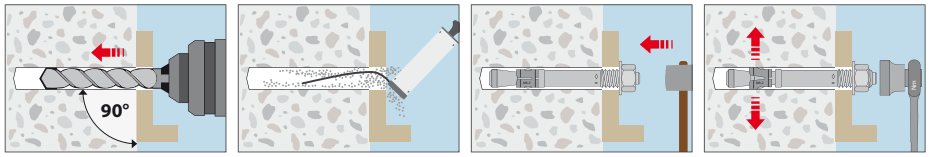
[1] Application limited to statically indeterminated systems.

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





Installation



Wedge Anchor B A4 / B HCR

Stainless steel A4/316 and Stainless steel 1.4529

Range of loading: 1,6 kN–45,2 kN
Range of concrete quality: C20/25–C50/60

ETA-01/0013 M6 | ETA-06/0155 M6 | F30-F120 | BBA UKTA - 22/6207 Option 7 for uncracked concrete | FM APPROVED M10 - M16 | EDELSTAHL Rostfrei

Description

The proven B A4 and B HCR Wedge Anchors with European Technical Assessment, Option 7, are suitable for uncracked concrete and time-saving push-through assemblies in interior and exterior areas. The Wedge Anchor B HCR can also be used under particularly aggressive environmental conditions, such as in swimming pools, in road tunnels or in contact with seawater.

Thanks to their three anchorage depths, they can be flexibly adapted to the respective installation requirements. The use with minimum anchorage depth reduces the drilling and installation effort, as well as the risk of reinforcement hits. When using a suction drill, the need for blowing out the drill hole is eliminated.

In size M6 the Wedge Anchors B A4 and B HCR from an anchorage depth of 30 mm, additionally have the European Technical Assessment for multiple fixings and can therefore be used for suspended ceilings and comparable fixings.

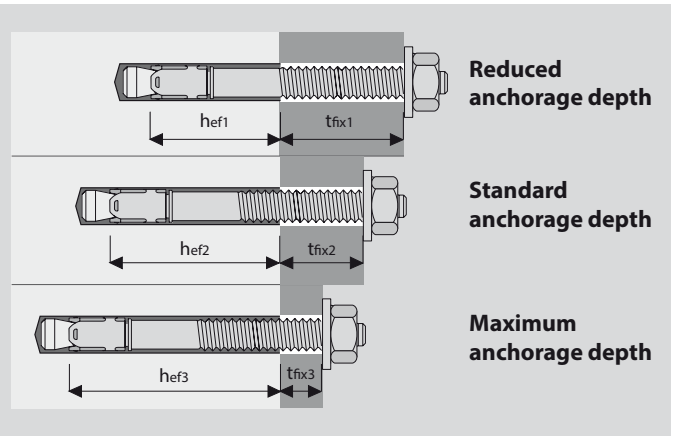
Advantages

- Approved for use in uncracked concrete (option 7)
- Very high permissible loads and small edge and center distances
- Three anchorage depths for optimum flexibility
- Installation with minimum anchorage depth saves drilling effort and time
- Installation with maximum anchorage depth for maximum, permissible loads
- Suitable for push-in, push-through and spaced installation
- Particularly economical: the short versions with minimum anchorage depth
- Fire tested F30-F120
- FM approval for installation of sprinkler systems (M10 to M16)
- Diameter M6 (hef ≥ 30mm) approved for multiple fastenings
- An impact cap prevents the thread from being damaged when hammering into the drill hole

Applications

Medium to heavy duty indoor and outdoor use, metal structures, brackets, machines.
Wedge Anchor B M6 A4 and HCR: Multiple use for non-structural applications and similar fixtures in tunnels and or external atmospheric exposures.

Example of Installation



Wedge Anchor-Setting Tool BSW

- Setting Tool for Wedge Anchor M6 – M16
- With SDS plus connection

Description	Ref. No.	Suitable for Wedge Anchor	Length mm	Package content pcs.	Weight per pkg. kg
BSW M6-M16	43990101	BZ3/BZ plus/B M6 – M16	140	1	0,13

Wedge Anchor B A4

- Stainless steel
- ETA assessment for uncracked concrete
- Three anchorage depths

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Reduced anchorage depth: Fixture thickness $t_{fix,min}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,min}$ mm	Maximum anchorage depth: Fixture thickness $t_{fix,max}$ mm	Maximum anchorage depth: Anchorage depth $h_{ef,max}$ mm	Setting depth h_1 mm	Anchor length l mm	Thread ØxL mm	Pkg. content pcs.	Weight per pkg. kg
B 6-5/40 A4[1)]	01005501	6	-	-	5	18	-	-	h_{ef} + 9	40	M6x16	100	1,06
B 6-5/52 A4	01006501	6	-	-	5	30	-	-	h_{ef} + 9	52	M6x20	100	1,27
B 6-10-20/67 A4	01010501	6	10	40	20	30	-	-	h_{ef} + 9	67	M6x30	100	1,56
B 6-25-35/82 A4	01015501	6	25	40	35	30	5	60	h_{ef} + 9	82	M6x35	100	1,80
B 6-40-50/97 A4	01025501	6	40	40	50	30	20	60	h_{ef} + 9	97	M6x35	100	2,08
B 8-5/50 A4[1)]	01105501	8	-	-	5	24	-	-	h_{ef} + 11	50	M8x22	100	2,34
B 8-4/60 A4	01110501	8	-	-	4	35	-	-	h_{ef} + 12	60	M8x25	100	2,64
B 8-10-19/75 A4	01115501	8	10	44	19	35	-	-	h_{ef} + 12	75	M8x40	100	3,10
B 8-15-24/80 A4	01120501	8	15	44	24	35	-	-	h_{ef} + 12	80	M8x45	100	3,28
B 8-20-29/85 A4	01125501	8	20	44	29	35	-	-	h_{ef} + 12	85	M8x50	100	3,42
B 8-30-39/95 A4	01135501	8	30	44	39	35	4	70	h_{ef} + 12	95	M8x60	100	3,73
B 8-45-54/110 A4	01145501	8	45	44	54	35	19	70	h_{ef} + 12	110	M8x75	100	4,20
B 8-55-64/120 A4	01150501	8	55	44	64	35	29	70	h_{ef} + 12	120	M8x85	100	4,57
B 10-10/60 A4[1)]	01205501	10	-	-	10	25	-	-	h_{ef} + 15	60	M10x25	50	2,30
B 10-10-16/85 A4	01210501	10	10	48	16	42	-	-	h_{ef} + 14	85	M10x40	50	2,85
B 10-15-21/90 A4	01215501	10	15	48	21	42	-	-	h_{ef} + 14	90	M10x45	50	2,97
B 10-20-26/95 A4	01220501	10	20	48	26	42	-	-	h_{ef} + 14	95	M10x50	50	3,10
B 10-30-36/105 A4	01225501	10	30	48	36	42	-	-	h_{ef} + 14	105	M10x60	50	3,33
B 10-45-51/120 A4	01230501	10	45	48	51	42	13	80	h_{ef} + 14	120	M10x75	50	3,75
B 10-50-56/125 A4	01235501	10	50	48	56	42	18	80	h_{ef} + 14	125	M10x80	50	3,87
B 10-70-76/145 A4	01240501	10	70	48	76	42	38	80	h_{ef} + 14	145	M10x80	50	4,38
B 10-100-106/175 A4	01245501	10	100	48	106	42	68	80	h_{ef} + 14	175	M10x80	50	5,15
B 10-140-146/215 A4	01250501	10	140	48	146	42	108	80	h_{ef} + 14	215	M10x80	25	3,10
B 12-5/75 A4[1)]	01305501	12	-	-	5	38	-	-	h_{ef} + 17	75	M12x30	25	1,96
B 12-14/95 A4	01310501	12	-	-	14	50	-	-	h_{ef} + 17	95	M12x50	25	2,33
B 12-10-25/105 A4	01312501	12	10	65	25	50	-	-	h_{ef} + 17	105	M12x60	25	2,53
B 12-15-30/110 A4	01315501	12	15	65	30	50	-	-	h_{ef} + 17	110	M12x65	25	2,62
B 12-20-35/115 A4	01320501	12	20	65	35	50	-	-	h_{ef} + 17	115	M12x70	25	2,70
B 12-30-45/125 A4	01325501	12	30	65	45	50	-	-	h_{ef} + 17	125	M12x80	25	2,88
B 12-50-65/145 A4	01330501	12	50	65	65	50	15	100	h_{ef} + 17	145	M12x100	25	3,28
B 12-65-80/160 A4	01335501	12	65	65	80	50	30	100	h_{ef} + 17	160	M12x100	25	3,55
B 12-85-100/180 A4	01340501	12	85	65	100	50	50	100	h_{ef} + 17	180	M12x100	25	3,90
B 12-105-120/200 A4	01345501	12	105	65	120	50	70	100	h_{ef} + 17	200	M12x100	25	4,28
B 12-145-160/240 A4	01355501	12	145	65	160	50	110	100	h_{ef} + 17	240	M12x80	20	4,39
B 16-5/90 A4[1)]	01505501	16	-	-	5	47	-	-	h_{ef} + 18	90	M16x35	20	3,37
B 16-14/115 A4	01510501	16	-	-	14	64	-	-	h_{ef} + 20	115	M16x60	20	3,98
B 16-10-26/130 A4	01512501	16	10	80	26	64	-	-	h_{ef} + 20	130	M16x70	20	4,34
B 16-30-46/150 A4	01515501	16	30	80	46	64	-	-	h_{ef} + 20	150	M16x90	20	4,87
B 16-60-76/180 A4	01520501	16	60	80	76	64	22	120	h_{ef} + 20	180	M16x110	20	5,66
B 16-80-96/200 A4	01525501	16	80	80	96	64	42	120	h_{ef} + 20	200	M16x110	10	3,26
B 16-100-116/220 A4	01530501	16	100	80	116	64	62	120	h_{ef} + 20	220	M16x80	10	3,59
B 16-130-146/250 A4	01535501	16	130	80	146	64	92	120	h_{ef} + 20	250	M16x80	10	3,99
B 16-200-216/320 A4	01545501	16	200	80	216	64	162	120	h_{ef} + 20	320	M16x80	10	5,16
B 20-5-27/150 A4	01605501	20	5	100	27	78	-	-	h_{ef} + 21	150	M20x70	10	3,86
B 20-35-57/180 A4	01610501	20	35	100	57	78	20	115	h_{ef} + 21	180	M20x70	10	4,47
B 20-60-82/205 A4	01612501	20	60	100	82	78	45	115	h_{ef} + 21	205	M20x70	10	5,03
B 20-95-117/240 A4	01615501	20	95	100	117	78	80	115	h_{ef} + 21	240	M20x70	10	6,26

[1)]Not part of assessment.

Wedge Anchor B HCR

- High corrosion resistant steel 1.4529 (HCR)
- Approved for multiple use for non-structural applications

Description	Ref. No.	Drill hole-Ø d_0 mm	Standard anchorage depth: Fixture thickness $t_{fix,std}$ mm	Standard anchorage depth: Anchorage depth $h_{ef,std}$ mm	Reduced anchorage depth: Fixture thickness $t_{fix,min}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,min}$ mm	Maximum anchorage depth: Fixture thickness $t_{fix,max}$ mm	Maximum anchorage depth: Anchorage depth $h_{ef,max}$ mm	Setting depth h_1 mm	Anchor length l mm	Thread ØxL mm	Pkg. content pcs.	Weight per pkg. kg
B 6-0-10/57 HCR	01007651	6	0	40	10	30	-	-	h_{ef} + 9	57	M6x20	100	1,58
B 6-10-20/67 HCR	01010651	6	10	40	20	30	-	-	h_{ef} + 9	67	M6x20	100	1,78
B 6-25-35/82 HCR	01015651	6	25	40	35	30	5	60	h_{ef} + 9	82	M6x20	100	2,13
B 6-40-50/97 HCR	01025651	6	40	40	50	30	20	60	h_{ef} + 9	97	M6x20	100	2,35

Other length on demand.

ETA-01/0013

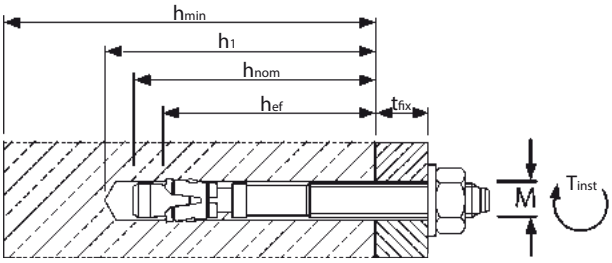
Extract from Permissible Service Conditions of European Technical Assessment ETA-01/0013 for use in uncracked concrete (Option 7)

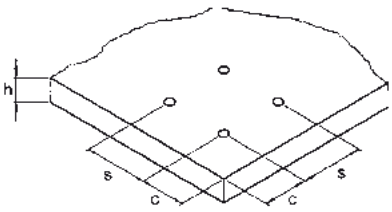
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data	**Wedge Anchor B A4 / HCR**			**M 6**			**M8**			**M 10**			**M 12**			**M 16**			**M 20**	
Reduced anchorage depth		h_{ef1}	**[mm]**	**30**[1]			**35**[1]			**42**			**50**			**64**			**78**	
Standard anchorage depth		h_{ef2}	**[mm]**	**40**			**44**			**48**			**65**			**80**			**100**	
Maximum anchorage depth		h_{ef3}	**[mm]**		**60**			**70**			**80**			**100**			**120**			**115**
											uncracked concrete									
Mean ultimate loads, tension	C25/30	Num	[kN]	10,2	11,0	11,0	12,4	19,6	19,6	17,5	23,1	23,1	22,6	36,4	36,4	39,7	53,5	53,5	53,1	73,0	73,0
Mean ultimate loads, shear	C25/30	Vum	[kN]	9,7	9,7	9,7	19,5	19,5	19,5	31,9	31,9	31,9	42,6	42,6	42,6	76,9	76,9	76,9	110,4	110,4	110,4
Approved loads, tension	C20/25	appr. N	[kN]	3,1	3,8	3,8	4,3	6,8	7,1	5,7	7,8	7,8	8,3	11,9	11,9	12,0	16,8	20,0	16,1	23,4	28,6
	C25/30	appr. N	[kN]	3,5	4,3	4,3	4,8	7,6	8,0	6,4	8,7	8,7	9,3	13,3	13,3	13,4	18,7	22,4	18,0	26,2	31,9
	C30/37	appr. N	[kN]	3,8	4,7	4,7	5,2	8,4	8,6	7,0	9,5	9,6	10,1	14,6	14,6	14,7	20,5	24,5	19,8	28,7	35,0
	C40/50	appr. N	[kN]	4,4	4,8	4,8	6,1	8,6	8,6	8,1	11,0	11,0	11,7	16,8	16,8	17,0	23,7	28,3	22,8	33,1	40,4
	C50/60	appr. N	[kN]	4,8	4,8	4,8	6,8	8,6	8,6	9,0	12,3	12,3	13,1	18,8	18,8	19,0	26,5	31,6	25,5	37,0	45,2
Approved loads, shear	≥ C20/25	appr. V	[kN]	3,8	4,0	4,0	6,9	6,9	6,9	10,9	10,9	10,9	15,4	15,4	15,4	28,6	28,6	28,6	43,9	43,9	43,9
Approved bending moments		appr. M	[Nm]	5,7	5,7	5,7	13,7	13,7	13,7	28,0	28,0	28,0	48,6	48,6	48,6	113,7	113,7	113,7	231,6	231,6	231,6
Spacing and edge distance																					
Effective anchorage depth			[mm]	30	40	60	35	44	70	42	48	80	50	65	100	64	80	120	78	100	115
Minimum thickness		h_{min}	[mm]	80	100	120	80	100	126	100	100	132	100	130	165	130	160	200	160	200	215
Characteristic spacing		$s_{cr,N}$	[mm]	90	120	180	105	132	210	126	144	240	150	195	300	192	240	360	234	300	345
Characteristic edge distance		$c_{cr,N}$	[mm]	45	60	90	52,5	66	105	63	72	120	75	97,5	150	96	120	180	117	150	172,5
Minimum spacing		s_{min}	[mm]	35	35	35	60	35	35	55	45	45	100	60	60	110	80	80	140	100	100
		for c ≥	[mm]	40	40	40	60	65	65	65	70	70	100	100	100	110	120	120	140	150	150
Minimum edge distance		c_{min}	[mm]	40	35	35	60	45	45	65	55	55	100	70	70	110	80	80	140	100	100
		for s ≥	[mm]	35	60	60	60	110	110	55	80	80	100	100	100	110	140	140	140	180	180
Installation parameters																					
Drill hole diameter		d_o	[mm]	6	6	6	8	8	8	10	10	10	12	12	12	16	16	16	20	20	20
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	7	7	7	9	9	9	12	12	12	14	14	14	18	18	18	22	22	22
Depth of drill hole		$h_1 \geq$	[mm]	45	55	75	55	65	91	65	70	102	75	90	125	95	110	148	110	130	145
Installation torque		T_{inst}	[Nm]	6	6	6	15	15	15	25	25	25	50	50	50	100	100	100	160	160	160
Width across nut		SW	[mm]	10	10	10	13	13	13	17	17	17	19	19	19	24	24	24	30	30	30
Height of the hexagon nut			[mm]	5	5	5	6,5	6,5	6,5	8	8	8	10	10	10	13	13	13	16	16	16
Outer diameter x washer thickness		d2 x s	[mm]	12 x 1,6	12 x 1,6	12 x 1,6	16 x 1,6	16 x 1,6	16 x 1,6	20 x 2	20 x 2	20 x 2	24 x 2,5	24 x 2,5	24 x 2,5	30 x 3	30 x 3	30 x 3	37 x 3	37 x 3	37 x 3

[1]Application limited to statically indeterminated systems.

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





ETA-06/0155

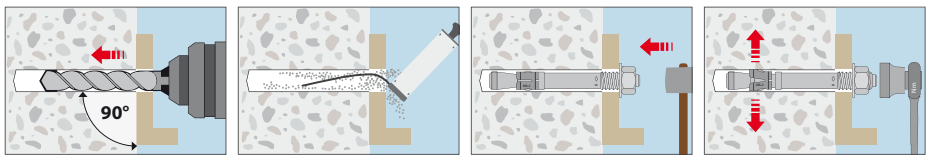
Extract from Permissible Service Conditions of ETA-06/0155 for use in concrete for redundant non-structural systems

Use as multiple fastening of non-structural systems according to ETAG001, part 6. Total safety factor according to ETAG 001 is taken into account (γ_M and γ_F). The maximum permissible load per fixing point may, depending on national regulations, be lower than the permissible loads of the anchor. The permissible loads per fixing point are regulated for the respective countries in ETAG 001, Part 6.

Loads and performance data	**Wedge Anchor B A4 / HCR**			**M 6**	
Reduced anchorage depth		h_{ef1}	**[mm]**	**30**	
Standard anchorage depth		h_{ef2}	**[mm]**		**40**
			cracked / uncracked concrete		≥ C25/30
Approved loads (any direction)		appr. N	[kN]	1,6	2,4
Approved bending moments		appr. M	[Nm]	5,7	5,7
Spacing and edge distance					
Effective anchorage depth			[mm]	30	40
Minimum thickness of concrete slab		h_{min}	[mm]	80	80
Characteristic spacing		$s_{cr,N}$	[mm]	260	370
Characteristic edge distance		$c_{cr,N}$	[mm]	130	185
Minimum spacing		s_{min}	[mm]	50	50
Minimum edge distance		c_{min}	[mm]	50	50
Loads under stress (C20/25 bis C50/60)					
Approved loads (any direction)	R30	appr. N_{fi}	[kN]	0,6	0,6
	R60	appr. N_{fi}	[kN]	0,5	0,5
	R90	appr. N_{fi}	[kN]	0,3	0,3
	R120	appr. N_{fi}	[kN]	0,3	0,3
Characteristic spacing		$s_{cr,fi}$	[mm]	120	160
Characteristic edge distance		$c_{cr,fi}$	[mm]	60	80
Installation parameters					
Drill hole diameter		d_o	[mm]	6	6
Diameter of clearance hole in the fixture		d_f	[mm]	7	7
Depth of drill hole		h_1	[mm]	45	55
Installation torque		T_{inst}	[Nm]	8	8
Width across nut		SW	[mm]	10	10
Height of the hexagon nut			[mm]	5	5
Outer diameter x washer thickness		d2 x s	[mm]	12 x 1,6	12 x 1,6

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

Installation



L - Anchor B-W

Steel, zinc plated

Description

The Wedge Anchor B-W is a self expanding hammer-in anchor, designed to attach steel reinforcing mats to existing concrete. The non threaded end is bent to hold the reinforcement mat in place.

Applications

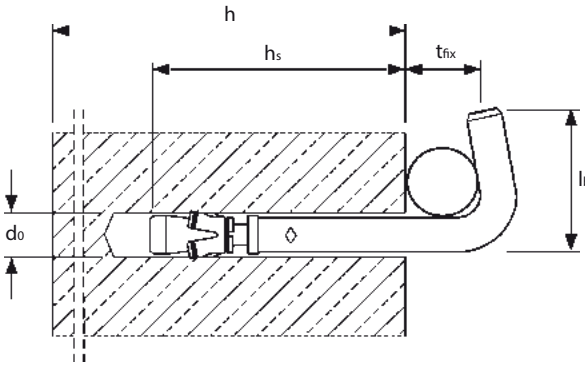
Safe and fast fastening of reinforcing mats for sprayed concrete.

L-Anchor B-W

- Steel, zinc plated
- For attaching steel reinforcing mats

Description	Ref. No.	Setting depth h_s mm	Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Bend length l_b mm	Package content pcs.	Weight per pck. kg
B-W 8x80x32	93140101	55	20	8 x 65	32	200	6,45
B-W 8x110x35	93148101	55	50	8 x 65	35	200	8,50
B-W 8x140x35	93163101	55	80	8 x 65	35	200	14,0

Other lengths and stainless steel A4/316 on demand.



Wedge Anchor B-IG

Steel, zinc plated / Stainless steel A4/316

Wedge Anchor B-IG

Wedge Anchor B-IG A4

Range of loading: **2,9 kN–15,8 kN**

Range of concrete quality: **C20/25–C50/60**

EDELSTAHL Rost frei

Description

The Wedge Anchor B-IG is the internally threaded version of the European approved Wedge Anchor B. It can be installed in normal drill holes without a setting tool. Expansion is achieved by tightening the screw. The fixture can easily be removed. Closer anchor spacing and edge distances than with drop-in anchors.

Applications

Medium duty anchorages where the use of an internal thread is required and/or anchor spacing and edge distances are closer than those needed for drop-in anchors: suspended ceilings, fastening of flat steel structures, ducts, ventilation systems, railings.

Wedge Anchor B-IG

- Steel, zinc plated
- With internal thread

Description	Ref. No.	Drill hole Ø x depth mm	Setting depth[1] mm	Anchor length l mm	Length of screw mm	Thread mm	Package content pcs.	Weight per package kg
B-IG M 6 x 45	03005101	8x60	51	45	t_{fix}+10	M6x15	100	1,39
B-IG M 8 x 50	03105101	10x65	57	50	t_{fix}+12	M8x15	100	2,40
B-IG M 10 x 60	03205101	12x75	71	60	t_{fix}+15	M10x20	50	1,95
B-IG M 12 x 75	03305101	16x95	84	75	t_{fix}+20	M12x26	25	2,29

[1]Install Anchor below concrete surface.

Wedge Anchor B-IG A4

- Stainless steel A4/316
- With internal thread

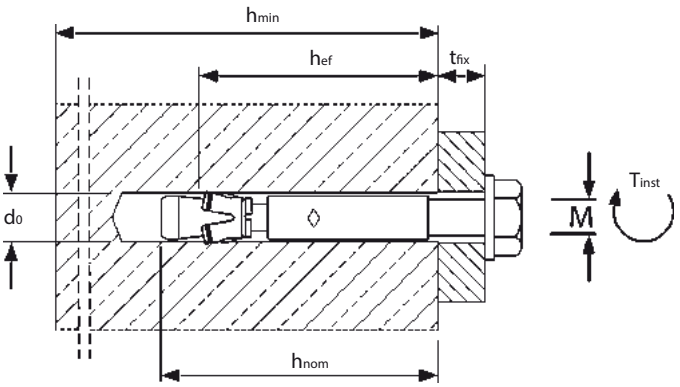
Description	Ref. No.	Drill hole Ø x depth mm	Setting depth[1] mm	Anchor length l mm	Length of screw mm	Thread mm	Package content pcs.	Weight per package kg
B-IG M 6 x 45 A4	03005501	8x60	51	45	t_{fix}+10	M6x15	100	1,41
B-IG M 8 x 50 A4	03105501	10x65	57	50	t_{fix}+12	M8x15	100	2,45
B-IG M 10 x 60 A4	03205501	12x75	71	60	t_{fix}+15	M10x20	50	1,98
B-IG M 12 x 75 A4	03305501	16x95	84	75	t_{fix}+20	M12x26	25	2,23

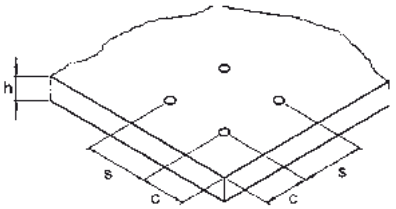
[1] Install Anchor below concrete surface.

Recommended loads for Wedge Anchor B-IG

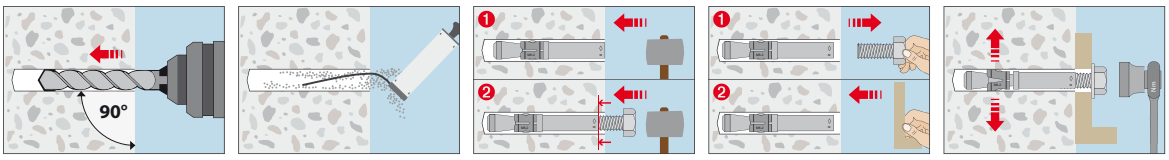
Recommended loads for single anchor without influence of spacing and edge distance. The total safety factor (γ_M and γ_F) is included.

Loads and performance data	Wedge Anchor B-IG			M 6x45		M 8x50		M 10x60		M 12x75	
				uncracked concrete							
				steel 5.8	A4-70	steel 5.8	A4-70	steel 5.8	A4-70	steel 5.8	A4-70
Mean ultimate loads, tension	C25/30	Num	[kN]	10,1	14,1	18,3	19,6	24,0	25,3	36,3	37,8
Mean ultimate loads, shear	C25/30	Vum	[kN]	5,0	7,0	6,9	12,8	7,2	20,3	21,1	29,5
Recommended loads, tension	C20/25	rec. N	[kN]	4,3	4,8	5,5	5,5	7,3	7,3	10,0	10,0
	C25/30	rec. N	[kN]	4,3	5,3	6,2	6,2	8,2	8,2	11,2	11,2
	C30/37	rec. N	[kN]	4,3	5,3	6,7	6,7	9,0	9,0	12,2	12,2
	C40/50	rec. N	[kN]	4,3	5,3	7,8	7,8	10,4	10,4	14,1	14,1
	C50/60	rec. N	[kN]	4,3	5,3	8,3	8,7	11,4	11,1	15,8	15,8
Recommended loads, shear	≥ C20/25	rec. V	[kN]	2,9	3,2	3,9	5,3	4,1	6,7	14,2	15,8
Recommended bending moments		rec. M	[Nm]	4,2	4,9	10,9	12,0	28,0	23,9	45,6	41,9
Spacing and edge distance											
Effective anchorage depth		h_{ef}	[mm]	39		43		52		64	
Characteristic spacing		scr, N	[mm]	117		129		156		192	
Characteristic edge distance		ccr, N	[mm]	58,5		64,5		78		96	
Minimum spacing		s_{min}	[mm]	50		55		75		90	
Minimum edge distance		c_{min}	[mm]	50		65		90		105	
Minimum thickness of concrete slab		h_{min}	[mm]	100		100		110		130	
Installation parameters											
Drill hole diameter		d_o	[mm]	8		10		12		16	
Diameter of clearance hole in the fixture		d_f	[mm]	7		9		12		14	
Depth of drill hole		h_1	[mm]	60		65		75		95	
Installation torque		T_{inst}	[Nm]	6		15		30		50	





Installation



Nail Anchor N

Steel, zinc plated / Stainless steel A4 / HCR

Nail Anchor N

Nail Anchor N-K

Nail Anchor N-M

R30-R120 | N/N-K A4/HCR | N/N-K A4/HCR | N-M

Range of loading: 0,71 kN–2,81 kN

Range of concrete quality: C12/15–C50/60

Description

The Nail Anchor N combines the advantages of a wedge anchor with an even easier installation. The Nail Anchor is simply hammered through the fixture into the concrete. Applying torque is not necessary in the threaded versions. When the load is applied the Nail Anchor expands automatically and anchors to the concrete.
There is a nail head (N-K) version, a M6 external thread (N) version and a dual threaded sleeve M8/M10 (N-M).

The Nail anchor in stainless Steel A4/316 and stainless Steel HCR is also tested according to ZTV and RWS tunnel temperature curve in cracked concrete. Load capacities see page 200.

Advantages

- ETA assessment for redundant fastenings in cracked and uncracked concrete
- Fast and simple mounting
- Reduced anchorage depth (25 mm) for reduced drilling costs
- Very small edge distances and spacings
- Loads up to 2,81 kN
- Only one product for two applications: dual thread M8/M10 (N-M)

Applications

Ceiling constructions, piping, cladding etc.

Nail Anchor N

- Steel, zinc plated
- With thread M6

Description	Ref. No.	Drill hole Ø	Standard anchorage depth: Fixture thickness t_{fix} mm	Standard anchorage depth: Drill hole depth h_1 mm	Standard anchorage depth: Anchorage depth h_{ef} mm	Reduced anchorage depth: Fixture thickness $t_{fix,red}$ mm	Reduced anchorage depth: Drill hole depth $h_{1,red}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Pkg. content pcs.	Weight per pkg. kg
N 6-0-5/44	60005101	6	0	40	30	5	35	25	44	200	2,22
N 6-5-10/49	60010101	6	5	40	30	10	35	25	49	200	2,39
N 6-10-15/54	60015101	6	10	40	30	15	35	25	54	200	2,58

Nail Anchor N-K

- Steel, zinc plated
- With Nailhead

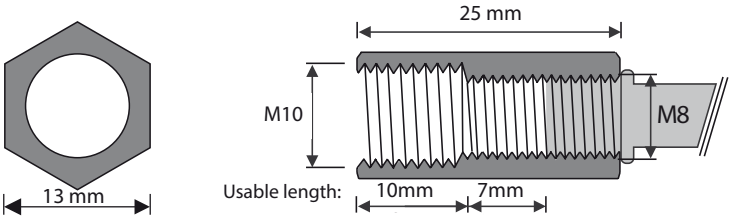
Description	Ref. No.	Drill hole Ø	Standard anchorage depth: Fixture thickness t_{fix} mm	Standard anchorage depth: Drill hole depth h_1 mm	Standard anchorage depth: Anchorage depth h_{ef} mm	Reduced anchorage depth: Fixture thickness $t_{fix,red}$ mm	Reduced anchorage depth: Drill hole depth $h_{1,red}$ mm	Reduced anchorage depth: Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Pkg. content pcs.	Weight per pkg. kg
N-K 6-0-5/39	60105101	6	0	40	30	5	35	25	39	200	2,24
N-K 6-5-10/44	60110101	6	5	40	30	10	35	25	44	200	2,29
N-K 6-10-15/49	60115101	6	10	40	30	15	35	25	49	200	2,54
N-K 6-15-20/54	60120101	6	15	40	30	20	35	25	54	200	2,74
N-K 6-30-35/69	60135101	6	30	40	30	35	35	25	69	200	3,44
N-K 6-50-55/89	60155101	6	50	40	30	55	35	25	89	100	2,19

Nail Anchor N-M

- Steel, zinc plated
- Connecting thread M8 and M10

Description	Ref. No.	Drill hole Ø mm	Drill hole depth h_1 mm	Anchorage depth h_{ef} mm	Anchor length l mm	Pkg. content pcs.	Weight per pkg. kg
N-M 6-25 M8/10	60310101	6	35	25	58	100	2,75
N-M 6-30 M8/10	60315101	6	40	30	63	100	2,85

Dimensions threaded sleeve N-M:



Nail Anchor N A4

- Stainless steel A4
- With thread M6

Description	Ref. No.	Drill hole Ø	Standard anchorage depth: Fixture thickness t_{fix} mm	Drill hole depth h_1 mm	Anchorage depth h_{ef} mm	Reduced anchorage depth: Fixture thickness $t_{fix,red}$ mm	Drill hole depth $h_{1,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Pkg. content pcs.	Weight per pkg. kg
N 6-5/49 A4	61010501	6	5	40	30	10	35	25[1)]	49	200	2,39

[1)]Reduced anchorage depth is only permitted for indoor use.

Nail Anchor N-KA4

- Stainless steel A4
- With Nailhead

Description	Ref. No.	Drill hole Ø	Standard anchorage depth: Fixture thickness t_{fix} mm	Drill hole depth h_1 mm	Anchorage depth h_{ef} mm	Reduced anchorage depth[1)]: Fixture thickness $t_{fix,red}$ mm	Drill hole depth $h_{1,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Pkg. content pcs.	Weight per pkg. kg
N-K 6-0/39 A4	61105501	6	0	40	30	5	35	25[1)]	39	200	2,24
N-K 6-5/44 A4	61110501	6	5	40	30	10	35	25[1)]	44	200	2,29
N-K 6-10/49 A4	61115501	6	10	40	30	15	35	25[1)]	49	200	2,54
N-K 6-15/54 A4	61120501	6	15	40	30	20	35	25[1)]	54	200	2,74
N-K 6-20/59 A4	61125501	6	20	40	30	25	35	25[1)]	59	200	2,91
N-K 6-30/69 A4	61135501	6	30	40	30	35	35	25[1)]	69	200	3,44
N-K 6-50/89 A4	61155501	6	50	40	30	55	35	25[1)]	89	100	2,19

[1)]Reduced anchorage depth is only permitted for indoor use.

Nail Anchor N HCR

- High corrosion resistant steel 1.4529 (HCR)
- With thread M6

Description	Ref. No.	Drill hole Ø	Standard anchorage depth: Fixture thickness t_{fix} mm	Drill hole depth h_1 mm	Anchorage depth h_{ef} mm	Reduced anchorage depth: Fixture thickness $t_{fix,red}$ mm	Drill hole depth $h_{1,red}$ mm	Anchorage depth $h_{ef,red}$ mm	Anchor length mm	Pkg. content pcs.	Weight per pkg. kg
N 6-5/49 HCR	61010651	6	5	40	30	10	35	25[1)]	49	200	2,39

[1)]Reduced anchorage depth is only permitted for indoor use.

Nail Anchor N-K HCR

- High corrosion resistant steel 1.4529 (HCR)
- With Nailhead

Description	Ref. No.	Drill hole Ø	Standard anchorage depth			Reduced anchorage depth[1)]			Anchor length	Pkg. content	Weight per pkg.
			Fixture thickness t_{fix} mm	Drill hole depth h_1 mm	Anchorage depth h_{ef} mm	Fixture thickness $t_{fix,red}$ mm	Drill hole depth $h_{1,red}$ mm	Anchorage depth $h_{ef,red}$ mm	mm	pcs.	kg
N-K 6-5/44 HCR	61110651	6	5	40	30	10	35	25[1)]	44	200	2,29
N-K 6-30/69 HCR	61135651	6	30	40	30	35	35	25[1)]	69	200	3,44
N-K 6-50/89 HCR	61155651	6	50	40	30	55	35	25[1)]	89	100	2,19

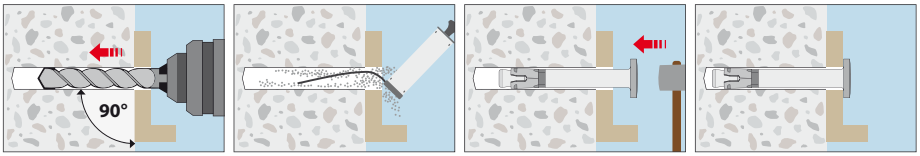
[1)]Reduced anchorage depth is only permitted for indoor use.

Setting Tool

- Setting Tool for Nail Anchor N-K
- With SDS plus connection
- With centering tip for secure fit

Description	Ref. No.	Pkg. content	Weight per pkg.
		pcs.	kg
N-K SWZ SDS	09795101	1	0,05

Installation

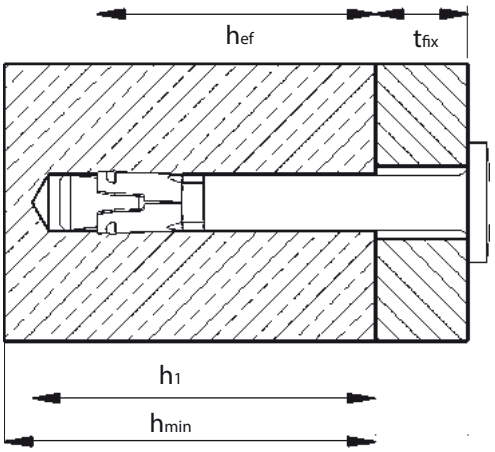


Extract from Permissible Service Conditions of European Technical Assessment ETA-11/0240 for use in concrete for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M and γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor. Load capacities under fire exposure see page 197.

Loads and performance data	**Nail Anchor steel zinc plated, stainless steel A4, HCR**			**N**		**N-K**		**N-M**	
						cracked / uncracked concrete			
Effective anchorage depth		h_{ef}	[mm]	25	30	25	30	25	30
Approved loads (Picture 1)	C12/15	appr. F	[kN]	1,43	1,90	1,43	1,90	1,43[1)]	1,90[1)]
	C20/25 - C50/60	appr. F	[kN]	2,14	2,81	2,14	2,81	2,14[1)]	2,81[1)]
Approved loads (Picture 2)	C12/15	appr. F	[kN]	0,71	0,95	0,71	0,95	0,71[1)]	0,95[1)]
	C20/25 - C50/60	appr. F	[kN]	0,95	1,19	0,95	1,19	0,95[1)]	1,19[1)]
Approved bending moments		appr. F	[Nm]	5,3	5,3	7,3/7,7[2)]	7,3/7,7[2)]	7,3	7,3
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	80	80	80	80
Installation parameters									
Drill hole diameter		d_o	[mm]	6	6	6	6	6	6
Diameter of clearance hole in the fixture		d_f	[mm]	7	7	7	7	-	-
Diameter nailhead			[mm]	-	-	13	13	-	-
Depth of drill hole		h_1	[mm]	35	40	35	40	35	40
Installation torque		$T_{inst} \leq$	[Nm]	4	4	-	-	-	-

[1)]When applying a shear load to anchor version N-M, shear load with lever arm must be proven.
[2)]Steel zinc plated / stainless steel A4, HCR

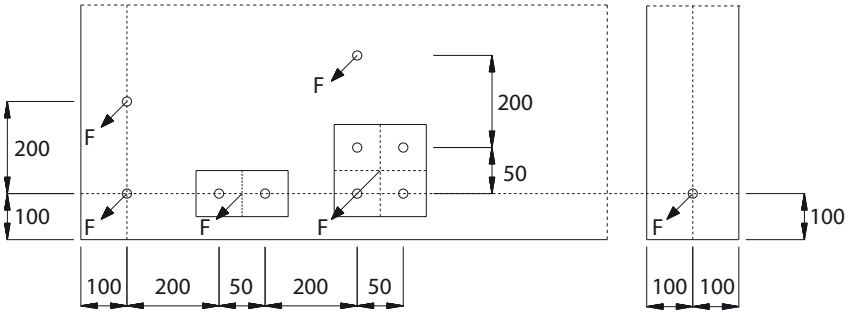


Respective spacing and edge distances [mm]:

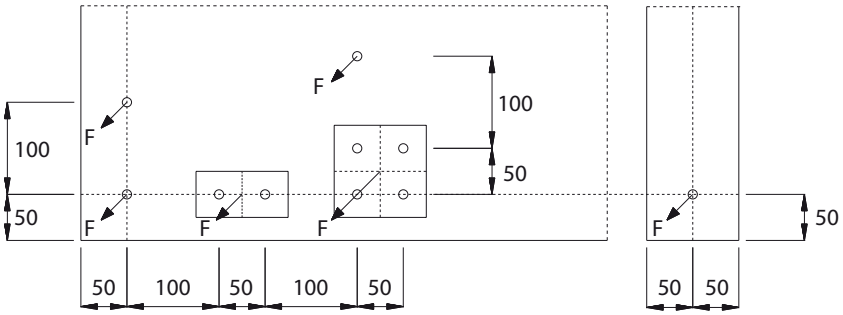
The approved load F is for one fixing point.
One fixing point can be:
- **Single anchor,**
- **Pair of anchors** with spacing s ≥ 50 mm or
- **Group of four anchors** with s ≥ 50 mm

If the spacing in a fixing point is greater than or equal to the respective spacing between the fixing points, the characteristic resistances apply to every single anchor.

Picture 1: maximum loads



Picture 2: minimum spacing and edge distance



Drop-in Anchor E / ES

Steel, zinc plated

Drop-in Anchor E

Drop-in Anchor ES

Drop-in Anchor ES

M6-M20 | M6-M16 | R30-R120 M6-M20 | M6-M20 | M10 - M20 | M8-M16

M6-M20

Range of loading: 1,2 kN–28,6 kN

Range of concrete quality: C20/25–C50/60

Description

The Drop-in Anchor E/ES is approved for redundant fastening for non-structural applications in cracked and uncracked concrete. The anchor sizes with an embedment of 30 mm deep are also approved as single anchor in uncracked concrete. The Drop-in Anchors with an anchorage depth of 25 mm are, however, permitted in pre-stressed hollow core slabs.

The Drop-in Anchor E/ES is placed into the drill hole in pre-setting installation and expanded reliably by means of a manual or hammer drill setting tool. Using a detachable setting tool with a stop drill bit (ASW) allows for quick and efficient, high volume installations. Using the marking setting tool produces a visible marking on the anchors-leeve which confirms the correct installation.

Advantages

- Approved for use as multiple fixing in cracked and uncracked concrete
- Approved as multiple fixing in pre-stressed concrete slabs
- Approved for use as single fixing in uncracked concrete (Anchorage depth ≥ 30 mm)
- Shallow drilling depth, thus low risk of hitting reinforcement strikes (Anchorage depth 25 mm)
- Quick, rational and efficient installation due to the detachable setting tool with a stop drill bit (ASW)
- Simple visual inspection with marking tool
- Many possible applications due to the use of standard metric screws and threaded rods
- FM approval for the installation of sprinkler systems (M10–M20)[2)]
- Suitable for the installation of sprinkler systems according to the requirements of damage prevention VDS, GmbH (M8–M16)2)
- Fire resistance tested in concrete C20/25 to C50/60

Applications

Suspensions in the area of heating, sanitary and ventilation, anchorage with threaded rods and screws, flat steel, profiled steel.

[1)] Applies only to anchorage depths $h_{ef} \geq 30$ mm

[2)] Also applies to ES M10x25

Drop-in Anchor E

- Steel, zinc plated
- Approved for concrete

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
E M 5 x 25[1)]	05000101	8 x 25	M5 x 10	100	0,74
E M 6 x 30	05005101	8 x 30	M6 x 13	100	0,84
E M 8 x 30	05100101	10 x 30	M8 x 13	100	1,17
E M 8 x 40	05105101	10 x 40	M8 x 20	100	1,49
E M 10 x 40	05200101	12 x 40	M10 x 15	50	1,07
E M 12 x 50	05300101	15 x 50	M12 x 18	50	2,18
E M 12 x 80	05305101	15 x 80	M12 x 45	50	3,15
E M 16 x 65	05500101	20 x 65	M16 x 23	25	2,55
E M 16 x 80	05505101	20 x 80	M16 x 38	25	2,91
E M 20 x 80	05600101	25 x 80	M20 x 34	25	4,45

[1)]Not part of assessment

Drop-in Anchor ES

- Steel, zinc plated/Approved for concrete
- Lipped Drop-in for installations in a bottomless hole

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
ES M 6x25	05025101	8 x 25	M6 x 12	100	0,74
ES M 8 x 25	05125101	10 x 25	M8 x 12	100	1,05
ES M 8 x 30	05150101	10 x 30	M8 x 13	100	1,15
ES M 8 x 40	05155101	10 x 40	M8 x 20	100	1,53
ES M 10 x 25	05225101	12 x 25	M10 x 12	50	0,80
ES M 10 x 30	05230101	12 x 30	M10 x 12	50	0,89
ES M 10 x 40	05250101	12 x 40	M10 x 15	50	1,10
ES M 12 x 25	05325101	15 x 25	M12 x 12	50	1,15
ES M 12 x 50	05350101	15 x 50	M12 x 18	50	2,15
ES M 16 x 65	05551101	20 x 65	M16 x 23	25	2,53

Safety Setting Tool

For Drop-in Anchor E and ES
With hand guard

Description	Ref. No.	Weight per piece kg
E-MSH 6 x 25	09025801	0,42
E-MSH 8 x 25	09125801	0,42
E-MSH 8 x 30	09100801	0,42
E-MSH 8 x 40	09105801	0,38
E-MSH 10 x 25	09225801	0,50
E-MSH 10 x 30	09205801	0,50
E-MSH 10 x 40	09200801	0,45
E-MSH 12 x 25	09325801	0,45
E-MSH 12 x 50	09300801	0,47
E-MSH 12 x 80	09305801	0,51
E-MSH 16 x 65	09500801	0,50
E-MSH 16 x 80	09505801	0,55
E-MSH 20 x 80	09600801	0,62

Standard Setting Tool

For Drop-in Anchor E and ES

Description	Ref. No.	Weight per piece kg
E-SW 5 x 25	09000150	0,08
E-SW 6 x 25	09002150	0,09
E-SW 6 x 30	09005150	0,09
E-SW 8 x 25	09125150	0,14
E-SW 8 x 30	09100150	0,14
E-SW 8 x 40	09105150	0,14
E-SW 10 x 25	09225150	0,15
E-SW 10 x 30	09205150	0,15
E-SW 10 x 40	09200150	0,15
E-SW 12 x 25	09325150	0,24
E-SW 12 x 50	09300150	0,25
E-SW 12 x 80	09305150	0,22
E-SW 16 x 65	09500150	0,41
E-SW 16 x 80/DW 15	09505150	0,42
E-SW 20 x 80	09600150	0,68

Plug-on setting tool with stop drill bit

For Drop-in Anchor E and ES.

Description	Ref. No.	For Drop-in Anchor	Suitable stop drill bit	Package content pcs.	Weight per piece kg
E-ASW 6 x 25	09097101	ES M 6 x 25	BB 8 x 25	1	0,20
E-ASW 6 x 30	09098101	E/ES M 6 x 30	BB 8 x 30	1	0,20
E-ASW 8 x 25	09197101	ES M 8 x 25	BB 10 x 25	1	0,20
E-ASW 8 x 30	09198101	E/ES M 8 x 30	BB 10 x 30	1	0,20
E-ASW 8 x 40	09199101	E/ES M 8 x 40	BB 10 x 40	1	0,23
E-ASW 10 x 25	09297101	ES M 10 x 25	BB 12 x 25	1	0,21
E-ASW 10 x 30	09298101	E/ES M 10 x 30	BB 12 x 30	1	0,21
E-ASW 10 x 40	09299101	E/ES M 10 x 40	BB 12 x 40	1	0,24

Stop drill bit

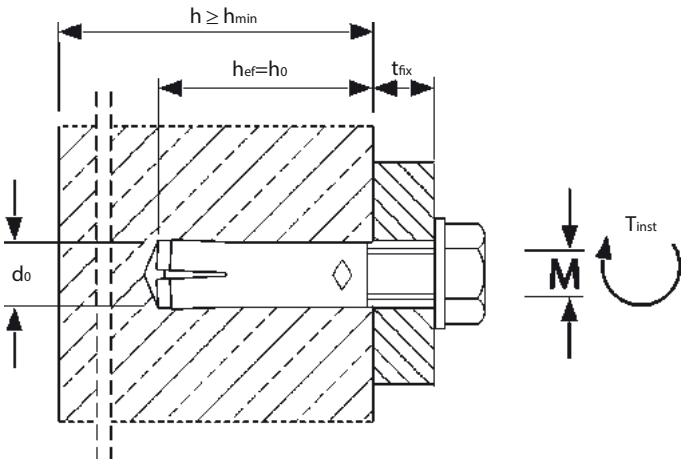
For Drop-in Anchor E and ES.

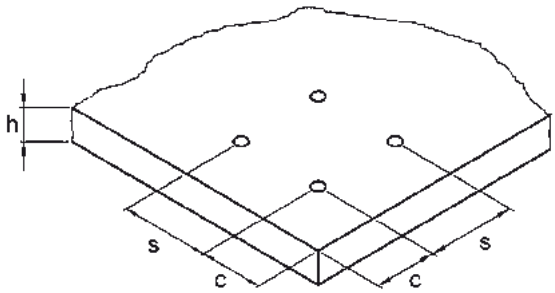
Description	Ref. No.	Drill hole Ø x depth [mm]	For Drop-in Anchor	Suitable for plug-on setting tool	Package content pcs.	Weight per piece kg
BB 8 x 25	50031001	8 x 25	ES M 6 x 25	E-ASW 6 x 25	1	0,11
BB 8 x 30	50031501	8 x 30	E/ES M 6 x 30	E-ASW 6 x 30	1	0,11
BB 10 x 25	50041001	10 x 25	ES M 8 x 25	E-ASW 8 x 25	1	0,11
BB 10 x 30	50041501	10 x 30	E/ES M 8 x 30	E-ASW 8 x 30	1	0,11
BB 10 x 40	50042001	10 x 40	E/ES M 8 x 40	E-ASW 8 x 40	1	0,12
BB 12 x 25	50051001	12 x 25	ES M 10 x 25	E-ASW 10 x 25	1	0,12
BB 12 x 30	50051501	12 x 30	E/ES M 10 x 30	E-ASW 10 x 30	1	0,12
BB 12 x 40	50052001	12 x 40	E/ES M 10 x 40	E-ASW 10 x 40	1	0,12
BB 15 x 25	50071001	15 x 25	ES M 12 x 25	-	1	0,15
BB 15 x 50	50072501	15 x 50	E/ES M 12 x 50	-	1	0,17

SDS Setting Tool

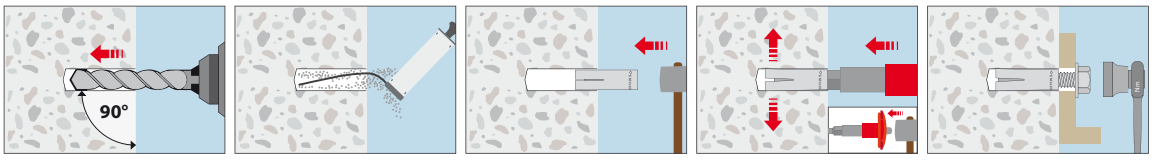
For Drop-in Anchor E and ES.
With SDS plus connection.

Description	Ref. No.	Weight per piece kg
E-SW 6 x 25 SDS	09090101	0,07
E-SW 8 x 25 SDS	09185101	0,07
E-SW 8 x 30 SDS	09190101	0,07
E-SW 8 x 40 SDS	09195101	0,07
E-SW 10 x 25 SDS	09286101	0,08
E-SW 10 x 30 SDS	09288101	0,08
E-SW 10 x 40 SDS	09290101	0,08
E-SW 12 x 25 SDS	09395101	0,10
E-SW 12 x 50 SDS	09390101	0,10





Installation



Extract from Permissible Service Conditions of European Technical Assessment ETA-02/0020 for use in uncracked concrete (Option 7)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data	Drop-in Anchor E/ES			M5x25[1,2]	M6x30[1]	M8x30[1]	M8x40	M10x30[1]	M10x40	M12x50	M12x80	M16x65	M16x80	M20x80
				uncracked concrete										
Mean ultimate loads, tension (Screw 8.8)	C25/30	Num	[kN]	8,0	10,0	11,5	13,5	15,6	16,9	24,1	24,1	36,4	36,4	50,5
Mean ultimate loads, shear (Screw 8.8)	C25/30	Vum	[kN]	5,7	6,9	11,1	11,1	13,5	13,5	29,5	29,5	50,4	50,4	76,4
Approved loads, tension (Screw 5.6 to 8.8)	C20/25	appr. N	[kN]	1,4	3,2	3,2	3,6	3,2	4,9	6,9	6,9	10,2	10,2	14,0
	C25/30	appr. N	[kN]	1,5	3,6	3,6	3,8	3,6	5,5	7,7	7,7	11,4	11,4	15,6
	C30/37	appr. N	[kN]	1,7	3,6	3,9	4,0	3,9	6,0	8,5	8,5	12,5	12,5	17,1
	C40/50	appr. N	[kN]	1,9	3,6	4,5	4,4	4,5	7,0	9,8	9,8	14,5	14,5	19,8
	C50/60	appr. N	[kN]	2,1	3,6	5,1	4,7	5,1	7,8	10,9	10,9	16,2	16,2	22,1
Approved loads, shear (Screw 5.6)	≥ C20/25	appr. V	[kN]	1,5	2,1	3,8	3,9	3,8	4,1	9,0	9,0	16,8	16,8	26,2
Approved loads, shear (Screw 5.8)	≥ C20/25	appr. V	[kN]	2,0	2,9	3,8	3,9	3,8	4,1	11,1	12,1	18,0	18,0	28,6
Approved loads, shear (Screw 8.8)	≥ C20/25	appr. V	[kN]	2,0	2,9	3,8	3,9	3,8	4,1	11,1	12,3	18,0	18,0	28,6
Approved bending moments (Screw 5.6)		appr. M	[Nm]	-	3,3	8,1	8,1	15,8	15,8	27,8	27,8	71,0	71,0	138,6
Approved bending moments (Screw 5.8)		appr. M	[Nm]	-	4,3	10,9	10,9	21,1	21,1	37,1	37,1	94,9	94,9	185,1
Approved bending moments (Screw 8.8)		appr. M	[Nm]	-	6,9	17,1	17,1	33,7	34,3	60,0	60,0	152,0	152,0	296,6
Spacing and edge distance														
Effective anchorage depth		h_{ef}	[mm]	25	30	30	40	30	40	50	80	65	80	80
Characteristic spacing		$s_{cr,N}$	[mm]	75	90	90	120	90	120	150	240	195	240	240
Characteristic edge distance		$c_{cr,N}$	[mm]	37,5	45	45	60	45	60	75	120	97,5	120	120
Minimum spacing		s_{min}	[mm]	60	55	60	80	100	100	120	120	150	150	160
Minimum edge distance		c_{min}	[mm]	95	95	95	95	115	135	165	165	200	200	260
Minimum thickness of concrete slab		h_{min}	[mm]	100	100	100	100	120	120	130	130	160	160	200
Installation parameters														
Drill hole diameter		d_o	[mm]	8	8	10	10	12	12	15	15	20	20	25
Diameter of clearance hole in the fixture		d_f	[mm]	6	7	9	9	12	12	14	14	18	18	22
Depth of drill hole		h_0	[mm]	25	30	30	40	30	40	50	80	65	80	80
Installation torque		$T_{inst} \leq$	[Nm]	3	4	8	8	15	15	35	35	60	60	120
Minimum screwing depth		L_{sd}	[mm]	6	7	9	9	10	11	13	13	18	18	22
Maximum screwing depth		L_{th}	[mm]	10	13	13	20	12	15	18	45	23	38	34

[1] Valid only for statically indeterminate systems. [2] Not part of assessment.

Extract from Permissible Service Conditions of European Technical Assessment ETA-05/0116 for use in concrete for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

Loads and performance data		Drop-in Anchor E/ES		M6x25	M6x30	M8x25	M8x30	M8x40	M10x25	M10x30	M10x40	M12x25	M12x50	M16x65
				cracked and uncracked concrete										
Approved loads (C12/15 and C16/20)		appr. F	[kN]	1,2	-	1,2	-	-	1,7	-	-	1,7	-	-
Approved loads (C20/25 to C50/60)		appr. F	[kN]	1,7	1,2	1,9	1,7	2,0	2,1	2,0	2,0	2,1	2,4	6,3
Approved bending moments (Screw 4.6)		appr. M	[Nm]	2,6	2,6	6,4	6,4	6,4	12,8	12,8	12,8	22,2	22,2	56,9
Approved bending moments (Screw 5.6)		appr. M	[Nm]	3,3	3,3	8,1	8,1	8,1	15,8	15,8	15,8	27,8	27,8	71,0
Approved bending moments (Screw 5.8)		appr. M	[Nm]	4,3	4,3	10,9	10,9	10,9	21,1	21,1	21,1	37,1	37,1	94,9
Approved bending moments (Screw 8.8)		appr. M	[Nm]	6,9	6,9	17,1	17,1	17,1	34,3	33,7	34,3	60,0	60,0	152,0
Spacing and edge distance														
Effective anchorage depth		h_{ef}	[mm]	25	30	25	30	40	25	30	40	25	50	65
Characteristic spacing		s_{cr}	[mm]	75	130	75	180	210	75	230	170	75	170	400
Characteristic edge distance		c_{cr}	[mm]	38	65	38	90	105	38	115	85	38	85	200
Minimum spacing[1]		s_{min}	[mm]	30	55	50	60	80	60	100	100	100	120	150
Minimum edge distance[1]		c_{min}	[mm]	60	95	100	95	95	100	115	135	110	165	200
Standard/Minimum thickness of concrete slab		$h_{min\,2}/h_{min\,1}$	[mm]	100/80	100	100/80	100	100	100/80	120	120	100/80	130	160
Installation parameters														
Drill hole diameter		d_o	[mm]	8	8	10	10	10	12	12	12	15	15	20
Diameter of clearance hole in the fixture		d_f	[mm]	7	7	9	9	9	12	12	12	14	14	18
Depth of drill hole		h_0	[mm]	25	30	25	30	40	25	30	40	25	50	65
Installation torque		$T_{inst} \leq$	[Nm]	4	4	8	8	8	15	15	15	35	35	60
Minimum screwing depth[1]		L_{sd}	[mm]	6	7	8	9	9	10	10	11	12	13	18
Maximum screwing depth[1]		L_{th}	[mm]	12	13	12	13	20	12	12	15	12	18	23
Loads under fire exposure (C20/25 to C50/60)														
(for screw ≥ 4.8)	Approved loads R30	appr. F	[kN]	0,4	0,4	0,6	0,9	1,1	0,6	0,9	1,5	0,6	1,5	4,0
	Approved loads R60	appr. F	[kN]	0,35	0,35	0,6	0,9	0,9	0,6	0,9	1,5	0,6	1,5	4,0
	Approved loads R90	appr. F	[kN]	0,3	0,3	0,6	0,6	0,6	0,6	0,9	1,1	0,6	1,5	3,0
	Approved loads R120	appr. F	[kN]	0,25	0,3	0,5	0,5	0,5	0,5	0,7	0,9	0,5	1,2	2,4
(for screw ≥ 5.6)	Approved loads R30	appr. F	[kN]	0,4	0,8	0,6	0,9	1,5	0,6	0,9	1,5	0,6	1,5	4,0
	Approved loads R60	appr. F	[kN]	0,35	0,8	0,6	0,9	1,5	0,6	0,9	1,5	0,6	1,5	4,0
	Approved loads R90	appr. F	[kN]	0,3	0,4	0,6	0,9	0,9	0,6	0,9	1,5	0,6	1,5	3,7
	Approved loads R120	appr. F	[kN]	0,25	0,3	0,5	0,5	0,5	0,5	0,7	1,0	0,5	1,2	2,4
Characteristic spacing		$s_{cr,fi}$	[mm]	100	130	100	180	210	100	170	170	100	200	400
Characteristic edge distance		$c_{cr,fi}$	[mm]	50	65	50	90	105	50	85	85	50	100	200

For anchor designing, an easy to operate software on CD-ROM is available on request or can be downloaded at www.mkt.de.
[1] Data for minimum thickness of concrete see ETA-05/0116

ETA-05/0116

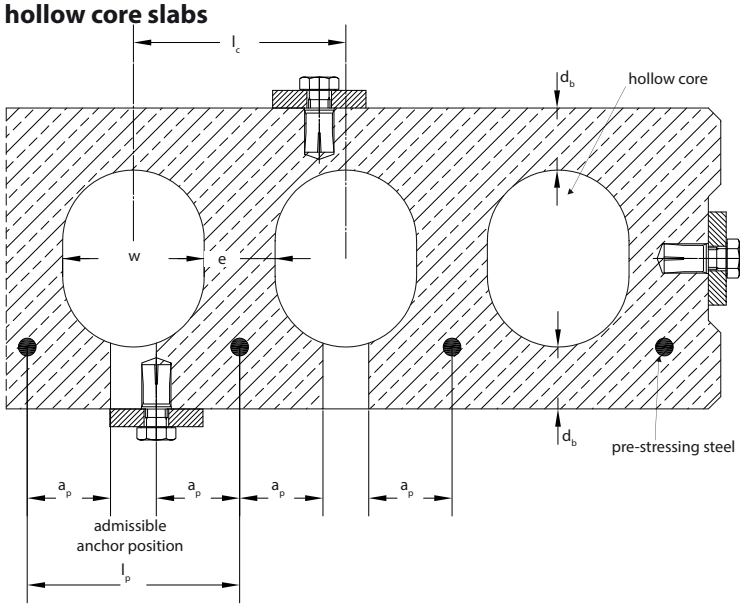
Extract from Permissible Service Conditions of European Technical Assessment ETA-05/0116 for use in precast pre-stressed hollow core slabs for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

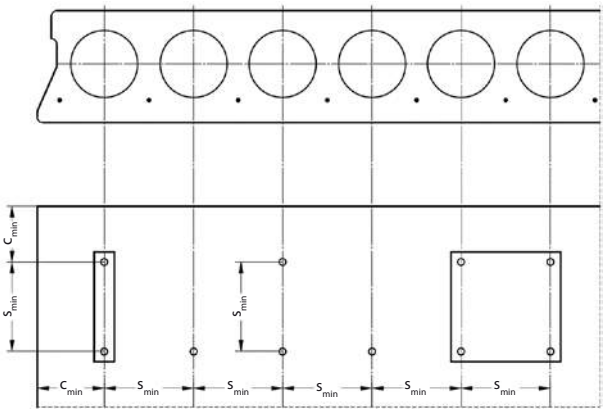
Loads and performance data	Drop-in Anchor ES		M6 x 25	M8 x 25	M10 x 25	M12 x 25
Precast pre-stressed hollow core slabs C30/37 to C50/60						
Flange thickness	$d_b \geq$	[mm]	35 (30[1)])			
Approved loads	$F_{appr.}$	[kN]	1,7	1,9	2,1	2,1
Approved bending moments (Steel 4.6)	appr. M	[Nm]	2,6	6,4	12,8	22,2
Approved bending moments (Steel 4.8)	appr. M	[Nm]	3,5	8,6	17,1	29,7
Approved bending moments (Steel 5.6)	appr. M	[Nm]	3,3	8,1	15,8	27,8
Approved bending moments (Steel 5.8)	appr. M	[Nm]	4,3	10,9	21,1	37,1
Approved bending moments (Steel 8.8)	appr. M	[Nm]	6,9	17,1	34,3	60,0
Spacing and edge distance						
Spacing distance	$s_{cr} = s_{min}$	[mm]	200			
Edge distance	$c_{cr} = c_{min}$	[mm]	150			
Installation parameters						
Drill hole diameter	d_o	[mm]	8	10	12	15
Diameter of clearance hole in the fixture	d_f	[mm]	7	9	12	14
Depth of drill hole	$h_o \geq$	[mm]	25	25	25	25
Installation torque	$T_{inst} \leq$	[Nm]	4	8	15	35

[1)] Drill hole must not cut hollow core

Admissible anchor positions in precast pre-stressed hollow core slabs



Minimum spacing and edge distance in precast pre-stressed hollow core slabs

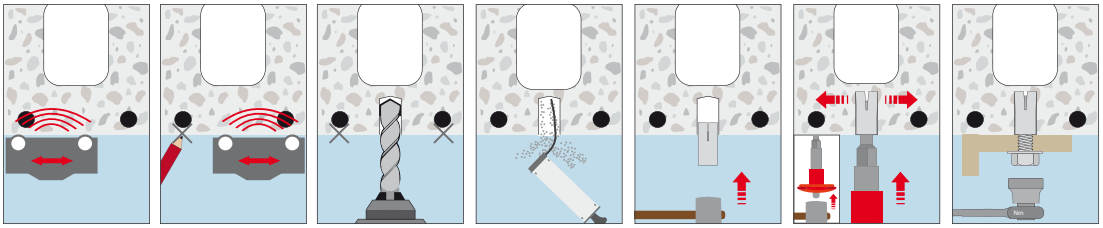


w / e ≤ 4,2

w	hollow core width	Minimum edge distance	$c_{min} \geq 150$ mm
e	web thickness	Minimum spacing	$s_{min} \geq 200$ mm

Core distance	$l_c \geq 100$ mm
Pre-stressing steel distance	$l_p \geq 100$ mm
Distance between anchor position and pre-stressing steel	$a_p \geq 50$ mm

Installation



Drop-in Anchor ED

Steel, zinc plated

Description

The Drop-in Anchor ED is designed for temporary mounting or fastenings of machines that are to be moved at a later time. The ED M12 D version with reinforced anchor shell is especially designed for the fastening of core drilling machines.

Applications

Fastening of concrete processing tools such as core-drills and concrete saws.

Base Material: **concrete C20/25–C50/60**

Drop-in Anchor ED

- Steel, zinc plated
- Suitable for diamond drilling equipment

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
ED M 12 x 50	05301101	15 x 50	M12 x 18	50	2,39
ED M 12 x 50 D	05317101	16 x 50	M12 x 18	50	2,81
ED M 16 x 65	05501101	20 x 65	M16 x 23	25	2,72

Standard Setting Tool

for Drop-in Anchor ED

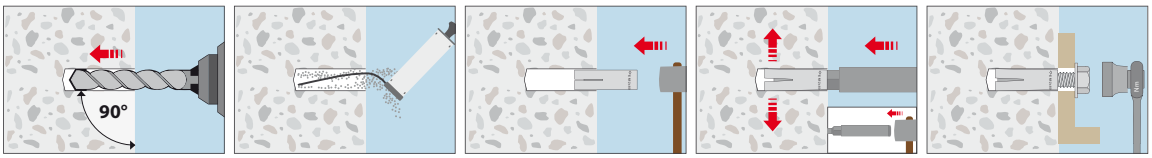
Description	Ref. No.
E-SW 12 x 50	09300150
E-SW 16 x 65	09500150

Recommended loads for Drop-in Anchor ED

Recommended loads for single anchor without influence of spacing and edge distance. The total safety factor (γ_M and γ_F) is included..

Loads and performance data	Drop-in Anchor ED			M 12x50	M 12x50 D	M 16x65
					uncracked concrete	
Recommen. loads, tension (Screw 5.6 to 8.8)	C20/25	rec. N	[kN]	7,1	7,1	10,5
Recommen. loads, shear (Screw 5.6)	≥ C20/25	rec. V	[kN]	9,0	9,0	16,8
Recommen. loads, shear (Screw 5.8/8.8)	≥ C20/25	rec. V	[kN]	12,0	12,0	18,0
Recommen. bending moments (Screw 5.6)		rec. M	[Nm]	27,8	27,8	71,0
Recommen. bending moments (Screw 5.8)		rec. M	[Nm]	37,1	37,1	94,9
Recommen. bending moments (Screw 8.8)		rec. M	[Nm]	60,0	60,0	152,0
Spacing and edge distance						
Effective anchorage depth		h_{ef}	[mm]	50	50	65
Characteristic spacing		$s_{cr,N}$	[mm]	150	150	195
Characteristic edge distance		$c_{cr,N}$	[mm]	75	75	97,5
Minimum spacing		s_{min}	[mm]	120	120	150
Minimum edge distance		c_{min}	[mm]	165	165	200
Minimum thickness of concrete slab		h_{min}	[mm]	130	130	160
Installation parameters						
Drill hole diameter		d_o	[mm]	15	16	20
Diameter of clearance hole in the fixture		d_f	[mm]	14	14	18
Depth of drill hole		h_0	[mm]	50	50	65
Installation torque		T_{inst}	[Nm]	35	35	60
Minimum screwing depth		L_{sd}	[mm]	13	13	18
Maximum screwing depth		L_{th}	[mm]	18	18	23

Installation



Drop-in Anchor ED-DW 15

Steel, zinc plated

Description

Drop-in Anchor with DYWIDAG® internal thread[1)] DW 15 for post installed threadbar (DYWIDAG®) connections. Suitable for concrete C12/15-C50/60 or hard natural stone. Safe installation if debris makes the thread impassible. The Drop-in Anchor does not protrude out of the concrete after removing the threadbar.

Applications

Multi-functional Anchor for concrete formwork. Cost efficient, quick fixing into existing concrete. Ideal for fixing one-sided formwork or temporary guardrails.

Base Material: **concrete C12/15–C 50/60 or hard natural stone**

Drop-in Anchor ED-DW 15

- Steel, zinc plated
- For fixing threadbars in formwork

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
ED-DW 15 x 80	05950101	22 x 80	DW 15 x 35	25	3,76

Standard Setting Tool

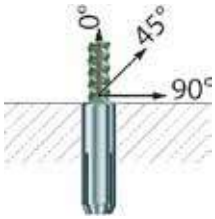
for Drop-in Anchor ED-DW 15

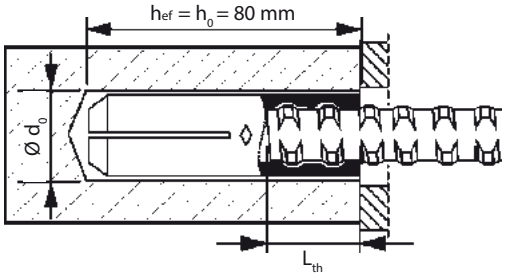
Description	Ref. No.
E-SW 16 x 80 / DW-15 x 80	9505150

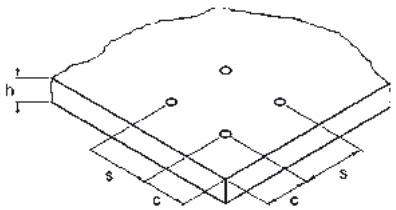
Recommended loads for ED-DW 15

Recommended loads for single anchor without influence of spacing and edge distance. The total safety factor (γ_M and γ_F) is included.

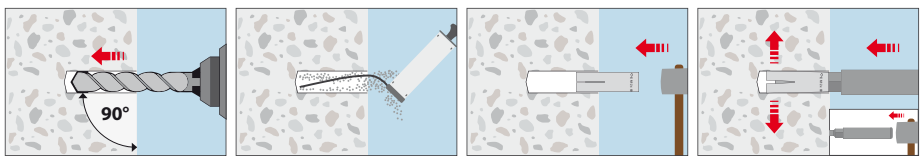
Loads and performance data		Applied load angle		0°	15°	30°	45°	60°	75°	90°
				uncracked concrete						
Recommended loads	C12/15	rec. F	[kN]	17,3	16,9	16,8	17,4	18,7	20,6	22,6
	≥ C20/25	rec. F	[kN]	19,3	18,7	18,3	18,6	19,5	21,1	22,6
Spacing and edge distance										
Effective anchorage depth		h_{ef}	[mm]	80						
Minimum spacing		s_{min}	[mm]	600						
Minimum edge distance		c_{min}	[mm]	300						
Minimum thickness of concrete slab		h_{min}	[mm]	160						
Installation parameters										
Drill hole diameter		d_o	[mm]	22						
Depth of drill hole		h_0	[mm]	80						
Length of thread		L_{th}	[mm]	35						
Stab/Screw DW15 minimum installation depth			[mm]	28						







Installation



[1)] DYWIDAG® internal thread (DYWIDAG® is a registered trademark of Walter Bau AG)

Drop-in Anchor E A4 / ES A4 / E HCR

Stainless steel A4/316 / High corrosion resistant steel 1.4529 (HCR)

Drop-in Anchor E A4

Drop-in Anchor ES A4

Range of loading: **1,2 kN–30,4 kN**

Range of concrete quality: **C20/25–C50/60**

M6-M20 | M6-M16 | R30-R120 M6-M16 A4 | M6-M20 | M10 - M20 A4 | M8-M16

M6-M20

Description

The Drop-in Anchor E/ES A4 / E HCR is approved as single anchor in uncracked concrete as well as for redundant fastening use for non-structural applications in cracked and uncracked concrete.

The Drop-in Anchor E/ES A4 / E HCR is placed into the drill hole in pre-setting installation and expanded reliably by means of a manual or hammer drill setting tool. Using a detachable setting tool with a stop drill bit (ASW) allows for quick and efficient, high volume installations. Using the marking setting tool produces a visible marking on the anchor sleeve which confirms the correct installation.The use of coated screws is necessary in order to be able to remove the fixture.

Advantages

- Approved for use as multiple fixing in cracked and uncracked concrete
- Approved for use as single fixing in uncracked concrete
- Quick, efficient and energy-saving installation thanks to stop drill bit and plug-on setting tool
- Simple visual inspection with marking tool
- Many possible applications due to the use of standard metric screws and threaded rods
- FM approval for the installation of sprinkler systems (M10-M20)
- Suitable for the installation of sprinkler systems according to the requirements of damage prevention VDS, GmbH
- Fire resistance tested in concrete C20/25 to C50/60

Applications

Attaching suspended ceilings, ventilation and sprinkler systems, structural steel, brackets, threaded rods.

Drop-in Anchor E A4

- Stainless steel A4/316
- Approved for concrete

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
E M 5 x 25 A4[1)]	05000501	8 x 25	M5 x 10	100	0,75
E M 6 x 30 A4	05005501	8 x 30	M6 x 13	100	0,83
E M 8 x 30 A4	05100501	10 x 30	M8 x 13	100	1,16
E M 8 x 40 A4	05105501	10 x 40	M8 x 20	100	1,49
E M 10 x 40 A4	05200501	12 x 40	M10 x 15	50	1,08
E M 12 x 50 A4	05300501	15 x 50	M12 x 18	50	2,19
E M 16 x 65 A4	05500501	20 x 65	M16 x 23	25	2,57
E M 20 x 80 A4	05600501	25 x 80	M20 x 34	25	4,63

Drop-in Anchor ES A4

- Stainless steel A4, Approved for concrete
- Lipped Drop-in for installations in a bottomless hole

Description	Ref. No.	Drill hole Ø x depth mm	Thread Ø x length mm	Package content pcs.	Weight per package kg
ES M 8 x 30 A4	05150501	10 x 30	M8 x 13	100	1,15
ES M 10 x 40 A4	05250501	12 x 40	M10 x 15	50	1,10
ES M 12 x 50 A4	05350501	15 x 50	M12 x 18	50	2,15

[1)]Not part of the ETA. Stainless steel HCR on request. Coated screws see page 31-32.

Safety Setting Tool

For Drop-in Anchor E and ES
With hand guard

Description	Ref. No.	Weight per piece kg
E-MSH 8 x 30	09100801	0,42
E-MSH 8 x 40	09105801	0,38
E-MSH 10 x 30	09205801	0,50
E-MSH 10 x 40	09200801	0,45
E-MSH 12 x 50	09300801	0,47
E-MSH 12 x 80	09305801	0,51
E-MSH 16 x 65	09500801	0,50
E-MSH 16 x 80	09505801	0,55
E-MSH 20 x 80	09600801	0,62

Standard Setting Tool

For Drop-in Anchor E and ES

Description	Ref. No.	Weight per piece kg
E-SW 5 x 25	09000150	0,08
E-SW 6 x 30	09005150	0,09
E-SW 8 x 30	09100150	0,14
E-SW 8 x 40	09105150	0,14
E-SW 10 x 30	09205150	0,15
E-SW 10 x 40	09200150	0,15
E-SW 12 x 50	09300150	0,25
E-SW 12 x 80	09305150	0,22
E-SW 16 x 65	09500150	0,41
E-SW 16 x 80/DW 15	09505150	0,42
E-SW 20 x 80	09600150	0,68

Plug-on setting tool with stop drill bit

For Drop-in Anchor E and ES.

Description	Ref. No.	For Drop-in Anchor	Suitable stop drill bit	Package content pcs.	Weight per piece kg
E-ASW 6 x 30	09098101	E/ES M 6 x 30	BB 8 x 30	1	0,20
E-ASW 8 x 30	09198101	E/ES M 8 x 30	BB 10 x 30	1	0,20
E-ASW 8 x 40	09199101	E/ES M 8 x 40	BB 10 x 40	1	0,23
E-ASW 10 x 30	09298101	E/ES M 10 x 30	BB 12 x 30	1	0,21
E-ASW 10 x 40	09299101	E/ES M 10 x 40	BB 12 x 40	1	0,24

Stop drill bit

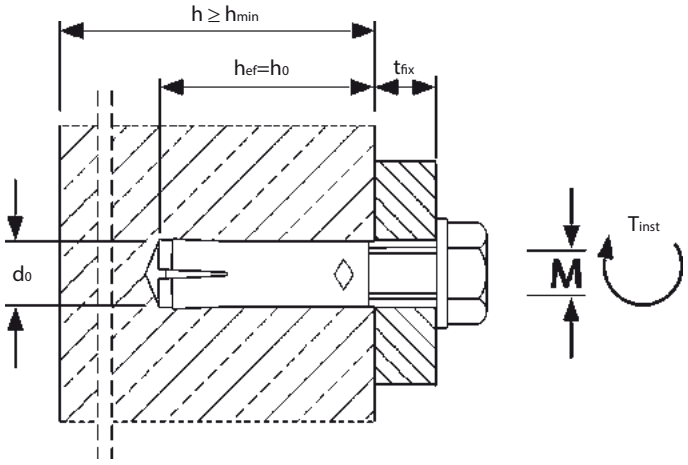
For Drop-in Anchor E and ES.

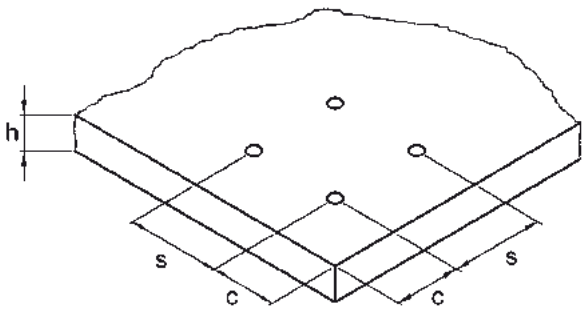
Description	Ref. No.	Drill hole Ø x depth [mm]	For Drop-in Anchor	Suitable for plug-on setting tool	Package content pcs.	Weight per piece kg
BB 8 x 30	50031501	8 x 30	E/ES M 6 x 30	E-ASW 6 x 30	1	0,11
BB 10 x 30	50041501	10 x 30	E/ES M 8 x 30	E-ASW 8 x 30	1	0,11
BB 10 x 40	50042001	10 x 40	E/ES M 8 x 40	E-ASW 8 x 40	1	0,12
BB 12 x 30	50051501	12 x 30	E/ES M 10 x 30	E-ASW 10 x 30	1	0,12
BB 12 x 40	50052001	12 x 40	E/ES M 10 x 40	E-ASW 10 x 40	1	0,12
BB 15 x 50	50072501	15 x 50	E/ES M 12 x 50	-	1	0,17

SDS Setting Tool

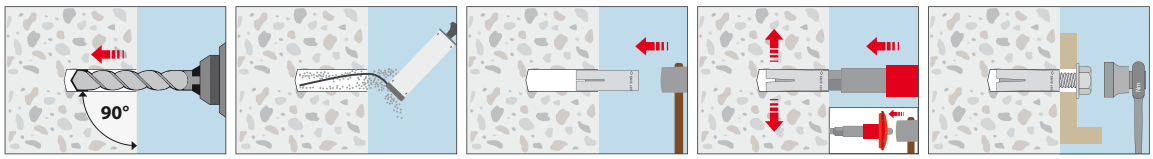
For Drop-in Anchor E and ES.
With SDS plus connection.

Description	Ref. No.	Weight per piece kg
E-SW 8 x 30 SDS	09190101	0,07
E-SW 8 x 40 SDS	09195101	0,07
E-SW 10 x 30 SDS	09288101	0,08
E-SW 10 x 40 SDS	09290101	0,08
E-SW 12 x 50 SDS	09390101	0,10





Installation



Extract from Permissible Service Conditions of European Technical Assessment ETA-02/0020 for use in uncracked concrete (Option 7)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 197.

Loads and performance data				Drop-in Anchor E A4 / HCR	M5x25[1)]	M6x30[1)]	M8x30[1)]	M8x40	M10x40	M12x50	M12x80	M16x65	M16x80	M20x80
								uncracked concrete						
Mean ultimate loads, tension	C25/30	N_{um}	[kN]		8,0	12,2	14,2	16,1	19,8	27,7	27,7	41,0	41,0	62,7
Mean ultimate loads, shear	C25/30	V_{um}	[kN]		5,7	8,5	14,1	14,8	20,3	37,3	37,3	64,9	64,9	94,6
Approved loads, tension	C20/25	appr. N	[kN]		1,6	3,8	3,8	5,2	5,9	8,3	8,3	12,3	12,3	16,8
	C25/30	appr. N	[kN]		1,7	4,3	4,3	5,6	6,6	9,3	9,3	13,7	13,7	18,7
	C30/37	appr. N	[kN]		1,9	4,7	4,7	5,9	7,2	10,1	10,1	15,0	15,0	20,5
	C40/50	appr. N	[kN]		2,2	5,4	5,4	6,4	8,4	11,7	11,7	17,4	17,4	23,7
	C50/60	appr. N	[kN]		2,5	5,4	6,1	6,9	9,3	13,1	13,1	19,4	19,4	26,5
Approved loads, shear	≥ C20/25	appr. V	[kN]		2,3	3,2	4,9	4,9	6,1	11,5	11,5	19,2	19,2	30,4
Approved bending moments (Screw A4-70)		appr. M	[Nm]		-	5,0	11,9	11,9	23,8	42,1	42,1	106,7	106,7	207,9
Spacing and edge distance														
Effective anchorage depth		h_{ef}	[mm]		25	30	30	40	40	50	80	65	80	80
Characteristic spacing		$s_{cr,N}$	[mm]		75	90	90	120	120	150	240	195	240	240
Characteristic edge distance		$c_{cr,N}$	[mm]		37,5	45	45	60	60	75	120	97,5	120	120
Minimum spacing		s_{min}	[mm]		60	50	60	80	100	120	120	150	150	160
Minimum edge distance		c_{min}	[mm]		95	80	95	95	135	165	165	200	200	260
Minimum thickness of concrete slab		h_{min}	[mm]		100	100	100	100	130	140	140	160	160	250
Installation parameters														
Drill hole diameter		d_o	[mm]		8	8	10	10	12	15	15	20	20	25
Diameter of clearance hole in the fixture		d_f	[mm]		6	7	9	9	12	14	14	18	18	22
Depth of drill hole		h_0	[mm]		25	30	30	40	40	50	80	65	80	80
Installation torque		$T_{inst} \leq$	[Nm]		3	4	8	8	15	35	35	60	60	120
Minimum screwing depth		L_{sd}	[mm]		6	7	9	9	11	13	13	18	18	22
Maximum screwing depth		L_{th}	[mm]		10	13	13	20	15	18	45	23	38	34

[1)]Valid only for statically indeterminate systems. Size M 5 not part of assessment.
For anchor designing, an easy to operate software on CD-ROM is available on request or can be downloaded at www.mkt.de.

Extract from Permissible Service Conditions of European Technical Assessment ETA-05/0116 for use in concrete for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

Loads and performance data	Drop-in Anchor E A4 / HCR		M6x30	M8x30	M8x40	M10x40	M12x50	M16x65
				cracked and uncracked concrete				
Approved loads (C20/25 to C50/60)	appr. F	[kN]	1,2	1,7	2,0	2,0	2,4	6,3
Approved bending moments (A4-70)	appr. M	[Nm]	5,0	11,9	11,9	23,8	42,1	106,7
Spacing and edge distance								
Effective anchorage depth	h_{ef}	[mm]	30	30	40	40	50	65
Characteristic spacing	s_{cr}	[mm]	130	180	210	170	170	400
Characteristic edge distance	c_{cr}	[mm]	65	90	105	85	85	200
Minimum spacing	s_{min}	[mm]	50	60	80	100	120	150
Minimum edge distance	c_{min}	[mm]	80	95	95	135	165	200
Minimum thickness of concrete slab	h_{min}	[mm]	100	100	100	130	140	160
Installation parameters								
Drill hole diameter	d_o	[mm]	8	10	10	12	15	20
Diameter of clearance hole in the fixture	d_f	[mm]	7	9	9	12	14	18
Depth of drill hole	h_0	[mm]	30	30	40	40	50	65
Installation torque	$T_{inst} \leq$	[Nm]	4	8	8	15	35	60
Minimum screwing depth	L_{sd}	[mm]	7	9	9	11	13	18
Maximum screwing depth	L_{th}	[mm]	13	13	20	15	18	23
Loads under fire exposure								
Approved loads R30	appr. F	[kN]	0,8	0,9	1,5	1,5	1,5	4,0
Approved loads R60	appr. F	[kN]	0,8	0,9	1,5	1,5	1,5	4,0
Approved loads R90	appr. F	[kN]	0,4	0,9	0,9	1,5	1,5	3,7
Approved loads R120	appr. F	[kN]	0,3	0,5	0,5	1,0	1,2	2,4
Characteristic spacing	$s_{cr,fi}$	[mm]	130	180	210	170	200	400
Characteristic edge distance	$c_{cr,fi}$	[mm]	65	90	105	85	100	200

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

Hollow Core Anchor Easy

Steel, zinc plated

R30-R120

G 4070019
M8-M12

Range of loading: **0,7 kN–4,3 kN**
Concrete quality: **≥ C45/55 bzw. B55;**
pre-stressed hollow concrete slabs

Description
The Hollow Core Anchor Easy is a one -piece unit, specially designed for anchoring in pre-stressed hollow concrete slabs.

When the bolt or nut is tightened, the cone is released from the anchor sleeve and pulled into it. Thereby the anchor expands in the cavity, creating a form fit or anchors itself in the solid material of the pre-stressed hollow concrete slabs. The Hollow Core Anchor Easy can be installed in accordance with the national technical approval Z-21.1-1785, both from the underside of the ceiling, as well as from above the floor. Besides the installation in pre-stressed concrete hollow slab ceilings, the use of the Hollow Core Anchor Easy in reinforced concrete hollow core slabs (e.g. Cobiax system) was tested.

Advantages
- National technical approval for anchorages of single dowels in pre-stressed concrete hollow core slabs, both from floor as well as from the ceiling side
- Generally approved by the building authorities as multiple anchors for anchoring light suspended ceilings as well as comparable anchorages
- Approved for use in dry interiors
- Approved for use under fire exposure R30-R120
- Versatile application possibilities due to the use of commercially available screws and threaded rods (FKL ≥ 5.8, M6: FKL = 8.8)
- No drill hole cleaning for processing and assembly required

Applications
Suspension of ventilation, sprinkler system, false ceilings, brackets with threaded studs or screws, ducts, anchoring prefabricated panels on hollow concrete floors/ceilings.

Note on screws, threaded rods or bolts, as well as nuts:
- M6: strength class 8.8
- M8 - M12: strength class ≥ 5.8
- In order to securely brace the hollow ceiling anchor, it is preferable to use bolts with full thread (e.g. ISO 4017 / DIN 933) or ensure a sufficiently long thread.
- Minimum screw and minimum bolt length, see installation data on the next page

Hollow Core Anchor Easy

- Steel, zinc plated
- For use in pre-stressed concrete hollow slab ceilings and reinforced concrete hollow core ceilings
- Mounting possible on floor and on ceiling side

Description	Ref. No.	Drill hole Ø x Depth mm	Thread	Sleeve length (without cone) mm	Package content pieces	Weight per package kg
Easy M 6	51005101	10 x 50	M 6	30	50	0,52
Easy M 8	51100101	12 x 55	M 8	35	50	0,72
Easy M 10	51200101	16 x 60	M 10	40	50	1,66
Easy M 12	51300101	18 x 70	M 12	45	25	1,08

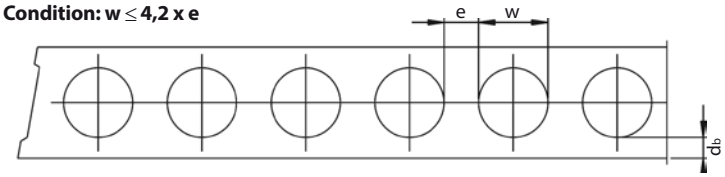
Extract from Permissible Service Conditions of Z-21.1-1785 for use in precast pre-stressed hollow core slabs

Approved loads for single anchor without influence of spacing and edge distance. Total safety factor included (γ_M and γ_F). Load capacities under fire exposure see page 197.

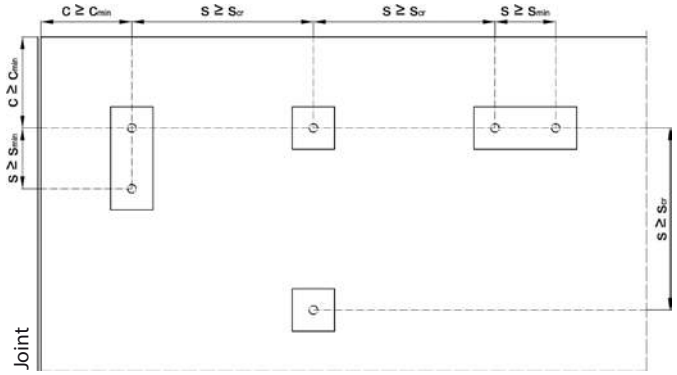
Loads and performance data	Easy			M 6				M 8				M 10				M 12			
				Precast pre-stressed concrete hollow slabs ≥ C45/55															
Flange thickness	d_b	[mm]	≥	25	30	40	50	25	30	40	50	25	30	40	50	25	30	40	50
Mean ultimate loads, tension	C45/55 N_{um}	[kN]		6,6	8,6	8,6	8,6	7,0	9,3	11,7	11,7	9,1	12,0	18,4	18,4	9,4	12,3	19,0	22,7
Mean ultimate loads, shear	C45/55 V_{um}	[kN]		6,9	8,1	8,1	8,1	7,3	8,7	9,2	9,2	8,0	9,4	12,2	14,5	8,3	9,8	12,7	15,5
Single anchor																			
Approved loads[1] (for $c \geq c_{cr}$)	F[1]	[kN]		0,7	0,9	2,0	2,9	0,7	0,9	2,0	3,6	0,9	1,2	3,0	3,6	1,0	1,2	3,0	4,3
Edge distance	c_{cr}	[mm]		150				150				150				150			
Approved loads[1] (for c_{min})	F[1]	[kN]		0,35	0,8	1,8	2,4	0,35	0,8	1,8	3,0	0,8	1,0	2,7	3,0	0,8	1,0	2,7	3,6
Minimum edge distance	c_{min}	[mm]		100				100				100				100			
Spacing	s_{cr}	[mm]		300				300				300				300			
Pair of anchors[2]																			
Approved loads[1] (for $c \geq c_{cr}$)	F[1]	[kN]		0,7	1,4	2,6	3,9	0,7	1,4	2,6	4,8	1,1	2,0	4,8	4,8	1,2	2,0	4,8	5,7
Minimum spacing	s_{min}	[mm]		70	80	100	100	70	80	100	100	70	80	100	100	70	80	100	100
Edge distance	c_{cr}	[mm]		150				150				150				150			
Approved loads[1] (for c_{min})	F[1]	[kN]		0,35	1,25	2,35	3,2	0,35	1,25	2,35	4,0	0,9	1,8	4,3	4,3	1,0	1,8	4,3	4,8
Minimum spacing	s_{min}	[mm]		70	80	100	100	70	80	100	100	70	80	100	100	70	80	100	100
Minimum edge distance	c_{min}	[mm]		100				100				100				100			
Approved bending moments																			
Stud / Screw, steel 5.8		[Nm]		-				10,7				21,4				37,4			
Stud / Screw, steel 8.8		[Nm]		4,4				17,1				34,2				59,8			
Installation parameters																			
Length of sleeve (without cone)	L	[mm]		30				35				40				45			
Minimum length of screw	min l_s	[mm]		42 + t_{fix}				47 + t_{fix}				55 + t_{fix}				61 + t_{fix}			
Minimum length of stud	min l_b	[mm]		47 + t_{fix}				53 + t_{fix}				63 + t_{fix}				71 + t_{fix}			
Minimum strength of stud / screw				8.8				5.8				5.8				5.8			
Drill hole diameter	d_o	[mm]		10				12				16				18			
Clearance hole in the fixture	d_f	[mm]		7				9				12				14			
Depth of drill hole	h_0	[mm]		50				55				60				70			
Installation torque	T_{inst}	[Nm]		10				20				30				40			

[1]For edge distance $c_{min} < c \leq c_{cr}$ can be determined by linear interpolation.
[2]Approved loads valid for double anchorage. Recommended load of the most stressed anchor may not exceed the recommended load of a single anchor. On double anchorages with spacing $s_{min} < s < s_{cr}$ the recommended load my be determined by linear interpolation, assuming the limiting value $s = s_{cr}$ for the double anchorage exposed to tension is twice the recommended load of a single anchor.

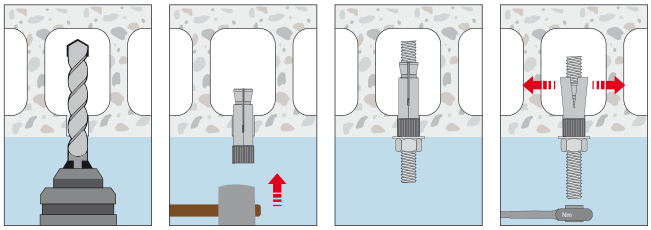
Condition: w ≤ 4,2 x e



Arrangement of the anchors



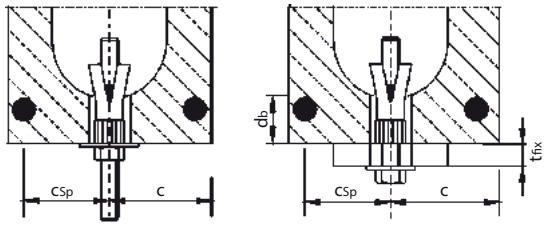
Installation



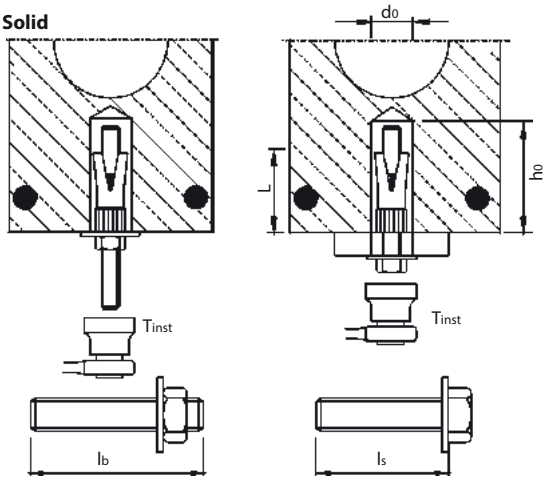
Installation with a threaded stud

Installation with a screw

Hollow



Solid



t_{fix} = Fixture thickness
d_b = Flange thickness
w = Width of hollow
e = Web width
c_{sp} = Spacing to tension wire
c = Edge distance

Hollow Core Anchor Easy A4

Stainless steel A4/316

G 4070019

Range of loading: **0,9 kN–3,6 kN**
Range of concrete quality: **≥ C45/55 bzw. B55; pre-stressed hollow concrete slabs**

Description
The Hollow Core Anchor Easy A4, consisting of an expansion cone and an expansive sleeve, was specially developed for use in pre-stressed concrete hollow ceilings in dry and damp interiors, as well as in outdoor atmospheres.

The expansion cone is firmly clamped in the expansion sleeve and is only detached from and pulled into the anchor sleeve, when the bolt or nut is tightened. This causes the anchor to expand in the cavity and creates a form fit, or anchors itself in the solid material of the pre-stressed concrete hollow slabs. The EASY hollow core ceiling anchor can be installed in accordance with the general building authority approval Z-21.1-1785, from under the ceiling as well as from ontop of the floor.

Advantages
- General building authority approval for anchorages of single anchors in pre-stressed concrete hollow core slabs, both from floor as well as from the ceiling side
- General building authority approval as multiple anchors for anchoring light suspended ceilings as well as comparable anchorages
- Approved for use in dry and damp interiors, and in outdoor atmospheres, if no particularly aggressive conditions are present.
- Approved for use under fire exposure R30-R120
- Versatile application possibilities due to the use of commercially available screws and threaded rods (A4 stainless steel, strength class ≥ 70)
- No drill hole cleaning required for processing and assembly

Applications
Suspended ceilings; suspensions in the heating, plumbing, electrical and ventilation; anchoring to floor or ceiling of pipe and cable trays, base plates, supports, shelves, wooden structures; other fastenings with threaded rods or screws.

Note on screws, threaded rods or bolts, as well as nuts:
- Material stainless steel A4, strength class ≥ 70 according to EN ISO 3506:2010
- In order to securely brace the hollow ceiling anchor, it is preferable to use bolts with full thread (e.g. ISO 4017 / DIN 933) or ensure a sufficiently long thread.
- Minimum screw and minimum bolt length, see installation data on the next page

Hollow Core Anchor Easy A4

- Stainless steel A4/316
- For use in pre-stressed concrete hollow slab ceilings
- Mounting possible on floor and on ceiling side

Description	Ref. No.	Drill hole Ø x depth mm	Thread	Sleeve length (without cone) mm	Package content pieces	Weight per package kg
Easy M 10 A4	57200501	16 x 60	M 10	40	50	1,66

Extract from Permissible Service Conditions of Z-21.1-1785 for use in precast pre-stressed hollow core slabs

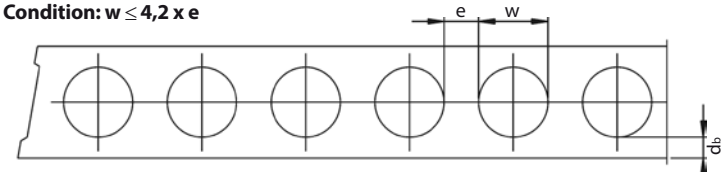
Approved loads for single anchor without influence of spacing and edge distance. Total safety factor included (γ_M and γ_F).

Loads and performance data	Easy			M 10 A4			
				Precast pre-stressed concrete hollow slabs ≥ C45/55			
Flange thickness	d_b	[mm]	≥	25	30	40	50
Mean ultimate loads, tension	C45/55 N_{um}	[kN]		9,1	12,0	18,4	18,4
Mean ultimate loads, shear	C45/55 V_{um}	[kN]		8,0	9,4	12,2	14,5
Single anchor							
Approved loads[1] (for c ≥ c_{cr})	F[1]	[kN]		0,9	1,2	3,0	3,6
Edge distance	c_{cr}	[mm]		150	150	150	150
Approved loads[1] (for c_{min})	F[1]	[kN]		0,8	1,0	2,7	3,0
Minimum edge distance	c_{min}	[mm]		100	100	100	100
Spacing	s_{cr}	[mm]		300	300	300	300
Pair of anchors[2]							
Approved loads[1] (for c ≥ c_{cr})	F[1]	[kN]		1,1	2,0	4,8	4,8
Minimum spacing	s_{min}	[mm]		70	80	100	100
Edge distance	c_{cr}	[mm]		150	150	150	150
Approved loads[1] (for c_{min})	F[1]	[kN]		0,9	1,8	4,3	4,3
Minimum spacing	s_{min}	[mm]		70	80	100	100
Minimum edge distance	c_{min}	[mm]		100	100	100	100
Approved bending moments							
Stud / Screw, Stainless steel A4, FKL ≥ 70		[Nm]		24	24	24	24
Installation parameters							
Length of sleeve (without cone)	L	[mm]		40	40	40	40
Minimum length of screw	min l_s	[mm]		55 + t_{fix}	55 + t_{fix}	55 + t_{fix}	55 + t_{fix}
Minimum length of stud	min l_b	[mm]		63 + t_{fix}	63 + t_{fix}	63 + t_{fix}	63 + t_{fix}
Minimum strength of stud / screw				FKL ≥ 70	FKL ≥ 70	FKL ≥ 70	FKL ≥ 70
Drill hole diameter	d_o	[mm]		16	16	16	16
Clearance hole in the fixture	d_f	[mm]		12	12	12	12
Depth of drill hole	h_0	[mm]		60	60	60	60
Installation torque	T_{inst}	[Nm]		30	30	30	30

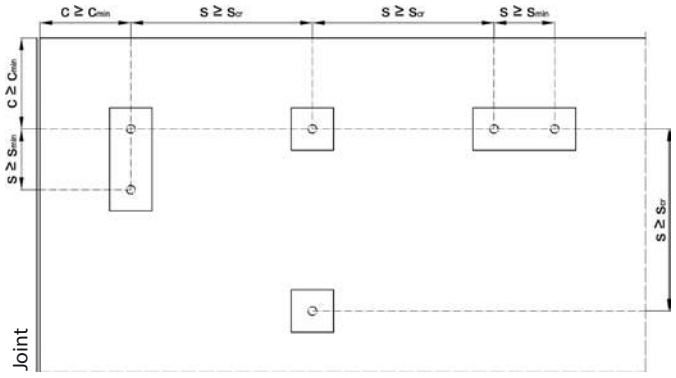
[1] For edge distance c_{min} < c ≤ c_{cr} can be determined by linear interpolation.

[2] Approved loads valid for double anchorage. Recommended load of the most stressed anchor may not exceed the recommended load of a single anchor. On double anchorages with spacing s_{min} < s < s_{cr} the recommended load my be determined by linear interpolation, assuming the limiting value s = s_{cr} for the double anchorage exposed to tension is twice the recommended load of a single anchor.

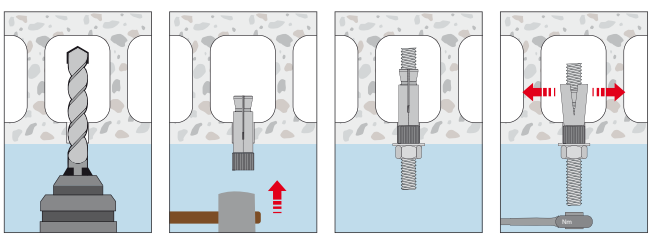
Condition: w ≤ 4,2 x e



Arrangement of the anchors



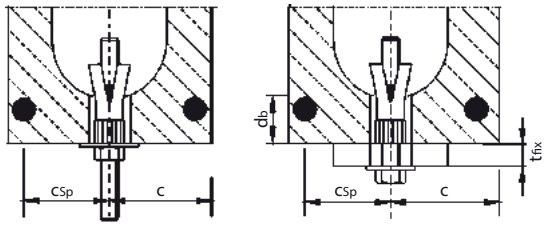
Installation



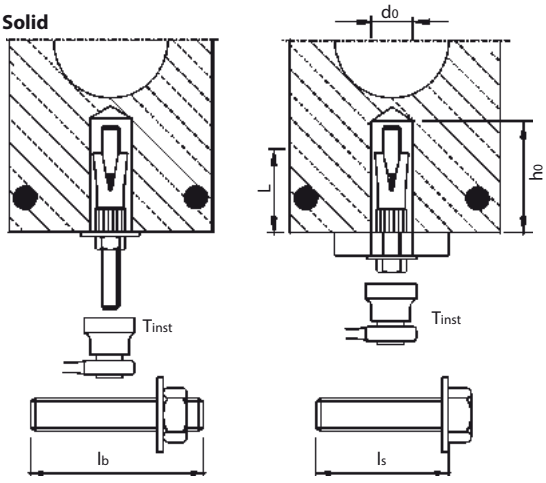
Installation with a threaded stud

Installation with a screw

Hollow



Solid



t_{fix} = Fixture thickness
d_b = Flange thickness
w = Width of hollow
e = Web width
c_{sp} = Spacing to tension wire
c = Edge distance

Highload Anchor SZ

Steel, zinc plated

Highload Anchor SZ-S

Highload Anchor SZ-B

Highload Anchor SZ-SK

ETA-02/0030

SEISMIC C1+C2

R30-R120

BBA UKTA - 22/6209

ZIVILSCHUTZ

M8-M24

Range of loading: **2,4 kN–114,3 kN**

Range of concrete quality: **C20/25–C50/60**

Description

The ETA (Option 1) approved Highload Anchor SZ is a high-performance through fastening Anchor System with plastic compression ring and with three part expansion sleeve. This allows for smaller spacings and edge distances with high loads. Through deeper setting, the variable anchorage depth of Highload Anchor SZ allows higher permissable shear loads in many cases, extending its range of possible uses.

Three different models of the Highload Anchor SZ are available: Screw/washer SZ-S, Bolthead SZ-B and for flush surface mounting SZ-SK. All models have been shock-tested by the federal office for population protection in Bern/Switzerland, the models from M8 are also approved for use under seismic actions C1 and C2.

The use of the hollow drill bit SB allows mounting the Highload Anchor SZ without additional blowing out of the drill-hole.

Advantages

- High tension and shear loads
- Variable anchoring depths for even higher shear loads
- Screw/washer (SZ-B) model and flat head (SZ-SK) model for finished surfaces
- Can be dismantled with a flush surface result (only the cone and expansion sleeve remain in the drill-hole)
- Smaller spacings and edge distances
- Fire protection approved
- Approved to use under seismic action according to the performance category C1+C2 (M8-M24)
- Expert technical assessment for fastenings in steel fiber reinforced concrete

Applications

Medium to highload anchoring in cracked and uncracked concrete, e.g. trusses, railings, machines, scaffolding and consoles.

Highload Anchor SZ

SZ-B SZ-S

- Steel, zinc plated
- ETA assessment for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.		Max. Fixture thickness[1]	Drill hole-ø	Drill hole depth[2]	Drill hole depth through	Setting depth[2]	min. anchorage depth - Max. effective anchorage depth	Anchor length l		Seismic C1 / C2	Thread	Pkg. cont.	Weight per pkg.
	Type SZ-S	Type SZ-B	$t_{fix,max}$	d_0	h_1	h_f	h_{nom}	$h_{ef,min}$ - $h_{ef,max}$	Type SZ-S	Type SZ-B				
			mm	mm	mm	mm	mm	mm	mm	mm			pcs.	kg
SZ 10-0	14005301	16005301	0	10	65	65	60	50	65	67	- / -	M 6	100	3,25
SZ 10-10	14010301	16010301	10	10	65 - 75	75	60-70	50 - 60	75	77	- / -	M 6	50	1,94
SZ 10-30	14025301	16025301	30	10	65 - 91	95	60-86	50 - 76	95	97	- / -	M 6	50	2,47
SZ 10-50	14030301	16030301	50	10	65 - 91	115	60-86	50 - 76	115	117	- / -	M 6	50	2,94
SZ 10-100	-	16045301	100	10	65 - 91	165	60-86	50 - 76	-	167	- / -	M 6	25	2,05
SZ 12-0	14105301	16105301	0	12	80	80	70	60	75	80	✓ / ✓	M 8	50	2,93
SZ 12-10	14110301	16110301	10	12	80 - 90	90	70 - 80	60 - 70	85	90	✓ / ✓	M 8	50	3,31
SZ 12-20	14118301	-	20	12	80 - 100	100	70 - 90	60 - 80	95	-	✓ / ✓	M 8	50	3,70
SZ 12-30	14125301	16125301	30	12	80 - 110	110	70 - 100	60 - 90	105	110	✓ / ✓	M 8	50	4,10
SZ 12-50	14130301	16130301	50	12	80 - 120	130	70 - 110	60 - 100	125	130	✓ / ✓	M 8	25	2,47
SZ 12-100	-	16145301	100	12	80 - 120	180	70 - 110	60 - 100	-	180	✓ / ✓	M 8	25	3,22
SZ 15-0	14205301	16205301	0	15	95	95	85	71	91	96	✓ / ✓	M 10	25	2,85
SZ 15-15	14215301	16215301	15	15	95 - 110	110	85 - 100	71 - 86	106	111	✓ / ✓	M 10	25	3,31
SZ 15-25	14220301	16220301	25	15	95 - 120	120	85 - 110	71 - 96	116	121	✓ / ✓	M 10	25	3,59
SZ 15-45	14225301	16225301	45	15	95 - 134	140	85 - 124	71 - 110	136	141	✓ / ✓	M 10	25	4,20
SZ 15-95	14240301	16240301	95	15	95 - 134	190	85 - 124	71 - 110	186	191	✓ / ✓	M 10	25	5,60
SZ 18-0	14305301	16305301	0	18	105	105	95	80	107	112	✓ / ✓	M 12	20	3,84
SZ 18-10	14310301	16310301	10	18	105 - 115	115	95 - 105	80 - 90	117	122	✓ / ✓	M 12	20	4,18
SZ 18-20	14315301	16315301	20	18	105 - 125	125	95 - 115	80 - 100	127	132	✓ / ✓	M 12	20	4,53
SZ 18-40	14325301	16325301	40	18	105 - 145	145	95 - 135	80 - 120	147	152	✓ / ✓	M 12	20	5,21
SZ 18-70	14335301	16335301	70	18	105 - 155	175	95 - 145	80 - 130	177	182	✓ / ✓	M 12	20	6,26
SZ 18-100	-	16340301	100	18	105 - 155	205	95 - 145	80 - 130	-	212	✓ / ✓	M 12	10	3,55
SZ 24-0	14505301	16505301	0	24	130	130	120	100	130	137	✓ / ✓	M 16	10	4,11
SZ 24-20	14515301	16515301	20	24	130 - 144	150	120 - 134	100 - 114	150	157	✓ / ✓	M 16	10	4,71
SZ 24-50	14525301	16525301	50	24	130 - 144	180	120 - 134	100 - 114	180	187	✓ / ✓	M 16	10	5,58
SZ 24-100	-	16530301	100	24	130 - 144	230	120 - 134	100 - 114	-	237	✓ / ✓	M 16	5	3,49
SZ 24-0 L	14555301	16555301	0	24	145	145	135	115	150	152	✓ / ✓	M 16	10	4,70
SZ 24-30 L	14565301	16565301	30	24	145 - 175	175	135 - 165	115 - 145	180	182	✓ / ✓	M 16	10	5,57
SZ 24-50 L	14575301	16575301	50	24	145 - 180	195	135 - 170	115 - 150	200	202	✓ / ✓	M 16	10	6,20
SZ 28-10	14610301	16610301	10	28	160 - 170	170	150 - 160	125 - 135	172	181	✓ / ✓	M 20	10	7,76
SZ 28-30	14615301	16615301	30	28	160 - 190	190	150 - 180	125 - 155	192	201	✓ / ✓	M 20	5	4,35
SZ 28-60	14625301	16625301	60	28	160 - 220	220	150 - 210	125 - 185	222	231	✓ / ✓	M 20	5	5,02
SZ 28-100	14630301	16630301	100	28	160 - 220	260	150 - 210	125 - 185	262	271	✓ / ✓	M 20	5	5,88
SZ 32-10	14710301	16710301	10	32	180 - 190	190	170 - 180	150 - 160	212	217	✓ / ✓	M 24	5	5,93
SZ 32-30	14715301	16715301	30	32	180 - 210	210	170 - 200	150 - 180	232	237	✓ / ✓	M 24	5	6,41
SZ 32-60	14725301	16725301	60	32	180 - 240	240	170 - 230	150 -210	262	267	✓ / ✓	M 24	5	7,21

[1]At minimum anchorage depth [2]For minimum anchorage depth - for maximum effective anchorage depth

Highload Anchor SZ-SK

- Steel, zinc plated; with countersunk head
- ETA assessment for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.	Max. Fixture thickness[1]	Drill hole-ø	Drill hole depth[2]	Drill hole depth through fixture	Setting depth[2]	min. anchorage depth - Max. effective anchorage depth	Anchor length l	Seismic C1 / C2	Thread	Pkg. cont.	Weight per pkg.
		$t_{fix,max}$	d_0	h_1	h_f	h_{nom}	$h_{ef,min}$ - $h_{ef,max}$					
		mm	mm	mm	mm	mm	mm	mm			pcs	kg
SZ-SK 10-10	14011801	10	10	65 - 67	75	60 - 62	50 - 52	70	- / -	M 6	50	1,69
SZ-SK 10-25	14021801	25	10	65 - 91	90	60 - 86	50 - 76	85	- / -	M 6	50	2,30
SZ-SK 10-40	14031801	40	10	65 - 91	105	60 - 86	50 - 76	100	- / -	M 6	50	2,58
SZ-SK 12-10	14111801	10	12	80	90	70	60	80	✓ / ✓	M 8	50	3,01
SZ-SK 12-25	14121801	25	12	80 - 85	105	70 - 85	60 - 75	95	✓ / ✓	M 8	50	3,65
SZ-SK 12-50	14131801	50	12	80 - 120	130	70 - 110	60 - 100	120	✓ / ✓	M 8	25	2,33
SZ-SK 15-10	14211801	10	15	95	105	84	71	95	✓ / ✓	M 10	25	2,95
SZ-SK 15-25	14221801	25	15	95 - 106	120	85 - 96	71 - 82	110	✓ / ✓	M 10	25	3,29
SZ-SK 15-35	14226801	35	15	95 - 116	130	85 - 106	71 - 92	120	✓ / ✓	M 10	25	3,55
SZ-SK 15-50	14231801	50	15	95 - 131	145	85 - 121	71 - 107	135	✓ / ✓	M 10	25	3,96
SZ-SK 18-20	14316801	20	18	105 - 107	125	95 - 97	80 - 82	115	✓ / ✓	M 12	20	3,99
SZ-SK 18-40	14326801	40	18	105 - 127	145	95 - 117	80 - 102	135	✓ / ✓	M 12	20	4,62

[1]At minimum anchorage depth [2]For minimum anchorage depth - for maximum effective anchorage depth

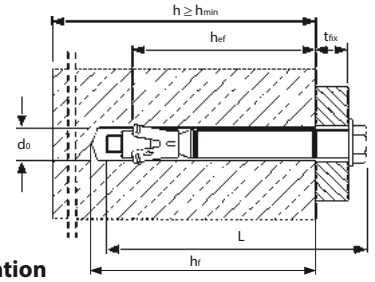
Other lengths and special assemblies on demand.

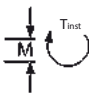
Extract from Permissible Service Conditions of European Technical Assessment ETA-02/0030 for use in cracked and uncracked concrete (Option 1)

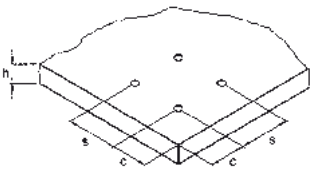
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

Loads and performance data				Highload Anchor SZ							
				SZ 10 M 6	SZ 12 M 8	SZ 15 M 10	SZ 18 M 12	SZ 24 M 16	SZ 24L M 16	SZ 28 M 20	SZ 32 M 24
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	16,1	21,1	32,8	42,5	60,8	79,8	80,0	134,4
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	18,0/19,0[1)]	28,3/33,4[1)]	42,0/58,6[1)]	71,3/83,7[1)]	106,0/143,7[1)]	106,0/143,7[1)]	151,4/198,5[1)]	213,9/213,9[1)]
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	50 - 76	60 - 100	71 - 110	80 - 130	100 - 114	115 - 150	125 - 185	150 - 210
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$				cracked concrete							
	C20/25	appr. N	[kN]	2,4	5,7	7,6	11,7	16,4	20,2	22,9	30,1
	C25/30	appr. N	[kN]	2,7	6,4	8,5	13,1	18,3	22,6	25,6	33,7
	C30/37	appr. N	[kN]	2,9	7,0	9,3	14,4	20,1	24,8	28,1	36,9
	C40/50	appr. N	[kN]	3,4	8,1	10,8	16,6	23,2	28,6	32,4	42,6
	C50/60	appr. N	[kN]	3,8	9,0	12,0	18,6	25,9	32,0	36,2	47,6
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$				uncracked concrete							
	C20/25	appr. N	[kN]	7,6	9,5	14,0	16,8	23,4	28,9	32,7	43,0
	C25/30	appr. N	[kN]	7,6	10,6	15,7	18,7	26,2	32,3	36,6	48,1
	C30/37	appr. N	[kN]	7,6	11,7	17,2	20,5	28,7	35,4	40,1	52,7
	C40/50	appr. N	[kN]	7,6	13,5	19,8	23,7	33,1	40,9	46,3	60,9
	C50/60	appr. N	[kN]	7,6	13,8	21,9	26,5	37,0	45,7	51,8	68,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$				cracked concrete							
SZ-S and SZ-SK	C20/25	appr. V	[kN]	10,3	15,2-17,1	19,6-27,4	23,5-41,7	32,8-39,9	40,4-60,2	45,8-82,5	60,2-99,8
	≥ C25/30	appr. V	[kN]	10,3	17,0-17,1	21,9-27,4	26,2-41,7	36,7-44,6	45,2-67,4	51,2-85,7	67,4-111,6
SZ-B	C20/25	appr. V	[kN]	9,1	14,3	19,6-20,6	23,5-36,0	32,8-39,9	40,4-52,0	45,8-69,7	60,2-99,8
	≥ C25/30	appr. V	[kN]	9,1	14,3	20,6	26,2-36,0	36,7-44,6	45,2-52,0	51,2-69,7	67,4-111,6
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$				uncracked concrete							
SZ-S and SZ-SK	C20/25	appr. V	[kN]	10,3	17,1	27,4	33,5-41,7	46,9-57,0	57,8-72,0	65,5-85,7	86,1-114,3
	≥ C25/30	appr. V	[kN]	10,3	17,1	27,4	37,5-41,7	52,4-63,8	64,6-72,0	73,2-85,7	96,2-114,3
SZ-B	C20/25	appr. V	[kN]	9,1	14,3	20,6	33,5-36,0	46,9-52,0	52,0	65,5-69,7	86,1-114,3
	≥ C25/30	appr. V	[kN]	9,1	14,3	20,6	36,0	52,0	52,0	69,7	96,2-114,3
Approved bending moments $h_{ef,min}$ - $h_{ef,max}$				cracked / uncracked concrete							
Approved bending moments		appr. M	[Nm]	6,9	17,1	34,3	60,0	152,0	152,0	296,6	513,1
Spacing and edge distance											
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	50 – 76	60 – 100	71 – 110	80 – 130	100 – 114	115 – 150	125 – 185	150 – 210
Minimum thickness of concrete slab for $h_{ef,min}$ - $h_{ef,max}$		h_{min}	[mm]	100 – 126	120 – 160	140 – 179	160 – 210	200 – 214	230 – 265	250 – 310	300 – 360
Characteristic spacing		$s_{cr,N}$	[mm]	150 – 228	180 – 300	213 – 330	240 – 390	300 – 342	345 – 450	375 – 555	450 – 630
Characteristic edge distance		$c_{cr,N}$	[mm]	75 – 114	90 – 150	106,5 – 165	120 – 195	150 – 171	172,5 – 225	187,5 – 277,5	225 – 315
				cracked concrete							
Minimum spacing / for edge distance c		s_{min} /c	[mm]	50/50	50/80	60/120	70/140	100/180	100/180	125/300	150/300
Minimum edge distance / for spacing s		c_{min} /s	[mm]	50/50	55/100	60/120	70/160	100/220	100/220	200/350	150/300
				uncracked concrete							
Minimum spacing / for edge distance c		s_{min} /c	[mm]	50/80	60/100	60/120	70/140	100/180	100/180	125/300	150/300
Minimum edge distance / for spacing s		c_{min} /s	[mm]	50/100	60/120	60/120	70/160	100/220	100/220	200/350	150/300
Installation parameters											
Drill hole diameter		d_o	[mm]	10	12	15	18	24	24	28	32
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	12	14	17	20	26	26	31	35
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$		h_o	[mm]	65 – 91	80 – 120	95 – 134	105 – 155	130 – 144	145 – 180	160 – 220	180 - 240
Installation parameters SZ-S and SZ-B											
Installation torque		T_{inst}	[Nm]	15	30	50	80	160	160	280	280
Width across nut			SW	10	13	17	19	24	24	30	36
Outer diameter of washer			[mm]	18	20	25	30	40	40	50	50
Installation parameters SZ-SK											
Installation torque		T_{inst}	[Nm]	10	25	55	70	-	-	-	-
Internal hexagon size SZ-SK			SW	4	5	6	8	-	-	-	-
Thickness of countersunk washer			[mm]	4	5	6	7	-	-	-	-
Outer diameter of countersunk washer			[mm]	16,5	20,5	24,5	29,5	-	-	-	-
Minimum thickness of fixture for maximum lateral force /without lateral force			[mm]	8 / 4	10 / 5	14 / 6	18 / 7	-	-	-	-

[1)] SZ-B / SZ-S, SZ-SK

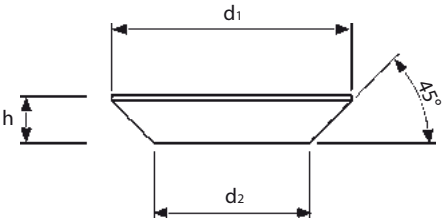




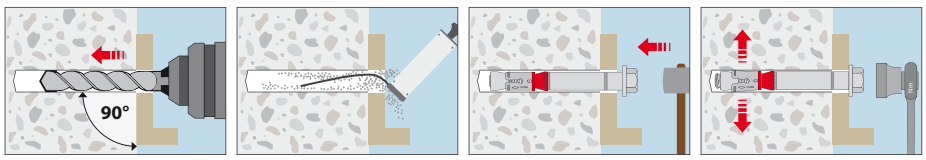


Dimensions countersunk head SZ-SK [mm]			
	d1	d2	h
SZ-SK 10 M 6	16,5	9,5	3,9
SZ-SK 12 M 8	20,5	11,5	5,0
SZ-SK 15 M 10	24,5	14,5	5,7
SZ-SK 18 M 12	29,5	17,5	6,7

Countersunk head (type SZ-SK).

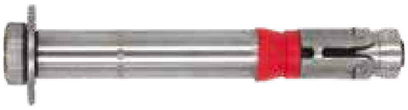


Installation

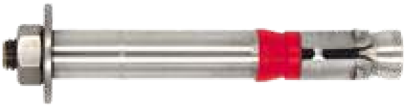


Highload Anchor SZ A4

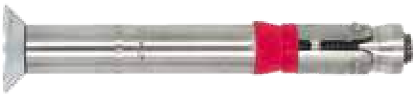
Stainless steel A4/316



Highload Anchor SZ-S A4



Highload Anchor SZ-B A4



Highload Anchor SZ-SK A4

Mechanical Heavy Duty Anchors

SEISMIC C1+C2

R30-R120

Range of loading:	**4,3 kN–52,6 kN**
Concrete quality:	**C20/25–C50/60**

Description

The SZ A4/316 is the stainless-steel version of the tried and tested Highload anchor SZ. It also posesses ETA (Option 1) approval. High-load Anchor SZ is a high-performance through fastening Anchor System with plastic compression ring and with three part expansion sleeve. This allows for smaller spacings and edge distances with high loads. Through deeper placing, the variable anchorage depth of Highload Anchor SZ A4 allows higher permissable shear loads in many cases, extending its range of possible uses.

Three different models of The Highload Anchor SZ are available: screw/washer SZ-S, Bolthead SZ-B and for a flush surface mounting SZ-SK. All models habe been shock-tested by the federal office for population protection in Bern/Switzerland, the models from M8 are also approved for use under seismic actions C1 and C2.

The use of the hollow drill bit SB allows mounting the Highload Anchor SZ A4 without additional blowing out of the drill-hole.

Advantages

- High tension and shear loads
- Variable anchoring depths for even higher shear loads
- Screw/washer (SZ-S) model and flat head (SZ-SK) model for finished surfaces
- Can be dismantled with a flush surface result (only the cone and expansion sleeve remain in the drill-hole)
- Smaller spacings and edge distances
- Indoor and outdoor use
- Approved for use under fire exposure R30-R120
- Approved to use under seismic action according to the performance category C1+C2 (M8–M24)
- Expert technical assessment for fastenings in steel fiber reinforced concrete

Applications

Medium to highload mounting in cracked and uncracked concrete, e.g. trusses, railings, machines, scaffolding and consoles. Even in damp rooms and outdoors.

Highload Anchor SZ A4

SZ-B SZ-S

- Stainless steel A4/316
- Approval for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.		Max. Fixture thickness[1]	Drill hole-ø	Drill hole depth[2]	Drill hole depth through fixture	Setting depth[2]	min. anchorage depth - Max. effective anchorage depth	Anchor length l		Seismic C1 / C2	Thread	Pkg. cont.	Weight per pkg.
	Type SZ-S	Type SZ-B	t_{fix}	d_0	h_1	h_f	h_{nom}	$h_{ef,min}$ - $h_{ef,max}$	Type SZ-S	Type SZ-B				
			mm	mm	mm	mm	mm	mm	mm	mm			pcs.	kg
SZ 12-0 A4	14105501	16105501	0	12	80	80	70	60	75	80	✓ / ✓	M 8	50	2,93
SZ 12-10 A4	14110501	16110501	10	12	80 - 90	90	70 - 80	60 - 70	85	90	✓ / ✓	M 8	50	3,31
SZ 12-30 A4	14125501	16125501	30	12	80 - 110	110	70 - 100	60 - 90	105	110	✓ / ✓	M 8	50	4,10
SZ 12-50 A4	14130501	16130501	50	12	80 - 120	130	70 - 110	60 - 100	125	130	✓ / ✓	M 8	25	2,47
SZ 12-100 A4	-	16145501	100	12	80 - 120	180	70 - 110	60 - 100	-	180	✓ / ✓	M 8	25	3,22
SZ 15-0 A4	14205501	16205501	0	15	95	95	85	71	91	96	✓ / ✓	M 10	25	2,85
SZ 15-15 A4	14215501	16215501	15	15	95 - 110	110	85 - 100	71 - 86	106	111	✓ / ✓	M 10	25	3,31
SZ 15-25 A4	14220501	16220501	25	15	95 - 120	120	85 - 110	71 - 96	116	121	✓ / ✓	M 10	25	3,59
SZ 15-45 A4	14225501	16225501	45	15	95 - 134	140	85 - 124	71 - 110	136	141	✓ / ✓	M 10	25	4,20
SZ 15-95 A4	14240501	16240501	95	15	95 - 134	190	85 - 124	71 - 110	186	191	✓ / ✓	M 10	25	5,60
SZ 18-0 A4	14305501	16305501	0	18	105	105	95	80	107	112	✓ / ✓	M 12	20	3,84
SZ 18-10 A4	14310501	16310501	10	18	105 - 115	115	95 - 105	80 - 90	117	122	✓ / ✓	M 12	20	4,18
SZ 18-20 A4	14315501	16315501	20	18	105 - 125	125	95 - 115	80 - 100	127	132	✓ / ✓	M 12	20	4,53
SZ 18-40 A4	14325501	16325501	40	18	105 - 145	145	95 - 135	80 - 120	147	152	✓ / ✓	M 12	20	5,21
SZ 18-70 A4	14335501	16335501	70	18	105 - 155	175	95 - 145	80 - 130	177	182	✓ / ✓	M 12	20	6,26
SZ 18-100 A4	-	16340501	100	18	105 - 155	205	95 - 145	80 - 130	-	212	✓ / ✓	M 12	10	3,55
SZ 24-0 A4	14505501	16505501	0	24	130	130	120	100	130	137	✓ / ✓	M 16	10	4,11
SZ 24-20 A4	14515501	16515501	20	24	130 - 144	150	120 - 134	100 - 114	150	157	✓ / ✓	M 16	10	4,71
SZ 24-50 A4	14525501	16525501	50	24	130 - 144	180	120 - 134	100 - 114	180	187	✓ / ✓	M 16	10	5,58
SZ 24-100 A4	-	16530501	100	24	130 - 144	230	120 - 134	100 - 114	-	237	✓ / ✓	M 16	5	3,49

[1]At minimum anchorage depth
[2]For minimum anchorage depth - for maximum effective anchorage depth

Highload Anchor SZ-SK A4

- Stainless steel A4/316
- Approval for cracked and uncracked concrete
- Variable anchorage depths

Description	Ref. No.	Max. Fixture thickness[1]	Drill hole-ø	Drill hole depth[2]	Drill hole depth through fixture	Setting depth[2]	min. anchorage depth - Max. effective anchorage depth	Anchor length l	Seismic C1 / C2	Thread	Pkg. cont.	Weight per pkg.
		t_{fix}	d_0	h_1	h_f	h_{nom}	$h_{ef,min}$ - $h_{ef,max}$					
		mm	mm	mm	mm	mm	mm	mm			pcs.	kg
SZ-SK 12-10 A4	14111531	10	12	80	90	70	60	80	✓ / ✓	M 8	50	3,01
SZ-SK 12-25 A4	14121531	25	12	80 - 85	105	70 - 85	60 - 75	95	✓ / ✓	M 8	50	3,65
SZ-SK 12-50 A4	14131531	50	12	80 - 120	130	70 - 110	60 - 100	120	✓ / ✓	M 8	25	2,33
SZ-SK 15-15 A4	14216531	15	15	95	105	85	71	100	✓ / ✓	M 10	25	2,95
SZ-SK 15-25 A4	14221531	25	15	95 - 106	120	85 - 96	71 - 82	110	✓ / ✓	M 10	25	3,29
SZ-SK 15-35 A4	14226531	35	15	95 - 116	130	85 - 106	71 - 92	120	✓ / ✓	M 10	25	3,55
SZ-SK 15-50 A4	14231531	50	15	95 - 131	145	85 - 121	71 - 107	135	✓ / ✓	M 10	25	3,96
SZ-SK 18-20 A4	14316531	20	18	105 - 107	125	95 - 97	80 - 82	115	✓ / ✓	M 12	20	3,99
SZ-SK 18-40 A4	14326531	40	18	105 - 127	145	95 - 117	80 - 102	135	✓ / ✓	M 12	20	4,62

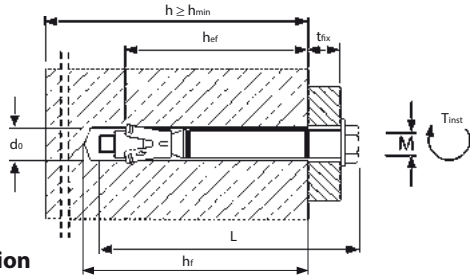
[1]At minimum anchorage depth
[2]For minimum anchorage depth - for maximum effective anchorage depth
Other lengths and special assemblies on demand.

Extract from Permissible Service Conditions of European Technical Assessment ETA-02/0030 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

Loads and performance data				Highload Anchor SZ A4/316			
				SZ 12 M 8 A4	SZ 15 M 10 A4	SZ 18 M 12 A4	SZ 24 M 16 A4
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	60 - 100	71 - 110	80 - 130	100 - 150
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$					cracked concrete		
	C20/25	appr. N	[kN]	4,3	7,6	11,7	16,4
	C25/30	appr. N	[kN]	4,8	8,5	13,1	18,3
	C30/37	appr. N	[kN]	5,2	9,3	14,4	20,1
	C40/50	appr. N	[kN]	6,1	10,8	16,6	23,2
	C50/60	appr. N	[kN]	6,8	12,0	18,6	25,9
					uncracked concrete		
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$	C20/25	appr. N	[kN]	7,6	11,9	16,7	23,4
	C25/30	appr. N	[kN]	8,5	13,3	18,6	26,2
	C30/37	appr. N	[kN]	9,3	14,6	20,4	28,7
	C40/50	appr. N	[kN]	9,9[1]/10,8[2]	15,7[1]/16,8[2]	22,9[1]/23,6[2]	33,1
	C50/60	appr. N	[kN]	9,9[1]/12,0[2]	15,7[1]/18,8[2]	22,9[1]/26,4[2]	37,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$					cracked concrete		
SZ-S and SZ-SK	C20/25	appr. V	[kN]	12,6	19,4	23,5-32,6	32,8-48,3
	≥ C25/30	appr. V	[kN]	12,6	19,4	26,2-32,6	36,7-48,3
SZ-B	C20/25	appr. V	[kN]	13,7	19,6-21,1	23,5-35,4	32,8-52,6
	≥ C25/30	appr. V	[kN]	13,7	21,1	26,2-35,4	36,7-52,6
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$					uncracked concrete		
SZ-S and SZ-SK	C20/25	appr. V	[kN]	12,6	19,4	32,6	46,9-48,3
	≥ C25/30	appr. V	[kN]	12,6	19,4	32,6	48,3
SZ-B	C20/25	appr. V	[kN]	13,7	21,1	33,5-35,4	46,9-52,6
	≥ C25/30	appr. V	[kN]	13,7	21,1	35,4	52,4-52,6
Approved bending moments $h_{ef,min}$ - $h_{ef,max}$					cracked concrete / uncracked concrete		
Approved bending moments		appr. M	[Nm]	11,9[1]/14,9[2]	23,8[1]/29,7[2]	42,1[1]/52,6[2]	106,2[1]/132,6[2]
Spacing and edge distance							
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	60 – 100	71 – 110	80 – 130	100 – 150
Minimum thickness of concrete slab for $h_{ef,min}$ - $h_{ef,max}$		h_{min}	[mm]	120 – 160	140 – 179	160 – 210	200 – 250
Characteristic spacing		$s_{cr,N}$	[mm]	180 – 300	213 – 330	240 – 390	300 – 450
Characteristic edge distance		$c_{cr,N}$	[mm]	90 – 150	106,5 – 165	120 – 195	150 – 225
					cracked concrete		
Minimum spacing / for edge distance c		s_{min} /c	[mm]	50/80	60/120	70/140	80/180
Minimum edge distance / for spacing s		c_{min} /s	[mm]	50/80	60/120	70/160	80/200
					uncracked concrete		
Minimum spacing / for edge distance c		s_{min} /c	[mm]	50/80	60/120	70/140	80/180
Minimum edge distance / for spacing s		c_{min} /s	[mm]	50/80	85/185	70/160	180/80
Installation parameters							
Drill hole diameter		d_o	[mm]	12	15	18	24
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	14	17	20	26
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$		h_1	[mm]	80 – 120	95 – 134	105 – 155	130 – 180
Installation parameters SZ-S and SZ-B							
Installation torque for SZ-S / SZ-B		T_{inst}	[Nm]	30/35	50/55	80/90	170/170
Width across nut			SW	13	17	19	24
Outer diameter of washer			[mm]	20	25	30	40
Installation parameters SZ-SK							
Installation torque		T_{inst}	[Nm]	17,5	42,5	50	-
Internal hexagon size SZ-SK			SW	5	6	8	-
Thickness of countersunk washer			[mm]	5	6	7	-
Outer diameter of countersunk washer			[mm]	20,5	24,5	29,5	-
Minimum thickness of fixture for maximum lateral force /without lateral force			[mm]	10 / 5	14 / 6	18 / 7	-

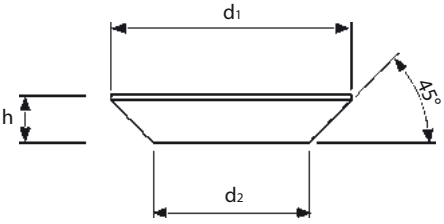
[1]SZ-S, SZ-SK [2]SZ-B



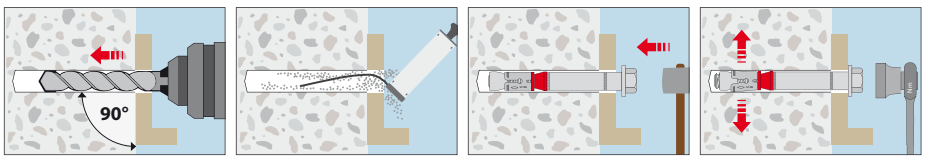
Dimensions countersunk head SZ-SK A4 [mm]

	d1	d2	h
SZ-SK 12 M 8	20,5	11,5	5,0
SZ-SK 15 M 10	24,5	14,5	5,7
SZ-SK 18 M 12	29,5	17,5	6,7

Countersunk head SZ-SK A4.



Installation



Highload Anchor SLZ

Steel, zinc plated

Highload Anchor SLZ-S

Highload Anchor SLZ-B

Range of loading: **5,7 kN–18,7 kN**

Range of concrete quality: **C20/25–C50/60**

ETA-09/0342

R30-R120

Description

The Highload Anchor SLZ with the diameter 14/M10 is a torque controlled sleeve anchor (ETA, Option 1) for through fastenings in cracked and uncracked concrete. With a drill hole diameter of 14mm, it is ideal for through fastenings in pallet racks with a 15mm clearance hole. The four part extension sleeve inserts the load smoothly into the concrete. The plastic-coated cone ensures the post-expansion. Two different models of the Highload Anchor SLZ are available: SLZ-S with hexagon head and SLZ-B with threaded bolt and nut.

Advantages

– High tension and shear loads
– Screw model (SLZ-S) for finished surfaces
– Can be dismantled with a flush surface result (only the cone and expansion sleeve remain in the drill-hole)
– Small edges distances and spacings
– Ideal external diameter and diameter of drill hole for clearance holes with 15mm diameter
– Approved to use under fire exposure R30-R120

Applications

Medium to heavy duty anchoring in cracked and uncracked concrete, e.g. pallet racks, base plates, machines.

Highload anchor SLZ-S

- Steel, zinc plated; with hexagon head
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth mm	Drill hole depth through fixture mm	Setting depth mm	Anchor length l mm	Fixture thickness t_{fix} mm	Thread	Pkg. cont. pcs.	Weight per pkg. kg
SLZ-S 14-10	15260101	14x85	95	73	94	10	M10	25	2,71
SLZ-S 14-25	15270101	14x85	110	73	109	25	M10	25	3,08
SLZ-S 14-50	15275101	14x85	135	73	134	50	M10	25	3,71

Other lengths and special assemblies on demand.

Highload anchor SLZ-B

- Steel, zinc plated; with bolt and nut
- Approved for cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø x depth mm	Drill hole depth through fixture mm	Setting depth mm	Anchor length l mm	Fixture thickness t_{fix} mm	Thread	Pkg. cont. pcs.	Weight per pkg. kg
SLZ-B 14-25	17270101	14x85	110	73	111	25	M10	25	3,08

Other lengths and special assemblies on demand.

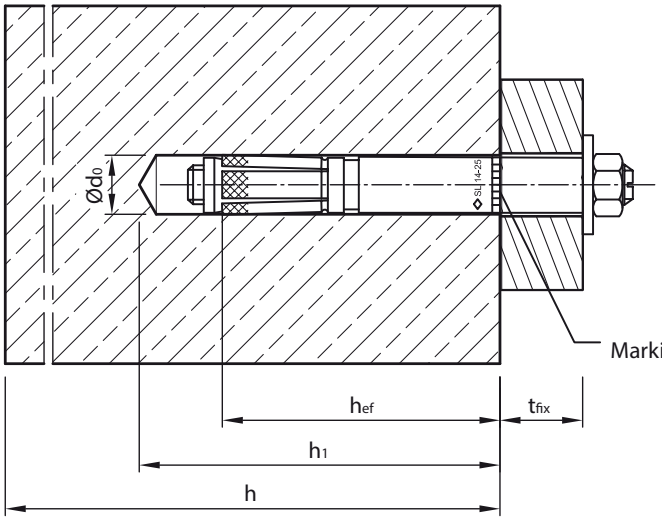
ETA-09/0342

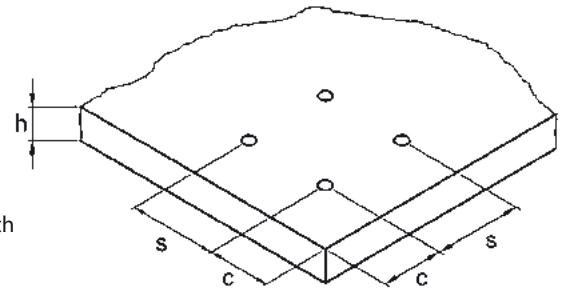
Extract from Permissible Service Conditions of European Technical Assessment ETA-09/0342 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

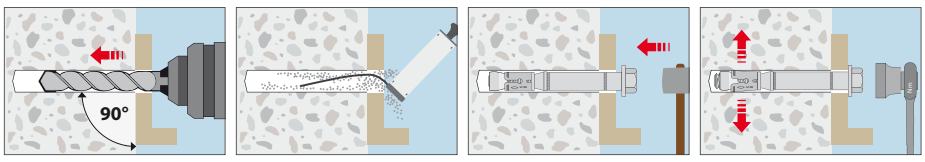
Loads and performance data		Highload Anchor SLZ		SLZ 14 M 10
		cracked concrete		
Approved loads, tension	C20/25	appr. N	[kN]	5,7
	C25/30	appr. N	[kN]	6,4
	C30/37	appr. N	[kN]	7,0
	C40/50	appr. N	[kN]	8,1
	C50/60	appr. N	[kN]	9,0
		uncracked concrete		
Approved loads, tension	C20/25	appr. N	[kN]	9,5
	C25/30	appr. N	[kN]	10,6
	C30/37	appr. N	[kN]	11,7
	C40/50	appr. N	[kN]	13,5
	C50/60	appr. N	[kN]	15,1
		cracked concrete		
Approved loads, shear	C20/25	appr. V	[kN]	17,2[1)]
	> C25/30	appr. V	[kN]	18,7[1)]
		uncracked concrete		
Approved loads, shear	C20/25	appr. V	[kN]	18,7[1)]
	> C25/30	appr. V	[kN]	18,7[1)]
		cracked and uncracked concrete		
Approved bending moments		appr. M	[Nm]	34,3
Spacing and edge distance				
Effective anchorage depth		h_{ef}	[mm]	65
Characteristic spacing		$s_{cr,N}$	[mm]	195
Characteristic edge distance		$c_{cr,N}$	[mm]	97,5
Minimum spacing / for edge distance c		s_{min} /c ≥	[mm]	60 / 120
Minimum edge distance / for spacing s		c_{min} /s ≥	[mm]	70 / 130
Minimum thickness of concrete slab		h_{min}	[mm]	130
Installation parameters				
Drill hole diameter		d_o	[mm]	14
Diameter of clearance hole in the fixture		d_f ≤	[mm]	16
Depth of drill hole		h_1 ≥	[mm]	85
Installation torque		T_{inst}	[Nm]	50
Width across nut		SW	[mm]	17

[1)] $t_{fix,max}$ = 75mm





Installation



Highload Anchor SL

Steel, zinc plated / Stainless steel A4/316

Highload Anchor SL

Highload Anchor SL A4

Range of loading: **5,4 kN–65,5 kN**

Range of concrete quality: **C12/15–C50/60**

Description

The Highload Anchor SL is a torque controlled sleeve anchor for through fastenings in uncracked concrete. Two versions are available: SL-S with hexagon head screw, SL-B with hexagon nut.

European Technical Assessment, Option 7 for anchor size M10 steel galvanized. German approval in concrete strength class C12/15.

Applications

Medium to heavy duty anchorings of base plates, supports, pallet racks, brackets, railings in uncracked concrete.

ETA-08/0230

M10 zinc plated

Highload Anchor SL

SL-B SL-S

- Steel, zinc plated
- For uncracked concrete

Description	Type SL-S	Type SL-B	Drill hole Ø x depth	Setting depth	Anchor length l		Fixture thickness	Thread	Pkg. cont.	Weight per pkg
					Type S	Type B	t_{fix}			
	Ref. No.	Ref. No.	mm	mm	mm	mm	mm		pcs.	kg
SL 14-0	10205101	12205101	14x85	73	84	86	0	M10	25	2,38
SL 14-10	10210101	12210101	14x85	73	94	96	10	M10	25	2,71
SL 14-25	10220101	12220101	14x85	73	109	111	25	M10	25	3,08
SL 14-50	10225101	12225101	14x85	73	134	136	50	M10	25	3,73
SL 14-75	10230101	12230101	14x85	73	159	161	75	M10	25	4,43
SL 14-100	10235101	12235101	14x85	73	179	181	100	M10	25	5,18
SL 14-125	-	12240101	14x85	73	-	210	125	M10	25	5,32
SL 14-160	-	12245101	14x85	73	-	245	160	M10	20	4,96

Other length and special assemblies on demand.

Highload Anchor SL A4[1)]

SL-B SL-S

- Stainless steel A4/316
- For uncracked concrete

Description	Type SL-S	Type SL-B	Drill hole Ø x depth	Setting depth	Anchor length l		Fixture thickness	Thread	Pkg. cont.	Weight per pkg.
					Type S	Type B	t_{fix}			
	Ref. No.	Ref. No.	mm	mm	mm	mm	mm		pcs.	kg
SL 14-10 A4	10210501	12210501	14x85	73	94	96	10	M 10	25	2,60
SL 14-25 A4	10220501	12220501	14x85	73	109	111	25	M 10	25	3,02
SL 14-50 A4	10225501	12225501	14x85	73	134	136	50	M 10	25	3,68
SL 28-30 A4	10610501	12610501	28x150	135	182	188	30	M 20	5	4,30
SL 28-60 A4	10615501	12615501	28x150	135	212	218	60	M 20	5	5,02

Other length and special assemblies on demand.

[1)] Not part of assessment/approvals.

ETA-08/0230
M10 zinc plated

Extract from Permissible Service Conditions of European Technical Assessment ETA-08/0230

Approved loads for single anchor without influence of spacing and edge distance. The total safety factor (γ_M and γ_F) is included.

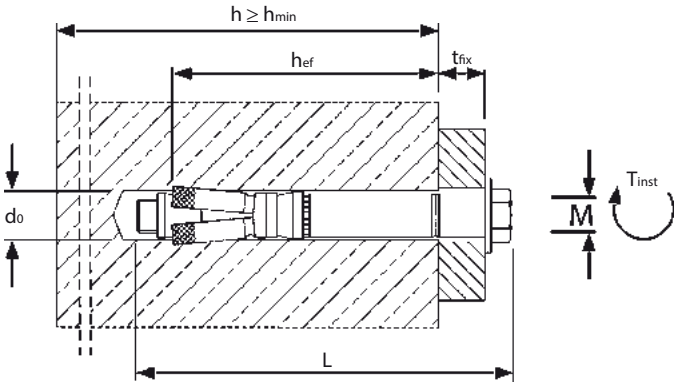
Recommended loads for the Highload Anchor SL

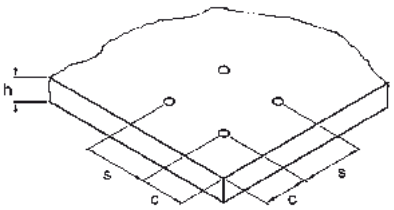
Recommended loads for single anchor without influence of spacing and edge distance. The total safety factor (γ_M and γ_F) is included.

Loads and performance data				Highload Anchor SL	SL 14 M 10	SL 10[1] M 6	SL 14[1] M 10	SL 28[1] M 20
					steel, zinc	A4-70	A4-70	A4-70
approved values - uncracked concrete						recommended values - uncracked concrete		
Mean ultimate loads, tension	C25/30	N_{um}	[kN]		43,3	15,9	40,8	160,8
Mean ultimate loads, shear	C25/30	V_{um}	[kN]		35,6	20,8	45,3	208,7
Loads, tension	C12/15[1]	N	[kN]		7,6[1]	-	-	-
	C20/25	N	[kN]		9,5	5,4	12,3	32,7
	C25/30	N	[kN]		10,6	5,4	13,7	36,6
	C30/37	N	[kN]		11,7	5,4	15,0	40,1
	C40/50	N	[kN]		13,5	5,4	15,5	46,3
	C50/60	N	[kN]		15,1	5,4	15,5	51,8
Loads, shear	C12/15[1]	V	[kN]		13,3[1]	-	-	-
	≥ C20/25	V	[kN]		13,3	6,6	14,5	65,5
Bending moments		M	[Nm]		34,3	4,9	23,9	208,1
Spacing and edge distance								
Effective anchorage depth		h_{ef}	[mm]		65	45	65	125
Characteristic spacing		$s_{cr,N}$	[mm]		195	135	195	375
Characteristic edge distance		$c_{cr,N}$	[mm]		97,5	67,5	97,5	187,5
Minimum spacing		s_{min}	[mm]		60	70	100	190
Minimum edge distance		c_{min}	[mm]		120	90	130	250
Minimum thickness of concrete slab		h_{min}	[mm]		130	130	200	350
Installation parameters								
Drill hole diameter		d_o	[mm]		14	10	14	28
Diameter of clearance hole in the fixture		d_f	[mm]		16	12	16	31
Depth of drill hole		h_1	[mm]		85	60	85	150
Installation torque		T_{inst}	[Nm]		50	10	50	400
Width across nut		SW	[mm]		17	10	17	30

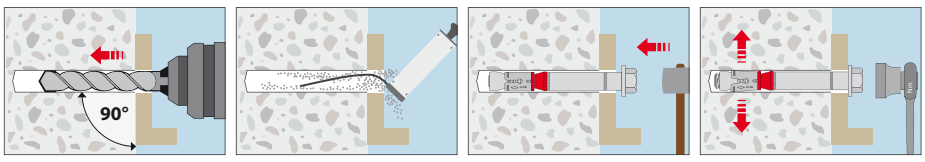
[1]Not part of assessment/approvals.

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





Installation



Concrete screw BSZ

Steel zinc plated

Concrete screw BSZ-SU

Concrete screw BSZ-SUH

Concrete screw BSZ-SK

Concrete screw BSZ-LK

Concrete screw BSZ-GLK

Concrete screw BSZ-M

Concrete screw BSZ-BS

Range of loading: **0,48 kN–32,7 kN**
Range of concrete quality: **C20/25–C50/60**

Description

Option 1 approved concrete screw BSZ cut a positive thread in the concrete when being screwed in and enable attachment to be made close to the edge through the expansion-free operating principle (=undercut). The approved adjustment enables subsequent alignment to compensate for unevenness. The concrete screw BSZ is also ideal for temporary fixings since it is fully removable. Installation with an impact screwdriver means that you do not need to use a torque wrench. It is quick, reliable and reduces assembly errors. The concrete screw BSZs are available with connection thread and with a range of different head shapes for a wide variety of applications.

Advantages

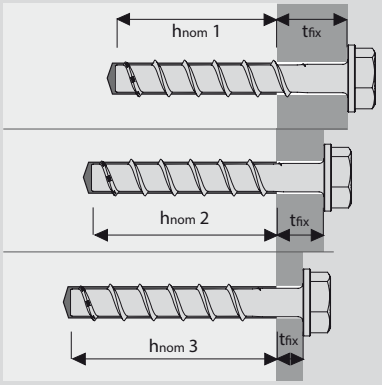
- European Technical Assessment for anchoring in cracked and uncracked concrete (Option 1) for concrete screws in sizes 6, 8, 10, 12 and 14
- With up to 3 embedment depths, it is versatile for high loads or low levels of drilling and installation effort
- European Technical Assessment for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs for concrete screws in sizes 5 and 6
- Approved for use under seismic conditions of category C1[2)] and C2[2)]
- By using the Filling Washer VS[3)], the permissible loads under seismic action C1 and C2 can be further increased
- Approved for use under fire exposure (R30-R120)
- General design approval for temporary fastenings (BSZ-SU: Ø10-Ø14)
- Small drill hole diameter, small edge and axial gap

- Rapid push-through installation with an impact screwdriver without torque regulation
- No curing times, can be loaded immediately
- Adjustable to compensate for unevenness (Ø8- Ø14 mm)
- Can be fully removed
- Wide range of possible applications through numerous variants
- Visually appealing through different head shapes
- Without assessment, can also be used in compression-resistant natural stone, various solid bricks and green concrete

Applications

To anchor moderate to heavy loads in cracked and uncracked concrete: Railings and handrails, shelves, wooden beams, supports and braces, brackets, pipeline and cable routes, suspended ceilings, etc. Temporary fastening of construction site facilities, such as props, fall protection and scaffolding.

Highly versatile for up to three different embedment depths



Embedment depth 1:
- low level of drilling and installation effort
- large clamping thickness
- reduced loads

Embedment depth 2:
- medium level of drilling and installation effort
- medium clamping thickness
- moderate load

Embedment depth 3:
- higher level of drilling and installation effort
- small clamping thickness
- heavy loads

[1)] Only for use in solid concrete

[2)] For head designs, diameters and screw-in depths, see product tables and ETA-16/0204

[3)] Filling washers see page 95

Concrete screw BSZ-SU

- Hex head with pressed disc
- Steel, zinc plated
- Through smaller drive with pressed disc also suitable for areas, where access is difficult, and elongated holes (e.g. mounting rails)

Description	Ref. No.	Embedment depth h 1[1]				Embedment depth h 2				Embedment depth h 3				Anchor length L	Pressed disc Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1 / C2					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ-SU 5x40	58111001	5	5x40	35	-	-	-	-	-	-	-	-	-	40	12,5	SW 10	100	0,96
BSZ-SU 5x50	58111501	15	5x40	35	-	-	-	-	-	-	-	-	-	50	12,5	SW 10	100	1,12
BSZ-SU 5x60	58112001	25	5x40	35	-	-	-	-	-	-	-	-	-	60	12,5	SW 10	100	1,26
BSZ-SU 6x40	58121001	5	6x40	35	-	-	-	-	-	-	-	-	-	40	15	SW 13	100	1,51
BSZ-SU 6x50	58121501	15	6x40	35	-	10	6x45	40	✓	-	-	-	-	50	15	SW 13	100	1,73
BSZ-SU 6x60	58122001	25	6x40	35	-	20	6x45	40	✓	5	6x60	55	✓ / -	60	15	SW 13	100	1,93
BSZ-SU 6x80	58123001	45	6x40	35	-	40	6x45	40	✓	25	6x60	55	✓ / -	80	15	SW 13	100	2,33
BSZ-SU 6x100	58124001	65	6x40	35	-	60	6x45	40	✓	45	6x60	55	✓ / -	100	15	SW 13	100	2,73
BSZ-SU 8x50	58131001	5	8x55	45	-	-	-	-	-	-	-	-	-	50	16	SW 13	50	1,58
BSZ-SU 8x60	58131501	15	8x55	45	-	5	8x65	55	-	-	-	-	-	60	16	SW 13	50	1,78
BSZ-SU 8x70	58132001	25	8x55	45	-	15	8x65	55	-	5	8x75	65	✓ / ✓	70	16	SW 13	50	1,97
BSZ-SU 8x80	58132501	35	8x55	45	-	25	8x65	55	-	15	8x75	65	✓ / ✓	80	16	SW 13	50	2,16
BSZ-SU 8x90	58133001	45	8x55	45	-	35	8x65	55	-	25	8x75	65	✓ / ✓	90	16	SW 13	50	2,35
BSZ-SU 8x100	58133501	55	8x55	45	-	45	8x65	55	-	35	8x75	65	✓ / ✓	100	16	SW 13	50	2,57
BSZ-SU 8x120	58134501	75	8x55	45	-	65	8x65	55	-	55	8x75	65	✓ / ✓	120	16	SW 13	50	2,95
BSZ-SU 8x140	58135501	95	8x55	45	-	85	8x65	55	-	75	8x75	65	✓ / ✓	140	16	SW 13	50	3,33
BSZ-SU 10x60	58141001	5	10x65	55	✓	-	-	-	-	-	-	-	-	60	20	SW 15	50	2,82
BSZ-SU 10x70	58141501	15	10x65	55	✓	-	-	-	-	-	-	-	-	70	20	SW 15	50	3,12
BSZ-SU 10x80	58142001	25	10x65	55	✓	5	10x85	75	-	-	-	-	-	80	20	SW 15	50	3,42
BSZ-SU 10x90	58142501	35	10x65	55	✓	15	10x85	75	-	5	10x95	85	✓ / ✓	90	20	SW 15	50	3,72
BSZ-SU 10x100	58143001	45	10x65	55	✓	25	10x85	75	-	15	10x95	85	✓ / ✓	100	20	SW 15	50	4,03
BSZ-SU 10x120	58144001	65	10x65	55	✓	45	10x85	75	-	35	10x95	85	✓ / ✓	120	20	SW 15	50	4,63
BSZ-SU 10x140	58145001	85	10x65	55	✓	65	10x85	75	-	55	10x95	85	✓ / ✓	140	20	SW 15	50	5,26
BSZ-SU 10x160	58146001	105	10x65	55	✓	85	10x85	75	-	75	10x95	85	✓ / ✓	160	20	SW 15	50	5,86
BSZ-SU 12x80	58151001	15	12x75	65	-	-	-	-	-	-	-	-	-	80	23,5	SW 17	25	2,32
BSZ-SU 12x110	58152501	45	12x75	65	-	25	12x95	85	-	10	12x110	100	✓ / ✓	110	23,5	SW17	25	2,95
BSZ-SU 12x130	58153501	65	12x75	65	-	45	12x95	85	-	30	12x110	100	✓ / ✓	130	23,5	SW 17	25	3,40
BSZ-SU 12x150	58154501	85	12x75	65	-	65	12x95	85	-	50	12x110	100	✓ / ✓	150	23,5	SW 17	25	3,82
BSZ-SU 14x80	58161001	5	14x85	75	-	-	-	-	-	-	-	-	-	80	28	SW 21	25	3,38
BSZ-SU 14x110	58162501	35	14x85	75	-	10	14x110	100	-	-	-	-	-	110	28	SW 21	25	4,22
BSZ-SU 14x130	58163501	55	14x85	75	-	30	14x110	100	-	15	14x125	115	✓ / ✓	130	28	SW 21	25	4,82
BSZ-SU 14x150	58164501	75	14x85	75	-	50	14x110	100	-	35	14x125	115	✓ / ✓	150	28	SW 21	25	5,40

[1] For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.

Concrete screw BSZ-SUH

- Hex head with pressed disc and large washer EN ISO 7094 (DIN 440)
- Steel, zinc plated
- For fixing purlins and wooden beams onto concrete

Description	Ref. No.	Embedment depth h_{nom} 1				Embedment depth h_{nom} 2				Embedment depth h_{nom} 3				Anchor length L	Drive	Washer[2]	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1 / C2					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm		mm	pcs.	kg
BSZ-SUH 10x180	58246501	121	10x65	55	✓	101	10x85	75	-	91	10x95	85	✓ / ✓	180	SW 15	44x4	25	4,34
BSZ-SUH 10x200	58247001	141	10x65	55	✓	121	10x85	75	-	111	10x95	85	✓ / ✓	200	SW 15	44x4	25	4,64
BSZ-SUH 10x240	58247501	181	10x65	55	✓	161	10x85	75	-	151	10x95	85	✓ / ✓	240	SW 15	44x4	25	5,25
BSZ-SUH 10x280	58248001	221	10x65	55	✓	201	10x85	75	-	191	10x95	85	✓ / ✓	280	SW 15	44x4	25	5,94
BSZ-SUH 10x320	58248501	261	10x65	55	✓	241	10x85	75	-	231	10x95	85	✓ / ✓	320	SW 15	44x4	25	6,54

[2] Outer diameter x thickness

Concrete screw BSZ-SK

- Countersunk head with Torx drive
- Steel, zinc plated
- For installations being flush with the fixture

Description	Ref. No.	Embedment depth 1 [1]				Embedment depth 2				Embedment depth 3				Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1 / C2					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ-SK 5x40	58311001	5	5x40	35	-	-	-	-	-	-	-	-	-	40	12	T 25	100	0,78
BSZ-SK 5x50	58311501	15	5x40	35	-	-	-	-	-	-	-	-	-	50	12	T 25	100	0,94
BSZ-SK 5x60	58312001	25	5x40	35	-	-	-	-	-	-	-	-	-	60	12	T 25	100	1,08
BSZ-SK 6x40	58321001	5	6x40	35	-	-	-	-	-	-	-	-	-	40	13	T 30	100	0,99
BSZ-SK 6x50	58321501	15	6x40	35	-	10	6x45	40	✓	-	-	-	-	50	13	T 30	100	1,20
BSZ-SK 6x60	58322001	25	6x40	35	-	20	6x45	40	✓	5	6x60	55	✓ / -	60	13	T 30	100	1,41
BSZ-SK 6x80	58323001	45	6x40	35	-	40	6x45	40	✓	25	6x60	55	✓ / -	80	13	T 30	100	1,85
BSZ-SK 6x100	58324001	65	6x40	35	-	60	6x45	40	✓	45	6x60	55	✓ / -	100	13	T 30	100	2,27
BSZ-SK 6x120	58325001	85	6x40	35	-	80	6x45	40	✓	65	6x60	55	✓ / -	120	13	T 30	100	2,69
BSZ-SK 6x140	58326001	105	6x40	35	-	100	6x45	40	✓	85	6x60	55	✓ / -	140	13	T 30	100	3,11
BSZ-SK 8x80	58332501	35	8x55	45	-	25	8x65	55	-	15	8x75	65	✓ / ✓	80	19,5	T 40	50	1,95
BSZ-SK 10x90	58342501	35	10x65	55	✓	15	10x85	75	-	5	10x95	85	✓ / ✓	90	21,5	T 50	50	3,10
BSZ-SK 10x100	58343001	45	10x65	55	✓	25	10x85	75	-	15	10x95	85	✓ / ✓	100	21,5	T 50	50	3,40

[1]For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.

Concrete screw BSZ-LK

- Pan head with Torx drive
- Steel, zinc plated
- For a flat fixing which has a high-quality look

Description	Ref. No.	Embedment depth 1 [1]				Embedment depth 2				Embedment depth 3				Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1 / C2					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ-LK 5x40	58411001	5	5x40	35	-	-	-	-	-	-	-	-	-	40	14	T 30	100	0,83
BSZ-LK 5x50	58411501	15	5x40	35	-	-	-	-	-	-	-	-	-	50	14	T 30	100	0,97
BSZ-LK 5x60	58412001	25	5x40	35	-	-	-	-	-	-	-	-	-	60	14	T 30	100	1,11
BSZ-LK 6x40	58421001	5	6x40	35	-	-	-	-	-	-	-	-	-	40	14,5	T 30	100	1,18
BSZ-LK 6x50	58421501	15	6x40	35	-	10	6x45	40	✓	-	-	-	-	50	14,5	T 30	100	1,41
BSZ-LK 6x60	58422001	25	6x40	35	-	20	6x45	40	✓	5	6x60	55	✓	60	14,5	T 30	100	1,59
BSZ-LK 6x80	58423001	45	6x40	35	-	40	6x45	40	✓	25	6x60	55	✓	80	14,5	T 30	100	2,03
BSZ-LK 6x100	58424001	65	6x40	35	-	60	6x45	40	✓	45	6x60	55	✓	100	14,5	T 30	100	2,45

[1]For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.

Concrete screw BSZ-GLK

- Large pan head with Torx drive
- Steel, zinc plated
- For fixing mounting rails

Description	Ref. No.	Embedment depth 1 [1]				Embedment depth 2				Embedment depth 3				Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1 / C2					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ-GLK 6x40	58521001	5	6x40	35	-	-	-	-	-	-	-	-	-	40	18	T 30	100	1,35
BSZ-GLK 6x60	58522001	25	6x40	35	-	20	6x45	40	✓	5	6x60	55	✓	60	18	T 30	100	1,81

[1]For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.

Concrete screw BSZ-M

- Socket with connecting thread M8/M10 and hex drive
- Steel, zinc plated
- For direct attachment of threaded rods

Description	Ref. No.	Einschraubtiefe h 1 [1]				Einschraubtiefe h 2				Einschraubtiefe h 3									
		Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 1 mm	Seis-mic C1	Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 2 mm	Seis-mic C1	Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 3 mm	Seis-mic C1	An-chor length L mm	Con-necting thread	Washer-Ø mm	Drive	Pkg. content Pcs.	Weight per pkg. kg
BSZ-M 6x35	58621001	0	6x40	35	-	-	-	-	-	-	-	-	-	35	M8/10 IG	25	SW 13	50	1,77
BSZ-M 6x55	58622001	20	6x40	35	-	15	6x45	40	✓	0	6x60	55	✓	55	M8/10 IG	25	SW 13	50	1,97

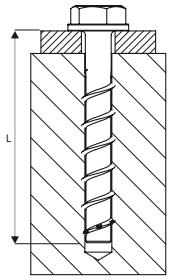
[1]For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.

Concrete screw BSZ-BS

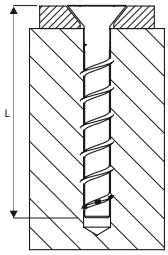
- Hanger bolt with metric connection thread and hex drive
- Steel, zinc plated
- To connect pipe clamps and threaded sockets

Description	Ref. No.	Embedment depth 1 [1]				Embedment depth 2				Embedment depth 3								
		Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 1 mm	Seis-mic C1	Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 2 mm	Seis-mic C1	Fixture thick-ness t_{fix} mm	Drill hole Ø x depth mm	Embed-ment depth h_{nom} 3 mm	Seis-mic C1 / C2	An-chor Length L mm	Head-Ø mm	Drive	Pkg. content pcs.	Weight per pkg. kg
BSZ-BS 6x35	58721001	0	6x40	35	-	-	-	-	-	-	-	-	-	35	M8x16	SW 10	100	1,63
BSZ-BS 6x55	58722001	20	6x40	35	-	15	6x45	40	✓	0	6x60	55	✓	55	M8x16	SW 10	100	1,88
BSZ-BS 6x75	58723001	40	6x40	35	-	35	6x45	40	✓	20	6x60	55	✓	75	M8x16	SW 10	100	2,30
BSZ-BS 6x95	58724001	60	6x40	35	-	55	6x45	40	✓	40	6x60	55	✓	95	M8x16	SW 10	100	2,71
BSZ-BS 6x135	58726001	100	6x40	35	-	95	6x45	40	✓	80	6x60	55	✓	135	M8x16	SW 10	100	3,86
BSZ-BS 6x155	58727001	120	6x40	35	-	115	6x45	40	✓	100	6x60	55	✓	155	M8x16	SW 10	100	4,41
BSZ-BS 6x175	58728001	140	6x40	35	-	135	6x45	40	✓	120	6x60	55	✓	175	M8x16	SW 10	100	4,95
BSZ-BS 6x195	58729001	160	6x40	35	-	155	6x45	40	✓	140	6x60	55	✓	195	M8x16	SW 10	100	5,48

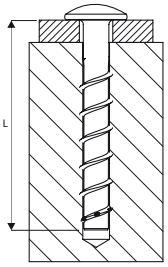
[1]For embedment depth h_{nom} 1 = 35 mm: Only for redundant non-structural systems in concrete and precast pre-stressed hollow core slabs.



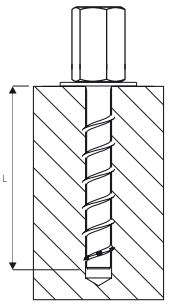
BSZ-SU / BSZ-SUH



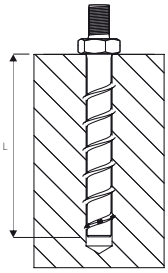
BSZ-SK



BSZ-LK / BSZ-GLK



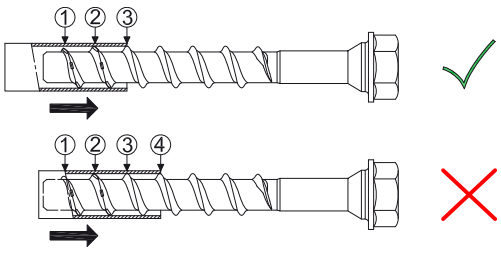
BSZ-M



BSZ-BS

Tube gauge BSZ-HL

- Steel, zinc plated
- For quick testing of the reusability of the Concrete screw BSZ-SU
- A maximum of 3 threads of the concrete screw may penetrate into the BSZ-HL sleeve gauge

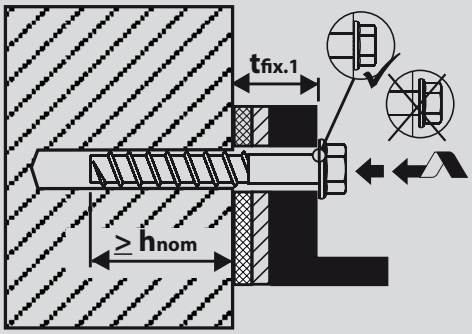


Description	Ref. No.	Suitable for Concrete screw	Pkg. content pcs.	Weight per kg. kg
BSZ-HL 10	58901001	BSZ-SU 10	10	0,18
BSZ-HL 12	58901201	BSZ-SU 12	10	0,19
BSZ-HL 14	58901401	BSZ-SU 14	10	0,22

Recommended impact screwdriver

Description of concrete screw	recommended impact screwdriver
BSZ 5	• Milwaukee C 12 IW (Square drive, Battery operation, max. torque 136 Nm) • Milwaukee C 12ID (Multi-toothed drive, Battery operation, max. torque 96 Nm) • Würth ASS 10-A (Battery operation, max. torque 105 Nm)
BSZ 6	• Milwaukee C 12 IW (Square drive, Battery operation, max. torque 136 Nm) • Milwaukee C 12ID (Multi-toothed drive, Battery operation, max. torque 96 Nm) • DeWalt DEDC 840 KB (Square drive, Battery operation, max. torque 160 Nm) • Würth ASS 14 (1/4 inch drive, Battery operation, max. torque 150 Nm)
BSZ 8 **BSZ 10**	• Milwaukee C 18 IW (Square drive, Battery operation, max. torque 250 Nm) • Bosch GDS 18E (Square drive, Mains operation, max. torque 250 Nm) • Makita 6905H (Square drive, Mains operation, max. torque 300 Nm) • Würth ASS 18 (1/2 inch drive, Battery operation, max. torque 180 Nm) • Würth ESS (1/2 inch drive, Mains operation, max. torque 250 Nm)
BSZ 12 **BSZ 14**	• Milwaukee HD 28 IW (Square drive, Battery operation, max. torque 440 Nm) • Bosch GDS 18E (Square drive, Mains operation, max. torque 250 Nm) • Makita 6905H (Square drive, Mains operation, max. torque 300 Nm) • Würth ASS 18 (1/2 inch drive HAT, Battery operation, max. torque 610 Nm) • Würth ESS (1/2 inch drive, Mains operation, max. torque 250 Nm)

Subsequent adjustment



Notes for subsequent adjustment see product range page 89.

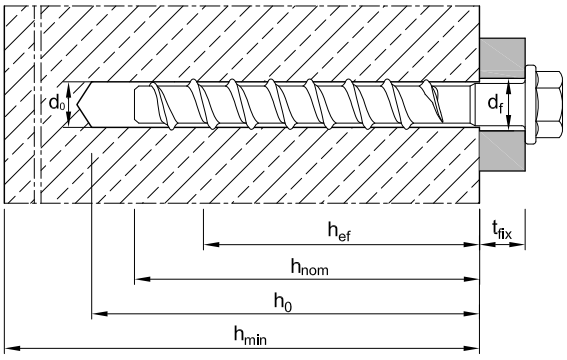
ETA-16/0204

Extract from Permissible Service Conditions of European Technical Assessment ETA-16/0204 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

Loads and performance data		Concrete screw size		BSZ 6			BSZ 8			BSZ 10			BSZ 12			BSZ 14		
Nominal embedment depth 1		h_{nom} 1	[mm]	-	-	45	-	-	55	-	-	65	-	-	75	-	-	
Nominal embedment depth 2		h_{nom} 2	[mm]	40	-	-	55	-	-	75	-	-	85	-	-	100	-	
Nominal embedment depth 3		h_{nom} 3	[mm]	-	55	-	-	65	-	-	85	-	-	100	-	-	115	
				cracked concrete														
Approved loads, tension	C20/25	appr. N	[kN]	1,0	1,9	2,4	4,3	5,7	4,3	7,6	9,2	5,7	9,0	11,7	7,2	11,5	14,5	
	C25/30	appr. N	[kN]	1,1	2,1	2,7	4,8	6,4	4,8	8,5	10,3	6,4	10,1	13,1	8,1	12,9	16,2	
	C30/37	appr. N	[kN]	1,2	2,3	2,9	5,2	7,0	5,2	9,3	11,3	7,0	11,0	14,4	8,9	14,1	17,7	
	C40/50	appr. N	[kN]	1,3	2,7	3,4	6,1	8,1	6,1	10,8	13,0	8,1	12,7	16,6	10,2	16,3	20,5	
	C50/60	appr. N	[kN]	1,5	3,0	3,8	6,8	9,0	6,8	12,0	14,5	9,0	14,2	18,6	11,5	18,2	22,9	
				uncracked concrete														
Approved loads, tension	C20/25	appr. N	[kN]	1,9	4,3	3,6	5,7	7,6	5,7	9,5	12,4	7,6	12,8	16,8	10,3	16,4	20,7	
	C25/30	appr. N	[kN]	2,1	4,8	4,0	6,4	8,5	6,4	10,6	13,8	8,5	14,4	18,7	11,6	18,4	23,1	
	C30/37	appr. N	[kN]	2,3	5,2	4,4	7,0	9,3	7,0	11,7	15,2	9,3	15,7	20,5	12,7	20,1	25,3	
	C40/50	appr. N	[kN]	2,7	6,1	5,1	8,1	10,8	8,1	13,5	17,5	10,8	18,2	23,7	14,6	23,3	29,2	
	C50/60	appr. N	[kN]	3,0	6,7	5,6	9,0	12,0	9,0	15,1	19,6	12,0	20,3	26,5	16,4	26,0	32,7	
				cracked / uncracked concrete														
Approved loads, shear	C20/25	appr. V	[kN]	2,8/4,0	4,0/4,0	3,4/4,9	4,6/6,6	6,1/8,8	4,6/6,6	15,2/19,4	18,4/19,4	5,8/8,3	18,0/24,0	23,5/24,0	7,2/10,3	23,0/32,0	28,9/32,0	
	≥ C25/30	appr. V	[kN]	3,2/4,0	4,0/4,0	3,8/5,4	5,2/7,4	6,9/9,7	5,2/7,4	17,0/19,4	19,4/19,4	6,5/9,3	20,1/24,0	24,0/24,0	8,1/11,6	25,7/32,0	32,0/32,0	
Approved bending moments		appr. M	[Nm]	6,2	6,2	14,9	14,9	14,9	32,0	32,0	32,0	64,6	64,6	64,6	105,7	105,7	105,7	
Spacing and edge distance																		
Effective anchorage depth		h_{ef}	[mm]	31	44	35	43	52	43	60	68	50	67	80	58	79	92	
Characteristic spacing		$s_{cr,N}$	[mm]	93	132	105	129	156	129	180	204	150	201	240	174	237	276	
Characteristic edge distance		$c_{cr,N}$	[mm]	46,5	66	52,5	64,5	78	64,5	90	102	75	100,5	120	87	118,5	138	
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	80	80	80	80	90	102	80	101	120	87	119	138	
Minimum spacing		s_{min}	[mm]	40	40	40	50	50	50	50	50	50	50	70	50	70	70	
Minimum edge distance		c_{min}	[mm]	40	40	40	50	50	50	50	50	50	50	70	50	70	70	
Installation parameters																		
Drill hole diameter		d_o	[mm]	6	6	8	8	8	10	10	10	12	12	12	14	14	14	
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	8	8	12	12	12	14	14	14	16	16	16	18	18	18	
Depth of drill hole		$h_0 \geq$	[mm]	45	60	55	65	75	65	85	95	75	95	110	85	110	125	
Installation torque with metric connection thread		$T_{inst} \leq$	[Nm]	10	10	20	20	20	40	40	40	60	60	60	80	80	80	
Tangential impact screwdriver[1)]		$T_{imp,max}$	[Nm]	160	160	300	300	300	400	400	400	650	650	650	650	650	650	

[1)] It is possible to fit with a tangential screwdriver with maximum output of $T_{imp,max}$ in accordance with the manufacturer's specifications



Extract from Permissible Service Conditions of European Technical Assessment ETA-16/0439 for use in concrete for redundant non-structural systems

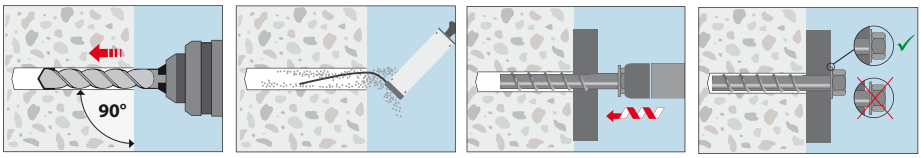
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

Loads and performance data		**Concrete screw size**		**BSZ 5**	**BSZ 6**	
Nominal embedment depth 1		**h_{nom} 1**	**[mm]**	**35**	**35**	**-**
Nominal embedment depth 2		**h_{nom} 2**	**[mm]**	**-**	**-**	**-**
Nominal embedment depth 3		**h_{nom} 3**	**[mm]**	**-**	**-**	**55**
			cracked concrete			
Approved loads, tension	C20/25	appr. N	[kN]	0,6	1,4	3,6
	C25/30	appr. N	[kN]	0,7	1,6	4,0
	C30/37	appr. N	[kN]	0,7	1,7	4,4
	C40/50	appr. N	[kN]	0,8	2,0	5,1
	C50/60	appr. N	[kN]	0,9	2,3	5,6
			uncracked concrete			
Approved loads, tension	C20/25	appr. N	[kN]	0,6	1,4	3,6
	C25/30	appr. N	[kN]	0,7	1,6	4,0
	C30/37	appr. N	[kN]	0,7	1,7	4,4
	C40/50	appr. N	[kN]	0,8	2,0	5,1
	C50/60	appr. N	[kN]	0,9	2,3	5,6
			cracked / uncracked concrete			
Approved loads, shear	C20/25	appr. V	[kN]	2,3/2,5	2,3/3,3	4,0/4,0
	≥ C25/30	appr. V	[kN]	2,5/2,5	2,6/3,7	4,0/4,0
Approved bending moments		appr. M	[Nm]	3,0	6,2	6,2
Spacing and edge distance						
Effective anchorage depth		h_{ef}	[mm]	27	27	44
Characteristic spacing		$s_{cr,N}$	[mm]	81	81	132
Characteristic edge distance		$c_{cr,N}$	[mm]	40,5	40,5	66
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100
Minimum spacing		s_{min}	[mm]	35	35	40
Minimum edge distance		c_{min}	[mm]	35	35	40
Installation parameters						
Drill hole diameter		d_o	[mm]	5	6	6
Diameter of clearance hole in the fixture		d_f	[mm]	7	8	8
Depth of drill hole		$h_1 \geq$	[mm]	40	40	60
Installation torque with metric connection thread		$T_{inst} \leq$	[Nm]	8	10	10
Tangential impact screwdriver [1)]		$T_{imp,max}$	[Nm]	110	160	160

[1)] It is possible to fit with a tangential screwdriver with maximum output of $T_{imp,max}$ in accordance with the manufacturer's specifications

Approved loads with exposure to fire in cracked and uncracked concrete C20/25 to C50/60						
Approved loads, tension	R30	appr. N_{fi}	[kN]	-	0,65	0,9
	R60	appr. N_{fi}	[kN]	-	0,65	0,8
	R90	appr. N_{fi}	[kN]	-	0,60	0,6
	R120	appr. N_{fi}	[kN]	-	0,40	0,4
Approved loads, shear	R30	appr. V_{fi}	[kN]	-	0,65	0,9
	R60	appr. V_{fi}	[kN]	-	0,65	0,8
	R90	appr. V_{fi}	[kN]	-	0,60	0,6
	R120	appr. V_{fi}	[kN]	-	0,40	0,4
Approved loads, shear	$s_{cr,fi}$		[mm]	-	108	176
Characteristic edge distance	$c_{cr,fi}$		[mm]	-	54	88

Installation

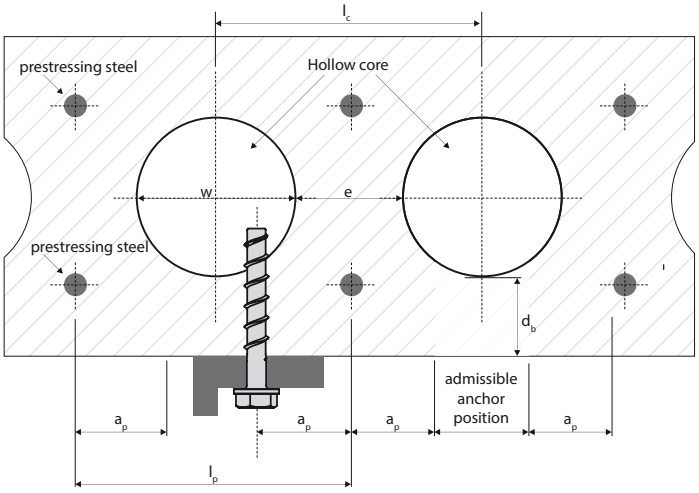


Extract from Permissible Service Conditions of European Technical Assessment ETA-16/0439 for use in precast pre-stressed hollow core slabs for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

Loads and performance data	Concrete screw size		BSZ 6		
Nominal embedment depth	h_{nom}	[mm]		≥ 35	
	Precast pre-stressed hollow core slabs C30/37 to C50/60				
Flange thickness	$d_b \geq$	[mm]	25	30	35
	$F_{appr.}$	[kN]	0,48	0,95	1,43
Spacing and edge distance					
Minimum spacing	s_{min}	[mm]		100	
Minimum edge distance	c_{min}	[mm]		100	
Installation parameters					
Drill hole diameter	d_o	[mm]		6	
Diameter of clearance hole in the fixture	d_f	[mm]		8	
Depth of drill hole	$h_1 \geq$	[mm]		40	
Installation torque	$T_{inst} \leq$	[Nm]		10	

Installation in precast pre-stressed hollow core slabs



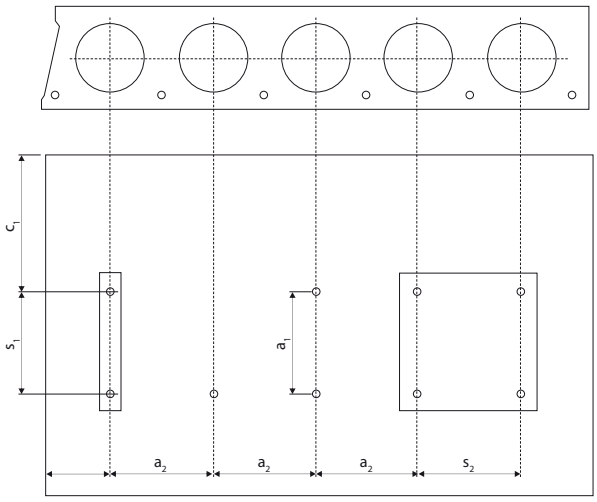
w / e ≤ 4,2

w Core width

e Web thickness

Core distance	l_c	≥ 100 mm
Distance between prestressing steel	l_p	≥ 100 mm
Distance between anchor position and pre-stressing steel	a_p	≥ 50 mm

Installation parameters for anchors in precast pre-stressed hollow core slabs



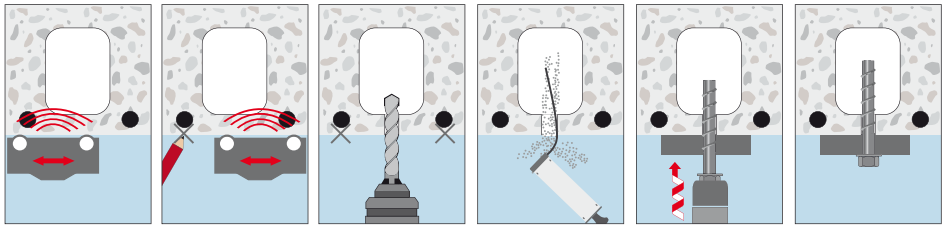
c_1, c_2 Edge distance

s_1, s_2 Anchor spacing

a_1, a_2 Distance between the anchor groups

Minimum edge distance	c_{min}	≥ 100 mm
Minimum spacing	s_{min}	≥ 100 mm
Minimum distance between the anchor groups	a_{min}	≥ 100 mm

Installation



Concrete screw BSZ2 A4

Stainless steel A4

NEW  **Concrete screw BSZ2-SU A4**

NEW  **Concrete screw BSZ2-SK A4**

NEW  **Concrete screw BSZ2-LK A4**

NEW **With improved tip and thread geometry**

ETA-22/0551 SEISMIC C1[2] R30-R120 Rost frei Ø8 - Ø10

Range of loading: **0,7 kN–19,4 kN**
Range of concrete quality: **C20/25–C50/60**

Description

The new concrete screw BSZ2 A4 with European technical approval option 1 was redesigned in order to achieve better safety features and comfortable installation. The new cutting grooves on the tip of the screw in conjunction with the optimised thread geometry allow for easier insertion and easier screwing into the concrete. Due to the under cut similar shape is it possible to have very low spacing and minimum edge distance.
The approved adjustment enables subsequent alignment to compensate for unevenness. Installation with an impact screwdriver means that you do not need to use a torque wrench. It is quick, reliable and reduces assembly errors. The BSZ A4 concrete screws are available with connection thread and with a range of diff erent head shapes for a wide variety of applications.

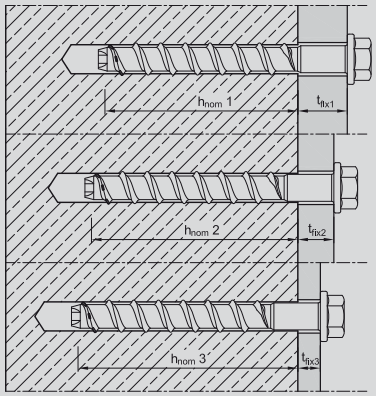
Advantages

- European Technical Assessment for anchoring in cracked and uncracked concrete (Option 1)
- With up to 3 embedment depths, it is versatile for high loads or low levels of drilling and installation effort
- Easy to apply due to conical shape and cutting grooves on the tip
- of the BSZ2 A4
- Easy to screw in due to optimised tip and thread geometry
- Approved for use under seismic conditions of category C1[2)]
- Approved for use under fire exposure (R30-R120)
- Small drill hole diameter, small edge and axial gap
- Rapid push-through installation with an impact screwdriver without torque regulation
- No curing times, can be loaded immediately
- Adjustable to compensate for unevenness
- Can be fully removed
- Wide range of possible applications through numerous variants
- Visually appealing through different head shapes
- Without assessment, can also be used in compression-resistant natural stone, various solid bricks and green concrete

Applications

To anchor moderate to heavy loads outside and inside in cracked and uncracked concrete: Railings and handrails, steel beans, wooden beams, brackets, pipeline and cable routes, etc.

Highly versatile for up to three different embedment depths



Embedment depth 1:
- low level of drilling and installation effort
- large clamping thickness
- reduced loads

Embedment depth 2:
- medium level of drilling and installation effort
- medium clamping thickness
- moderate load

Embedment depth 3:
- higher level of drilling and installation effort
- small clamping thickness
- heavy loads

[1)] Only for use in solid concrete

[2)] For head designs, diameters and screw-in depths, see product tables and ETA-22/0551

Concrete screw BSZ2-SU A4

- Sechskantkopf mit angepresster Scheibe
- Stainless steel A4
- Easy to screw in due to optimised tip and thread geometry
- Through smaller drive and pressed on washer also suitable for areas where access is difficult and elongated holes

NEW

Description	Ref. No.	Embedment depth h 1				Embedment depth h 2				Embedment depth h3				Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ2-SU 6x50 A4	59121101	15	6x40	35	-	5	6x50	45	✓	-	-	-	-	50	17	SW 13	100	1,79
BSZ2-SU 6x60 A4	59121601	25	6x40	35	-	15	6x50	45	✓	5	6x60	55	✓	60	17	SW 13	100	2,17
BSZ2-SU 8x70 A4	59132101	25	8x55	45	✓	15	8x65	55	-	5	8x75	65	✓	70	16	SW 13	50	2,05
BSZ2-SU 8x80 A4	59132601	35	8x55	45	✓	25	8x65	55	-	15	8x75	65	✓	80	16	SW 13	50	2,20
BSZ2-SU 10x90 A4	59142601	35	10x65	55	✓	15	10x85	75	-	5	10x95	85	✓	90	20	SW 15	50	3,82
BSZ2-SU 10x100 A4	59143101	45	10x65	55	✓	25	10x85	75	-	15	10x95	85	✓	100	20	SW 15	50	4,13
BSZ2-SU 10x120 A4	59144101	65	10x65	55	✓	45	10x85	75	-	35	10x95	85	✓	120	20	SW 15	50	4,73

Concrete screw BSZ2-SK A4

- Countersunk head with Torx drive
- Stainless steel A4
- Easy to screw in due to optimised tip and thread geometry
- For installations being flush with the fixture

NEW

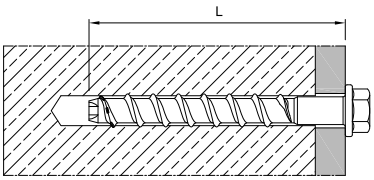
Description	Ref. No.	Embedment depth h 1				Embedment depth h 2				Embedment depth h 3				Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 3	Seismic C1					
		mm	mm	mm		mm	mm	mm		mm	mm	mm		mm	mm		pcs.	kg
BSZ2-SK 6x50 A4	59321601	15	6x40	35	-	5	6x50	45	✓	-	-	-	-	50	13	T 30	100	1,30
BSZ2-SK 6x65 A4	59322601	30	6x40	35	-	20	6x50	45	✓	10	6x60	55	✓	65	13	T 30	100	1,57
BSZ2-SK 6x85 A4	59323601	50	6x40	35	-	40	6x50	45	✓	30	6x60	55	✓	85	13	T 30	100	2,05
BSZ2-SK 6x105 A4	59324601	70	6x40	35	-	60	6x50	45	✓	50	6x60	55	✓	105	13	T 30	100	2,35
BSZ2-SK 8x80 A4	59332601	35	8x55	45	✓	25	8x65	55	-	15	8x75	65	✓	80	19,5	T 40	50	1,95
BSZ2-SK 10x90 A4	59342601	35	10x65	55	✓	15	10x85	75	-	5	10x95	85	✓	90	21,5	T 50	50	3,10
BSZ2-SK 10x120 A4	59344101	65	10x65	55	✓	45	10x85	75	-	35	10x95	85	✓	120	21,5	T 50	50	4,17

Concrete screw BSZ2-LK A4

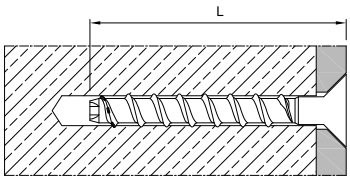
- Pan head with Torx drive
- Stainless steel A4
- Easy to screw in due to optimised tip and thread geometry
- For a flat fixing which has a high-quality look

NEW

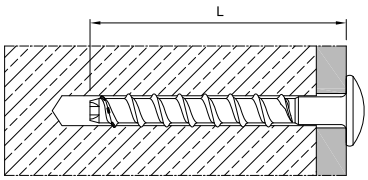
Description	Ref. No.	Embedment depth h 1				Embedment depth h 2				Embedment depth h 3					Anchor Length L	Head-Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 1	Seismic C1	Fixture thickness t_{fix}	Drill hole Ø x depth	Embedment depth h_{nom} 2	Seismic C1	Klemmstärke t_{fix} 3	Fixture thickness t_{fix}	Embedment depth h_{nom} 3	Seismic C1						
		mm	mm	mm		mm	mm	mm		mm	mm	mm			mm	mm		pcs.	kg
BSZ2-LK 6x50 A4	59421601	15	6x40	35	-	5	6x50	45	✓	-	-	-	-		50	15	T 30	100	1,45
BSZ2-LK 6x60 A4	59422101	25	6x40	35	-	15	6x50	45	✓	5	6x60	55	✓		60	15	T 30	100	1,67
BSZ2-LK 6x80 A4	59423101	45	6x40	35	-	35	6x50	45	✓	25	6x60	55	✓		80	15	T 30	100	2,08
BSZ2-LK 6x100 A4	59424101	65	6x40	35	-	55	6x50	45	✓	45	6x60	55	✓		100	15	T 30	100	2,57



BSZ2-SU A4



BSZ2-SK A4

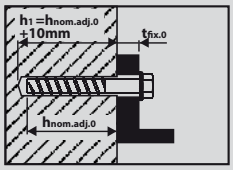


BSZ2-LK A4

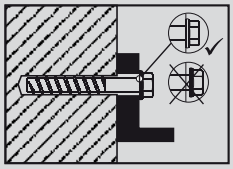
Recommended impact screwdriver

Description of concrete screw	recommended impact screwdriver
BSZ2 A4 Ø6	• Milwaukee C 12 IW (Square drive, Battery operation, max. torque 136 Nm) • Milwaukee C 12ID (Multi-toothed drive, Battery operation, max. torque 96 Nm) • DeWalt DEDC 840 KB (Square drive, Battery operation, max. torque 160 Nm) • Würth ASS 14 (1/4 inch drive, Battery operation, max. torque 150 Nm)
BSZ2 A4 Ø8 **BSZ2 A4 Ø10**	• Milwaukee C 18 IW (Square drive, Battery operation, max. torque 250 Nm) • Bosch GDS 18E (Square drive, Mains operation, max. torque 250 Nm) • Makita 6905H (Square drive, Mains operation, max. torque 300 Nm) • Würth ASS 18 (1/2 inch drive, Battery operation, max. torque 180 Nm) • Würth ESS (1/2 inch drive, Mains operation, max. torque 250 Nm)

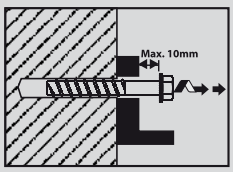
Notes for subsequent adjustment



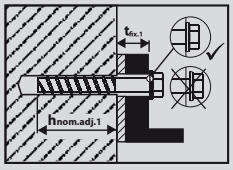
1. In order to be able to carry out subsequent adjustment, the concrete screw must be screwed at least 10 mm deeper than the nominal embedment depth. This must be taken into account at the point when you are selecting the length of the concrete screw.



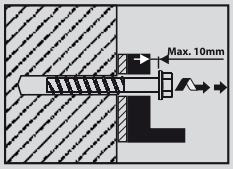
2. After successful installation, if relining is necessary for compensation, this is possible with the concrete screw BSZ2 A4.



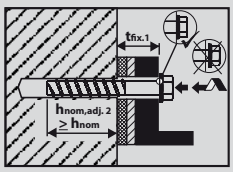
3. To do this, when the adjustment is carried out for the first time, the concrete screw must be turned back by a maximum of 10 mm.



4. After fitting the lining, then remount the fixture in accordance with the installation instructions.



5. If the first lining is not sufficient then it is possible to repeat the adjustment. To do this, once again, the concrete screw must be turned back by a maximum of 10 mm so that another lining can be fitted.



6. After the second lining, then remount the fixture in accordance with the installation instructions..

- The anchor can only be adjusted twice. When doing this the anchor can only be screwed back to a maximum of 10 mm.
- In total the lining which is a result of the adjustment must be a maximum of 10 mm.
- The required seating depth h_{nom} must be maintained after adjustment ($h_{nom} = L - t_{fix}$).

ETA-22/0551

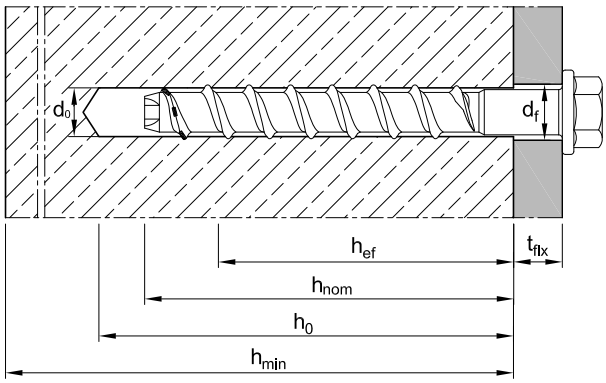
Extract from Permissible Service Conditions of European Technical Assessment ETA-22/0551 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

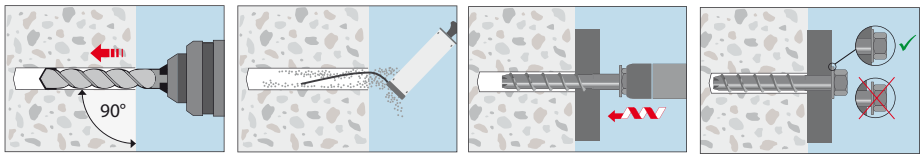
Loads and performance data		Concrete screw size		BSZ2 6 A4			BSZ2 8 A4			BSZ2 10 A4		
Nominal embedment depth 1		**h_{nom} 1**	**[mm]**	**35**[1]	**-**	**-**	**45**	**-**	**-**	**55**	**-**	**-**
Nominal embedment depth 2		**h_{nom} 2**	**[mm]**	**-**	**45**	**-**	**-**	**55**	**-**	**-**	**75**	**-**
Nominal embedment depth 3		**h_{nom} 3**	**[mm]**	**-**	**-**	**55**	**-**	**-**	**65**	**-**	**-**	**85**
							cracked concrete					
Approved loads, tension	C20/25	appr. N	[kN]	1,2	0,7	1,4	1,4	2,6	3,8	2,9	6,2	8,1
	C25/30	appr. N	[kN]	1,3	0,8	1,6	1,6	2,9	4,3	3,2	6,8	8,8
	C30/37	appr. N	[kN]	1,4	0,8	1,7	1,7	3,2	4,7	3,5	7,3	9,5
	C40/50	appr. N	[kN]	1,6	0,9	2,0	2,0	3,7	5,4	4,0	8,1	10,6
	C50/60	appr. N	[kN]	1,7	1,0	2,3	2,3	4,1	6,0	4,5	8,8	11,6
							uncracked concrete					
Approved loads, tension	C20/25	appr. N	[kN]	1,7	1,9	4,0	4,2	5,7	8,0	5,2	9,0	11,9
	C25/30	appr. N	[kN]	1,8	2,1	4,4	4,7	6,4	8,7	5,9	10,1	13,3
	C30/37	appr. N	[kN]	1,9	2,3	4,7	5,2	7,0	9,1	6,4	11,1	14,6
	C40/50	appr. N	[kN]	2,1	2,7	5,3	6,0	8,1	10,0	7,4	12,8	16,8
	C50/60	appr. N	[kN]	2,3	3,0	5,7	6,7	9,0	10,7	8,3	14,3	18,8
							cracked / uncracked concrete					
Approved loads, shear	C20/25	appr. V	[kN]	2,0 / 2,9	4,0	4,0	6,2 / 7,7	7,7	9,7	10,4 / 12,9	17,6 / 19,4	19,4
	≥ C25/30	appr. V	[kN]	2,3 / 3,3	4,0	4,0	7,0 / 7,7	7,7	9,7	11,6 / 12,9	19,4	19,4
Approved bending moments		appr. M	[Nm]	6,2	6,2	6,2	14,9	14,9	14,9	32,0	32,0	32,0
Spacing and edge distance												
Effective anchorage depth		h_{ef}	[mm]	25	34	42	32	41	49	40	57	65
Characteristic spacing		$s_{cr,N}$	[mm]	75	102	126	96	123	147	120	171	195
Characteristic edge distance		$c_{cr,N}$	[mm]	37,5	51	63	48	61,5	73,5	60	85,5	97,5
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	80	100	120	100	130	130
Minimum spacing		s_{min}	[mm]	35	35	35	35	35	35	40	40	40
Minimum edge distance		c_{min}	[mm]	35	35	35	35	35	35	40	40	40
Installation parameters												
Drill hole diameter		d_o	[mm]	6	6	6	8	8	8	10	10	10
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	8	8	8	12	12	12	14	14	14
Depth of drill hole		$h_{o} \geq$	[mm]	40	50	60	55	65	75	65	85	95
Tangential impact screwdriver[1]		$T_{imp,max}$	[Nm]	160	160	160	300	300	300	450	450	450

[1]Only for statically indeterminate non-structural systems (multiple use) according to EN 1992-4:2018, in dry internal conditions.

[2]It is possible to fit with a tangential screwdriver with maximum output of $T_{imp,max}$ in accordance with the manufacturer's specifications



Installation



Concrete screw BSZ-B A4

Stainless steel A4

Concrete screw BSZ-B A4

Range of loading: **2,4 kN–19,6 kN**
Range of concrete quality: **C20/25–C50/60**

Description

Option 1 approved concrete screw BSZ-B A4 cut a positive thread in the concrete when being screwed in and enable attachment to be made close to the edge through the expansion-free operating principle (=undercut). Installation with an impact screwdriver means that you do not need to use a torque wrench. It is quick, reliable and reduces assembly errors. The BSZ A4 concrete screw is suitable for applications indoors and outdoors.

Advantages

- European Technical Assessment for anchoring in cracked and uncracked concrete (Option 1)
- With up to 3 embedment depths, it is versatile for high loads or low levels of drilling and installation effort
- Approved for use under seismic conditions of category C1[1)]
- Approved for use under fire exposure (R30-R120)
- Small drill hole diameter, small edge and axial gap
- No curing times, can be loaded immediately
- Adjustable to compensate for unevenness
- Can be fully removed

Applications

To anchor moderate to heavy loads outside and inside in cracked and uncracked concrete: Railings and handrails, steel beans, supports and braces etc.

Concrete screw BSZ-B A4

- With metric connection thread and hex drive
- Stainless steel A4
- For pre-setting and through-setting installation and for distance mounting

Description	Ref. No.	Embedment depth 1				Embedment depth 2				Embedment depth 3				Anchor length L	Pressed disk Ø	Drive	Pkg. content	Weight per pkg.
		Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Embedment depth h_{nom} 1 mm	Seismic C1	Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Embedment depth h_{nom} 2 mm	Seismic C1	Fixture thickness t_{fix} mm	Drill hole Ø x depth mm	Embedment depth h_{nom} 3 mm	Seismic C1	mm	mm		Pcs.	kg
BSZ-B 8x105 A4	59834001	39	8x55	45	-	29	8x65	55	-	19	8x75	65	✓	105	M10x30	SW 7	50	2,30
BSZ-B 10x140 A4	59845001	59	10x65	55	✓	39	10x85	75	-	29	10x95	85	✓	140	M12x35	SW 9	50	4,58
BSZ-B 10x160 A4	59846001	79	10x65	55	✓	59	10x85	75	-	49	10x95	85	✓	160	M12x55	SW 9	50	5,30

Recommended impact screwdriver

- Milwaukee C 18 IW (Square drive, Battery operation, max. torque 250 Nm)
- Bosch GDS 18E (Square drive, Mains operation, max. torque 250 Nm)
- Makita 6905H (Square drive, Mains operation, max. torque 300 Nm)
- Würth ASS 18 (1/2 inch drive, Battery operation, max. torque 180 Nm)
- Würth ESS (1/2 inch drive, Mains operation, max. torque 250 Nm)

[1)] For restrictions see ETA-16/0204

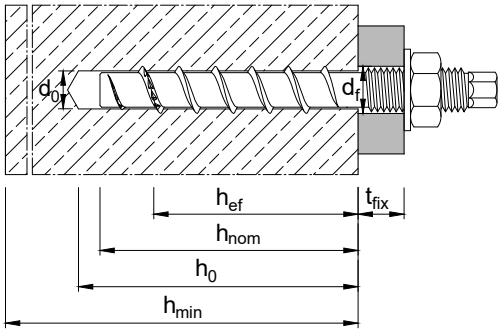
ETA-16/0204

Extract from Permissible Service Conditions of European Technical Assessment ETA-16/0204 for use in cracked and uncracked concrete (Option 1)

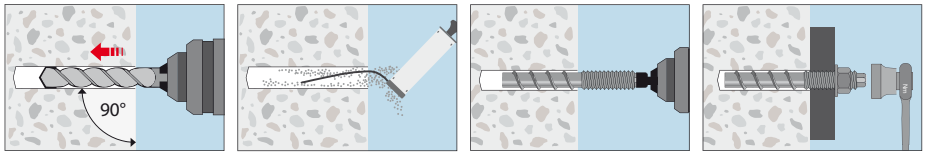
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. Load capacities under fire exposure see page 198.

Loads and performance data		**Concrete screw size**			**BSZ 8 A4**			**BSZ 10 A4**	
Nominal embedment depth 1		**h_{nom} 1**	**[mm]**	**45**	**-**	**-**	**55**	**-**	**-**
Nominal embedment depth 2		**h_{nom} 2**	**[mm]**	**-**	**55**	**-**	**-**	**75**	**-**
Nominal embedment depth 3		**h_{nom} 3**	**[mm]**	**-**	**-**	**65**	**-**	**-**	**85**
					cracked concrete				
Approved loads, tension	C20/25	appr. N	[kN]	2,4	4,3	5,7	4,3	7,6	9,2
	C25/30	appr. N	[kN]	2,7	4,8	6,4	4,8	8,5	10,3
	C30/37	appr. N	[kN]	2,9	5,2	7,0	5,2	9,3	11,3
	C40/50	appr. N	[kN]	3,4	6,1	8,1	6,1	10,8	13,0
	C50/60	appr. N	[kN]	3,8	6,8	9,0	6,8	12,0	14,5
					uncracked concrete				
Approved loads, tension	C20/25	appr. N	[kN]	3,6	5,7	7,6	5,7	9,5	12,4
	C25/30	appr. N	[kN]	4,0	6,4	8,5	6,4	10,6	13,8
	C30/37	appr. N	[kN]	4,4	7,0	9,3	7,0	11,7	15,2
	C40/50	appr. N	[kN]	5,1	8,1	10,8	8,1	13,5	17,5
	C50/60	appr. N	[kN]	5,6	9,0	12,0	9,0	15,1	19,6
					cracked / uncracked concrete				
Approved loads, shear	C20/25	appr. V	[kN]	3,4/4,9	4,6/6,6	6,1/8,8	4,6/6,6	15,2/19,4	18,4/19,4
	≥ C25/30	appr. V	[kN]	3,8/5,4	5,2/7,4	6,9/9,7	5,2/7,4	17,0/19,4	19,4/19,4
Approved bending moments		appr. M	[Nm]	14,9	14,9	14,9	32	32	32
Spacing and edge distance									
Effective anchorage depth		h_{ef}	[mm]	35	43	52	43	60	68
Characteristic spacing		$s_{cr,N}$	[mm]	105	129	156	129	180	204
Characteristic edge distance		$c_{cr,N}$	[mm]	52,5	64,5	78	64,5	90	102
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	80	80	90	102
Minimum spacing		s_{min}	[mm]	40	50	50	50	50	50
Minimum edge distance		c_{min}	[mm]	40	50	50	50	50	50
Installation parameters									
Drill hole diameter		d_o	[mm]	8	8	8	10	10	10
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	12	12	12	14	14	14
Depth of drill hole		$h_0 \geq$	[mm]	55	65	75	65	85	95
Installation torque for metric connection thread		$T_{inst} \leq$	[Nm]	20	20	20	40	40	40
Tangential impact screwdriver[1)]		$T_{imp,max}$	[Nm]	300	300	300	400	400	400

[1)] It is possible to fit with a tangential screwdriver with maximum output of $T_{imp,max}$ in accordance with the manufacturer's specifications



Installation



Asphalt Screw AS

Steel, zinc flake coated

Asphalt Screw AS

Metric thread reducer AS 22

Screw-in tool AS

Cartridge VME plus
Side-by-side Cartridge

Range of loading: **40 kN–80 kN Schocklast**
Base material: **Asphalt**

Description

In combination with the VME plus injection system, the Asphalt Screw AS is excellently suited for the repeated transfer of high shock loads in all common types of asphalt.

When screwed into the asphalt, the Asphalt Screw AS creates a positive undercut and the VME plus injection mortar previously placed in the borehole is pressed into the air pores of the asphalt. This consolidates the subgrade in the vicinity of the asphalt screw for a large force transmission area. The diameter of the large countersunk head is larger than the diameter of clearance hole in the fixture and thus prevents the Asphalt Screw AS from being pulled out when the fastening screw is tightened. The optional Metric thread reducer for the Asphalt Screw AS 22 x 100 zl and Asphalt Screw AS 22 x 155 zl allow reduction to M12 or M10.

Advantages

- Fastening directly into the asphalt even without a concrete foundation
- Installation flush with the surface
- Suitable for temporary mounting
- Mounting of the attachment can be done immediately – no curing time of the VME plus must be observed
- Frost-proof: Sealing the borehole prevents water ingress and frost damage during winter days
- High force transmission under repeated shock loads

Note

Only suitable for constant compressive loads. Not suitable for constant tensile loads. Only apply tensile or shear loads of short duration. Observe the instructions of the VME plus.

Applications for fasteners in asphalt

Anti-impact and passive restraint systems, traffic signs, guards, speed bumps, bicycle racks, parking benches, shopping cart canopies, fences.

Asphalt Screw AS

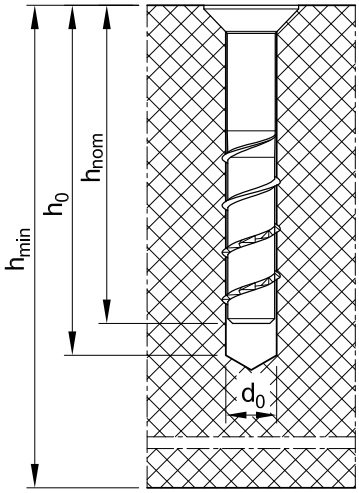
- Countersunk head with internally thread
- Steel, zinc flake coated
- Internal drive SW12

Description	Ref. No.	Drill hole Ø x depth mm	Setting depth mm	Length mm	Internal thread mm	Screw drive	Drive	Package content pcs.	Weight per package kg
AS 16x100 zl	52671901	16 x 110	100	100	M10 x 20	SW 12	-	25	3,62
AS 22x100 zl	52872901	22 x 110	100	100	M16 x 30	SW 12	-	25	5,18
AS 22x155 zl	52881901	22 x 165	155	155	M16 x 30	SW 12	-	25	8,89
Metric thread reducer AS 22 M16 – M10	52999970	-	-	-	M10 x 25	Slotdrive	-	25	0,49
Metric thread reducer AS 22 M16 – M12	52999971	-	-	-	M12 x 25	Slotdrive	-	25	0,35
Screw-in tool for AS	52999981	-	-	140	-	SW 12	1/2"	1	0,19
Cartridge VME plus 440	28258001	-	-	-	-	-	-	1	0,78
Cartridge VME plus 585	28258243	-	-	-	-	-	-	1	1,02
Static mixer VM-XHP	28305301	-	-	270	-	-	-	12	0,18

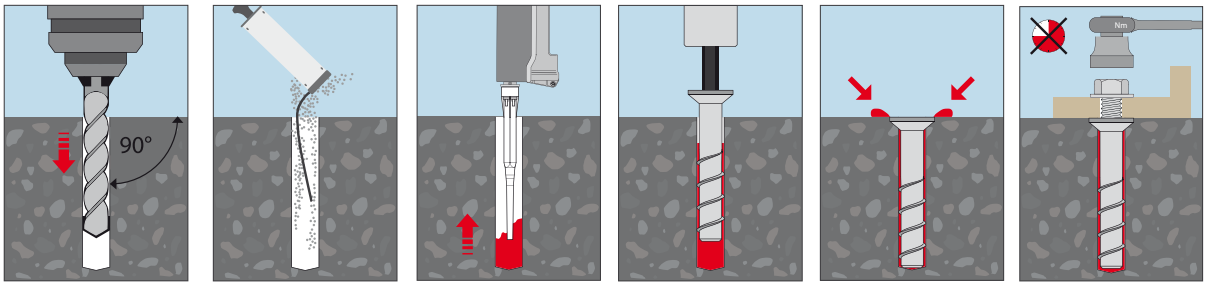
One static mixer VM-XHP comes with each cartridge

Recommended loads for Asphalt Screw AS

Loads and performance data					
			AS 16 x 100 zl	AS 22 x 100 zl	AS 22 x 155 zl
Maximum shock loads	F	[kN]	40	50	80
Installation parameters					
Minimum thickness of asphalt	h_{min}	[mm]	150	150	200
Drill hole diameter	d_0	[mm]	16	22	22
Depth of drill hole	h_0	[mm]	110	110	165
Setting depth	h_{nom}	[mm]	100	100	155
Installation torque	$T_{inst} \leq$	[Nm]	20	80	80
Internal hexagon size	SW	[mm]	12	12	12
Diameter of countersunk head		[mm]	30	30	30
Diameter of clearance hole	$d_F \leq$	[mm]	12	18	18
Required screw length		[mm]	$15 + t_{fix}$	$25 + t_{fix}$	$25 + t_{fix}$
Injection system VME plus					
Amount of adhesive per drill hole		[ml]	17	18	26



Installation



Filling Washer VS

Filling Washer VS

Description

The VS filling washer is used for subsequent filling of the annular gap between fastening element (wedge anchor, concrete screw or anchor rod) and attachment. With the wedge anchors BZ3 and BZ plus as well as the BSZ concrete screw, the filling washer VS is additionally mounted, with injection systems in exchange to the existing washers of the anchor rods. After assembly, injection adhesive (VMZ, VMH, VMU plus or VME plus) is injected into the cross-section drill hole injected with the enclosed mixer reduction, until adhesive emerges.

Advantages

The filling washer enables filling of the annular gap as the final step to set the anchor.
– Larger holes are possible in the item being attached
– Increased allowable shear loads under seismic loading

Application

For fastenings made using the MKT Wedge Anchors BZ3 and BZ plus, the Concrete screw BSZ, as well as the MKT Injection Systems VMZ, VMH, VMU plus or VME plus.

Note

When choosing an anchor, observe that the fixture thickness of the anchor must be reduced by up to 6mm.

Filling Washer VS

→ Steel, zinc plated

→ Every 20-pack includes 10, every 10-pack includes 5 and every 4-pack includes 2 mixer tips

Description	Ref. No.	Suitable for thread	Internal-Ø	Outer-Ø	Filling Washer VS thickness	Reduction of fixture thickness t_{fix} by		Package content	Weight per package
						BZ3, BZ plus, BSZ	VMZ, VMH, VMU plus, VME plus		
			mm	mm	mm	mm	mm	pcs.	kg
VS M8	56084101	M8	9	23	5	5	3,4	20	0,32
VS M10	56104101	M10	12	26	5	5	3	20	0,37
VS M12	56124101	M12	14	28	5	5	2,5	20	0,40
VS M16	56164101	M16	17	34	5	5	2	10	0,30
VS M20	56204101	M20	21	41	5	5	2	10	0,41
VS M24	56244101	M24	25	48	6	6	2	4	0,30

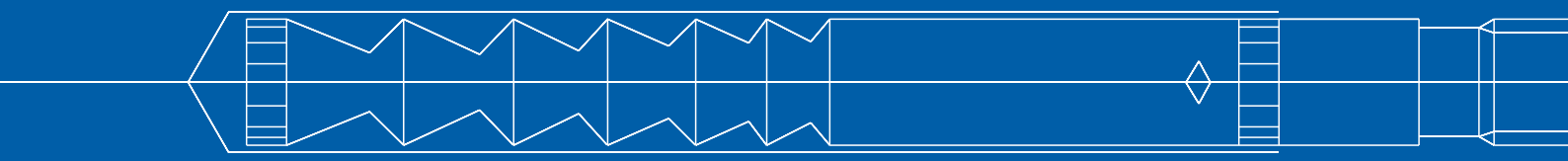
Filling Washer VS A4

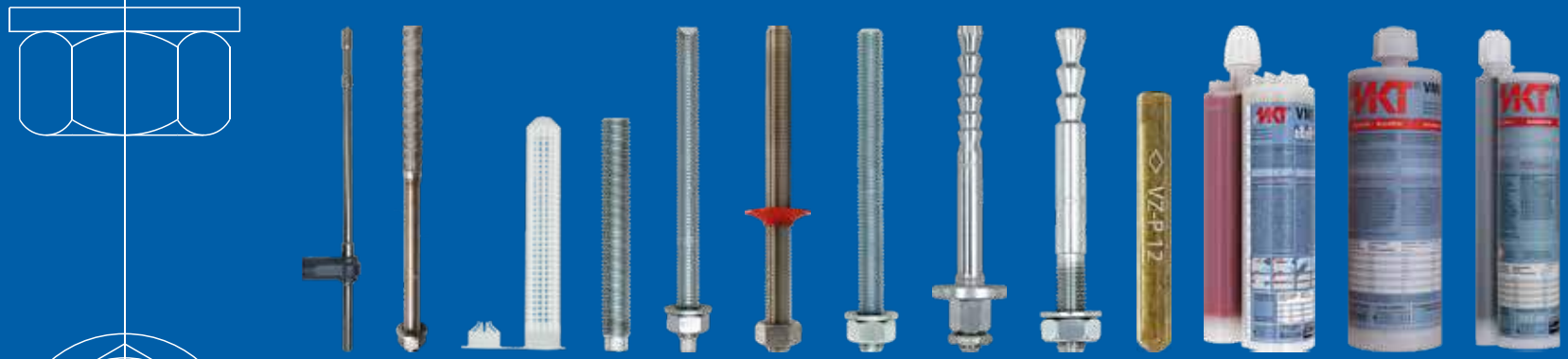
→ Stainless Steel A4

→ Every 20-pack includes 10, every 10-pack includes 5 and every 4-pack includes 2 mixer tips

Description	Ref. No.	Suitable for thread	Internal-Ø	Outer-Ø	Filling Washer VS thickness	Reduction of fixture thickness t_{fix} by		Package content	Weight per package
						BZ3 A4, BZ plus A4, BSZ2 A4	VMZ, VMH, VMU plus, VME plus		
			mm	mm	mm	mm	mm	pcs.	kg
VS M8 A4	56084501	M8	9	23	5	5	3,4	20	0,32
VS M10 A4	56104501	M10	12	26	5	5	3	20	0,37
VS M12 A4	56124501	M12	14	28	5	5	2,5	20	0,40
VS M16 A4	56164501	M16	17	34	5	5	2	10	0,30
VS M20 A4	56204501	M20	21	41	5	5	2	10	0,41
VS M24 A4	56244501	M24	25	48	6	6	2	4	0,30

Chemical Anchors





Product Range 2023/24

Service | Light Duty Anchors | Chemical Anchors | Mechanical Heavy Duty Anchors

Injection System VMZ

Conical Stud VMZ-A

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

Cartridge VMZ 280
Coaxial Cartridge
for silicone guns
Content: 280ml, incl. 2
Static mixer on Cartridge

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

Cartridge VMZ 420
Coaxial Cartridge
Content: 420ml

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

Range of loading:	**4,1 kN–105,7 kN**
Range of concrete quality:	**C20/25–C50/60**
Material:	**Steel, zinc plated, Stainless steel A4, Stainless steel HCR on demand: hot dip galvanized or sheradized**

Description
The Injection System VMZ 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 a European technical approved fastening system for both cracked and uncracked concrete. Hammer drills, diamond drills or suction drills can be used to create the drill holes. When using the hollow drill bit SB, contamination and fine dust exposure of the respiratory tract are reduced to a minimum and subsequent drill hole cleaning is not necessary.

SEISMIC M10-M24 · F30-F120 · M10-M24 HCR · BBA UKTA - 22/6210 · ZIVILSCHUTZ ab VMZ 50 M8

A+ · Rost frei · M10-M24

Advantages
- Approved in cracked and uncracked concrete
- Very high loads with low anchorage depths and component thicknesses
- Greatest possible economy of the fastening due to small anchors with low drilling effort
- No load reduction for wet or water-filled drill holes (drill holes d_0=14mm and larger)
- Approved to use under seismic action according to the performance category C1 and C2 (M10-M24)
- For higher loads under seismic action, the annular gap between anchor rod and fixture can be filled using the VS backfill disc
- Fire test report for all dimensions
- Tested according to ZTV tunnel temperature curve (M10-M24 HCR)
- Suitable for Pre- and through-setting installation (M10 – M24)
- The large variety of threaded studs of different diameters, anchorage depths and fixture thicknesses covers almost all requirements
- VMZ-A 75 M12: drill hole like M10 but connection thread M12 (ideally suited for through fastening installation)
- Styrene-free 2 component adhesive VMZ on vinyl ester basis for approved processing from a substrate temperature of -15°C
- Styrene-free injection adhesive VMZ 345 express for fast curing
- Opened cartridges can be re-used with a new mixer nozzle
- Drill hole creation with hammer drill, diamant drill or suction drill

Applications
Heavy duty fastenings in cracked and uncracked concrete, e.g. steel beams, steel supports, railings, brackets, facade substructures, cable trays, fixing of bridge railings according to GEL 14 (VMZ 75 M12-40/135 A4) and GEL 33 (VMZ 90 M16-60/175 A4).

Injection Cartridge VMZ

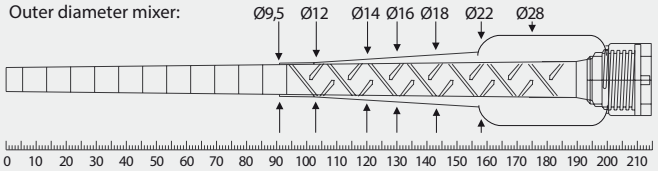
- Two component cartridge, styrene-free
- Various cartridge systems
- Approved for cracked and uncracked concrete

Description	Ref. No.	Content ml	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 cartridges)	28305111	-	12	0,12	0,01
Mixer extension VM-XE 10/200 (200mm)	28306011	-	12	-	0,01
Mixer extension VM-XE 10/500 (500mm)	85951101	-	10	-	0,02
Installation wedge VMZ-MK	33300103	-	10	-	0,01

One static mixer comes with each cartridge.
[1)]Cartridge VMZ 280 comes with 2 mixers.

Usable length Static mixer VM-X

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



Curing Time Injection Adhesive VMZ

- Cartridge temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
-15°C to -10°C	45 min	7 d	14 d[1)]
-9°C to -5°C	45 min	10:30 h	21:00 h[1)]
-4°C to -1°C[1)]	45 min	6:00 h	12:00 h[2)]
0°C to +4°C	20 min	3:00 h	6:00 h
+5°C to +9°C	12 min	2:00 h	4:00 h
+10°C to +19°C	6 min	1:20 h	2:40 h
+20°C to +29°C	4 min	45 min	1:30 h
+30°C to +34°C	2 min	25 min	50 min
+35°C to +39°C	1,4 min	20 min	40 min
+40°C	1,4 min	15 min	30 min

[1)]It must be ensured that icing does not occur in the drill hole.

Curing Time Injection Adhesive VMZ express

- Cartridge temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
-5°C to -1°C	20 min	4:00 h	8:00 h[1)]
0°C to +4°C	10 min	2:00 h	4:00 h
+5°C to +9°C	6 min	1:00 h	2:00 h
+10°C to +19°C	3 min	40 min	80 min
+20°C to +29°C	1 min	20 min	40 min
+30°C	1 min	10 min	20 min

[1)]It must be ensured that icing does not occur in the drill hole.

Accessories for Injection System VMZ

VMZ-A Threaded Stud	Drill bit Ø mm	Blow-out pump[1)] / Air gun[1)]	Cleaning brush RB[1)]	Extension tube	Dispenser
VMZ-A M8	10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
VMZ-A M10 VMZ-A 75 M12	12	VM-AP 360 VM-ABP 200	RB 12 M6 / RB 12 M8	VM-XE 10	
VMZ-A M12	14	VM-AP 360 VM-ABP 200	RB 14 M6 / RB 14 M8	VM-XE 10	
VMZ-A M16	18	VM-AP 360 VM-ABP 200 / 250 / 500	RB 18 M6 / RB 18 M8	VM-XE 10	
VMZ-A 115 M20	22	VM-ABP 250 / 500	RB 22 M6	VM-XE 10	
VMZ-A M20	24	VM-ABP 250 / 500	RB 24 M6	VM-XE 10	
VMZ-A M24	26	VM-ABP 250 / 500	RB 26 M6	VM-XE 10	
See page		**178**	**179**	**180**	**181/182**

[1)] When using the hollow drill bit SB (see page 177), subsequent cleaning is no longer necessary. In the case of diamond drilled holes, the drill hole is rinsed with water and blown out with compressed air (see ETA-04/0092).

Conical Stud VMZ-A

Steel, zinc plated

- For use in structures subject to dry internal conditions
- Version LG: with thread to concrete surface
- Drill hole depth from 42mm

Description	Ref. No.	Drill hole Ø x depth mm	Setting depth mm	Seismic C1 / C2	Fixture thickness mm	Anchor length mm	Thread mm	Pkg. cont. pcs.	Weight per pkg. kg
VMZ-A 40 M8-15/65	32115101	10x42	41	- / -	15	65	M8x22	10	0,30
VMZ-A 50 M8-15/80	32120101	10x55	52	- / -	15	80	M8x22	10	0,36
VMZ-A 50 M8-30/95	32135101	10x55	52	- / -	30	95	M8x31	10	0,41
VMZ-A 50 M8-45/110	32145101	10x55	52	- / -	45	110	M8x31	10	0,47
VMZ-A 60 M10-10/85	32205101	12x65	63	✓ / ✓	10	85	M10x18	10	0,61
VMZ-A 60 M10-20/95	32220101	12x65	63	✓ / ✓	20	95	M10x27	10	0,66
VMZ-A 60 M10-30/105	32225101	12x65	63	✓ / ✓	30	105	M10x27	10	0,72
VMZ-A 60 M10-60/135	32235101	12x65	63	✓ / ✓	60	135	M10x47	10	0,87
VMZ-A 60 M10-100/175	32245101	12x65	63	✓ / ✓	100	175	M10x57	10	1,10
VMZ-A 75 M10-20/110	32255101	12x80	78	✓ / ✓	20	110	M10x27	10	0,75
VMZ-A 75 M12-25/120	32323171	12x80	78	✓ / ✓	25	120	M12x37	10	0,85
VMZ-A 75 M12-40/135	32324171	12x80	78	✓ / ✓	40	135	M12x52	10	0,95
VMZ-A 75 M12-60/155	32333101	12x80	78	✓ / ✓	60	155	M12x72	10	1,05
VMZ-A 75 M12-80/175	32336101	12x80	78	✓ / ✓	80	175	M12x87	10	1,20
VMZ-A 70 M12-25/115	32323101	14x75	74	✓ / ✓	25	115	M12x36	10	1,20
VMZ-A 80 M12-10/110	32305101	14x85	84	✓ / ✓	10	110	M12x21	10	1,17
VMZ-A 80 M12-25/125	32325101	14x85	84	✓ / ✓	25	125	M12x36	10	1,28
VMZ-A 80 M12-50/150	32330101	14x85	84	✓ / ✓	50	150	M12x46	10	1,49
VMZ-A 80 M12-100/200	32345101	14x85	84	✓ / ✓	100	200	M12x71	10	1,93
VMZ-A 80 M12-125/225	32355101	14x85	84	✓ / ✓	125	225	M12x71	10	2,17
VMZ-A 80 M12-165/265	32365101	14x85	84	✓ / ✓	165	265	M12x71	10	2,57
VMZ-A 95 M12-25/140	32327101	14x100	99	✓ / ✓	25	140	M12x36	10	1,40
VMZ-A 100 M12-25/145	32375101	14x105	104	✓ / ✓	25	145	M12x36	10	1,46
VMZ-A 100 M12-60/180	32385101	14x105	104	✓ / ✓	60	180	M12x56	10	1,75
VMZ-A 100 M12-100/220	32390101	14x105	104	✓ / ✓	100	220	M12x84	10	2,12
VMZ-A 110 M12-25/155	32377101	14x115	114	✓ / ✓	25	155	M12x36	10	1,55
VMZ-A 125 M12-25/170	32379101	14x130	129	✓ / ✓	25	170	M12x36	10	1,75
VMZ-A 90 M16-30/145	32555101	18 x 98	94	✓ / ✓	30	145	M16x44	10	2,20
VMZ-A 105 M16-30/160	32550101	18x113	109	✓ / ✓	30	160	M16x44	10	2,45
VMZ-A 125 M16-30/180	32515101	18x133	130	✓ / ✓	30	180	M16x44	10	2,78
VMZ-A 125 M16-60/210	32520101	18x133	130	✓ / ✓	60	210	M16x55	10	3,60
VMZ-A 125 M16-100/250	32530101	18x133	130	✓ / ✓	100	250	M16x65	10	4,23
VMZ-A 125 M16-165/315	32540101	18x133	130	✓ / ✓	165	315	M16x90	10	5,25
VMZ-A 145 M16-30/200	32560101	18x153	150	✓ / ✓	30	200	M16x44	10	3,70
VMZ-A 160 M16-30/215	32502101	18x168	165	✓ / ✓	30	215	M16x44	10	3,54
VMZ-A 160 M16-60/245	32504101	18x168	165	✓ / ✓	60	245	M16x55	10	3,98
VMZ-A 160 M16-100/285	32506101	18x168	165	✓ / ✓	100	285	M16x65	10	4,62
VMZ-A 115 M20-30/175	32608101	22x120	120	✓ / ✓	30	175	M20x46	5	2,40
VMZ-A 170 M20-20/225 LG	32603101	24x180	180	✓ / ✓	20	225	M20x41	5	3,40
VMZ-A 170 M20-25/230	32605101	24x180	180	✓ / ✓	25	230	M20x33	5	3,52
VMZ-A 170 M20-50/255	32610101	24x180	180	✓ / ✓	50	255	M20x46	5	3,83
VMZ-A 170 M20-100/305	32620101	24x180	180	✓ / ✓	100	305	M20x71	5	4,46
VMZ-A 190 M20-50/275	32612101	24x200	200	✓ / ✓	50	275	M20x46	5	4,20
VMZ-A 170 M24-50/260	32705101	26x185	182	✓ / ✓	50	260	M24x50	5	4,58
VMZ-A 170 M24-100/310	32715101	26x185	182	✓ / ✓	100	310	M24x75	5	5,46
VMZ-A 200 M24-50/290 LG	32711101	26x215	212	✓ / ✓	50	290	M24x75	5	5,11
VMZ-A 200 M24-50/290	32710101	26x215	212	✓ / ✓	50	290	M24x50	5	5,11
VMZ-A 200 M24-100/340	32720101	26x215	212	✓ / ✓	100	340	M24x75	5	6,01
VMZ-A 225 M24-50/315	32712101	26x240	237	✓ / ✓	50	315	M24x50	5	5,73

Other lengths or threads on demand.

Conical Stud VMZ-A A4

Stainless steel A4 / 316

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Version LG: with thread to concrete surface
- Drill hole depth from 42mm

Description	Ref. No.	Drill hole Ø x depth mm	Setting depth mm	Seismic C1 / C2	Fixture thickness mm	Anchor length mm	Thread mm	Pkg. cont. pcs.	Weight per pkg. kg
VMZ-A 40 M8-15/65 A4	32115501	10x42	41	- / -	15	65	M8x22	10	0,30
VMZ-A 50 M8-15/80 A4	32120501	10x55	52	- / -	15	80	M8x22	10	0,36
VMZ-A 50 M8-30/95 A4	32135501	10x55	52	- / -	30	95	M8x31	10	0,41
VMZ-A 50 M8-45/110 A4	32145501	10x55	52	- / -	45	110	M8x31	10	0,47
VMZ-A 60 M10-10/85 A4	32205501	12x65	63	✓ / ✓	10	85	M10x18	10	0,61
VMZ-A 60 M10-20/95 A4	32220501	12x65	63	✓ / ✓	20	95	M10x27	10	0,66
VMZ-A 60 M10-30/105 A4	32225501	12x65	63	✓ / ✓	30	105	M10x27	10	0,72
VMZ-A 60 M10-60/135 A4	32235501	12x65	63	✓ / ✓	60	135	M10x47	10	0,87
VMZ-A 60 M10-100/175 A4	32245501	12x65	63	✓ / ✓	100	175	M10x57	10	1,10
VMZ-A 75 M10-20/110 A4	32255501	12x80	78	✓ / ✓	20	110	M10x27	10	0,75
VMZ-A 75 M10-40/130 A4	32265501	12x80	78	✓ / ✓	40	130	M10x47	10	0,86
VMZ-A 75 M12-25/120 A4	32323571	12x80	78	✓ / ✓	25	120	M12x37	10	0,85
VMZ-A 75 M12-40/135 A4	32324571	12x80	78	✓ / ✓	40	135	M12x52	10	0,95
VMZ-A 75 M12-60/155 A4	32333501	12x80	78	✓ / ✓	60	155	M12x72	10	1,05
VMZ-A 75 M12-80/175 A4	32336501	12x80	78	✓ / ✓	80	175	M12x92	10	1,20
VMZ-A 70 M12-25/115 A4	32323501	14x75	74	✓ / ✓	25	115	M12x36	10	1,20
VMZ-A 70 M12-40/130 A4	32324501	14x75	74	✓ / ✓	40	130	M12x36	10	1,33
VMZ-A 80 M12-10/110 A4	32305501	14x85	84	✓ / ✓	10	110	M12x21	10	1,17
VMZ-A 80 M12-25/125 A4	32325501	14x85	84	✓ / ✓	25	125	M12x36	10	1,28
VMZ-A 80 M12-50/150 A4	32330501	14x85	84	✓ / ✓	50	150	M12x46	10	1,49
VMZ-A 80 M12-100/200 A4	32345501	14x85	84	✓ / ✓	100	200	M12x71	10	1,93
VMZ-A 80 M12-125/225 A4	32355501	14x85	84	✓ / ✓	125	225	M12x71	10	2,17
VMZ-A 80 M12-165/265 A4	32365501	14x85	84	✓ / ✓	165	265	M12x71	10	2,57
VMZ-A 95 M12-25/140 A4	32327501	14x100	99	✓ / ✓	25	140	M12x36	10	1,40
VMZ-A 100 M12-25/145 A4	32375501	14x105	104	✓ / ✓	25	145	M12x36	10	1,46
VMZ-A 100 M12-60/180 A4	32385501	14x105	104	✓ / ✓	60	180	M12x56	10	1,75
VMZ-A 100 M12-100/220 A4	32390501	14x105	104	✓ / ✓	100	220	M12x84	10	2,12
VMZ-A 110 M12-25/155 A4	32377501	14x115	114	✓ / ✓	25	155	M12x36	10	1,55
VMZ-A 125 M12-25/170 A4	32379501	14x130	129	✓ / ✓	25	170	M12x36	10	1,75
VMZ-A 90 M16-30/145 A4	32555501	18x98	94	✓ / ✓	30	145	M16x44	10	2,20
VMZ-A 90 M16-45/160 A4	32558501	18x98	94	✓ / ✓	45	160	M16x59	10	2,78
VMZ-A 90 M16-60/175 A4	32559501	18 x 98	94	✓ / ✓	60	175	M16x74	10	3,08
VMZ-A 105 M16-30/160 A4	32550501	18x113	109	✓ / ✓	30	160	M16x44	10	2,45
VMZ-A 125 M16-30/180 A4	32515501	18x133	130	✓ / ✓	30	180	M16x44	10	2,78
VMZ-A 125 M16-60/210 A4	32520501	18x133	130	✓ / ✓	60	210	M16x55	10	3,60
VMZ-A 125 M16-100/250 A4	32530501	18x133	130	✓ / ✓	100	250	M16x65	10	4,23
VMZ-A 125 M16-165/315 A4	32540501	18x133	130	✓ / ✓	165	315	M16x90	10	5,25
VMZ-A 145 M16-30/200 A4	32560501	18x153	150	✓ / ✓	30	200	M16x44	10	3,70
VMZ-A 160 M16-30/215 A4	32502501	18x168	165	✓ / ✓	30	215	M16x44	10	3,54
VMZ-A 160 M16-60/245 A4	32504501	18x168	165	✓ / ✓	60	245	M16x55	10	3,98
VMZ-A 160 M16-100/285 A4	32506501	18x168	165	✓ / ✓	100	285	M16x65	10	4,62
VMZ-A 115 M20-30/175 A4	32608501	22x120	120	✓ / ✓	30	175	M20x46	5	2,40
VMZ-A 170 M20-20/225 LG A4	32603501	24x180	180	✓ / ✓	20	225	M20x41	5	3,40
VMZ-A 170 M20-25/230 A4	32605501	24x180	180	✓ / ✓	25	230	M20x33	5	3,52
VMZ-A 170 M20-50/255 A4	32610501	24x180	180	✓ / ✓	50	255	M20x46	5	3,83
VMZ-A 170 M20-100/305 A4	32620501	24x180	180	✓ / ✓	100	305	M20x71	5	4,46
VMZ-A 190 M20-50/275 A4	32612501	24x200	200	✓ / ✓	50	275	M20x46	5	4,20
VMZ-A 170 M24-50/260 A4	32705501	26x185	182	✓ / ✓	50	260	M24x50	5	4,58
VMZ-A 170 M24-100/310 A4	32715501	26x185	182	✓ / ✓	100	310	M24x75	5	5,46
VMZ-A 200 M24-50/290 LG A4	32711501	26x215	212	✓ / ✓	50	290	M24x75	5	5,11
VMZ-A 200 M24-50/290 A4	32710501	26x215	212	✓ / ✓	50	290	M24x50	5	5,11
VMZ-A 200 M24-100/340 A4	32720501	26x215	212	✓ / ✓	100	340	M24x75	5	6,01
VMZ-A 225 M24-50/315 A4	32712501	26x240	237	✓ / ✓	50	315	M24x50	5	5,73

Other lengths or threads on demand.

Conical Stud VMZ-A HCR

Stainless steel HCR

- For use in particularly corrosive environments
- High Corrosion Resistant Steel grade 1.4529
- Version LG: with thread to concrete surface

Description	Ref. No.	Drill hole Ø x depth mm	Setting depth mm	Seismic C1 / C2	Fixture thickness mm	Anchor length mm	Thread mm	Pkg. cont. pcs.	Weight per pkg. kg
VMZ-A 40 M8-15/65 HCR	32115651	10x42	41	- / -	15	65	M8x22	10	0,30
VMZ-A 50 M8-15/80 HCR	32120651	10x55	52	- / -	15	80	M8x22	10	0,36
VMZ-A 50 M8-30/95 HCR	32135651	10x55	52	- / -	30	95	M8x31	10	0,41
VMZ-A 50 M8-45/110 HCR	32145651	10x55	52	- / -	45	110	M8x31	10	0,47
VMZ-A 60 M10-10/85 HCR	32205651	12x65	63	✓ / ✓	10	85	M10x18	10	0,61
VMZ-A 60 M10-20/95 HCR	32220651	12x65	63	✓ / ✓	20	95	M10x27	10	0,66
VMZ-A 60 M10-30/105 HCR	32225651	12x65	63	✓ / ✓	30	105	M10x27	10	0,72
VMZ-A 60 M10-60/135 HCR	32235651	12x65	63	✓ / ✓	60	135	M10x47	10	0,87
VMZ-A 60 M10-100/175 HCR	32245651	12x65	63	✓ / ✓	100	175	M10x57	10	1,10
VMZ-A 75 M10-20/110 HCR	32255651	12x80	78	✓ / ✓	20	110	M10x27	10	0,75
VMZ-A 75 M12-25/120 HCR	32323671	12x80	78	✓ / ✓	25	120	M12x37	10	0,85
VMZ-A 70 M12-25/115 HCR	32323651	14x75	74	✓ / ✓	25	115	M12x36	10	1,20
VMZ-A 80 M12-10/110 HCR	32305651	14x85	84	✓ / ✓	10	110	M12x21	10	1,17
VMZ-A 80 M12-25/125 HCR	32325651	14x85	84	✓ / ✓	25	125	M12x36	10	1,28
VMZ-A 80 M12-50/150 HCR	32330651	14x85	84	✓ / ✓	50	150	M12x46	10	1,49
VMZ-A 80 M12-100/200 HCR	32345651	14x85	84	✓ / ✓	100	200	M12x71	10	1,93
VMZ-A 80 M12-125/225 HCR	32355651	14x85	84	✓ / ✓	125	225	M12x71	10	2,17
VMZ-A 80 M12-165/265 HCR	32365651	14x85	84	✓ / ✓	165	265	M12x71	10	2,57
VMZ-A 95 M12-25/140 HCR	32327651	14x100	99	✓ / ✓	25	140	M12x36	10	1,40
VMZ-A 100 M12-25/145 HCR	32375651	14x105	104	✓ / ✓	25	145	M12x36	10	1,46
VMZ-A 100 M12-60/180 HCR	32385651	14x105	104	✓ / ✓	60	180	M12x56	10	1,75
VMZ-A 100 M12-100/220 HCR	32390651	14x105	104	✓ / ✓	100	220	M12x84	10	2,12
VMZ-A 110 M12-25/155 HCR	32377651	14x115	114	✓ / ✓	25	155	M12x36	10	1,55
VMZ-A 125 M12-25/170 HCR	32379651	14x130	129	✓ / ✓	25	170	M12x36	10	1,75
VMZ-A 90 M16-30/145 HCR	32555651	18x98	94	✓ / ✓	30	145	M16x44	10	2,20
VMZ-A 105 M16-30/160 HCR	32550651	18x113	109	✓ / ✓	30	160	M16x44	10	2,45
VMZ-A 125 M16-30/180 HCR	32515651	18x133	130	✓ / ✓	30	180	M16x44	10	2,78
VMZ-A 125 M16-60/210 HCR	32520651	18x133	130	✓ / ✓	60	210	M16x55	10	3,60
VMZ-A 125 M16-100/250 HCR	32530651	18x133	130	✓ / ✓	100	250	M16x65	10	4,23
VMZ-A 125 M16-165/315 HCR	32540651	18x133	130	✓ / ✓	165	315	M16x90	10	5,25
VMZ-A 145 M16-30/200 HCR	32560651	18x153	150	✓ / ✓	30	200	M16x44	10	3,70
VMZ-A 160 M16-30/215 HCR	32502651	18x168	165	✓ / ✓	30	215	M16x44	10	3,54
VMZ-A 115 M20-30/175 HCR	32608651	22x120	120	✓ / ✓	30	175	M20x46	5	2,40
VMZ-A 170 M20-20/225 LG HCR	32603651	24x180	180	✓ / ✓	20	225	M20x41	5	3,40
VMZ-A 170 M20-25/230 HCR	32605651	24x180	180	✓ / ✓	25	230	M20x33	5	3,52
VMZ-A 170 M20-50/255 HCR	32610651	24x180	180	✓ / ✓	50	255	M20x46	5	3,83
VMZ-A 170 M20-100/305 HCR	32620651	24x180	180	✓ / ✓	100	305	M20x71	5	4,46
VMZ-A 190 M20-50/275 HCR	32612651	24x200	200	✓ / ✓	50	275	M20x46	5	4,20
VMZ-A 170 M24-50/260 HCR	32705651	26x185	182	✓ / ✓	50	260	M24x50	5	4,58
VMZ-A 200 M24-50/290 LG HCR	32705651	26x215	215	✓ / ✓	50	290	M24x75	5	5,11
VMZ-A 200 M24-50/290 HCR	32710651	26x215	215	✓ / ✓	50	290	M24x50	5	5,11
VMZ-A 200 M24-100/340 HCR	32720651	26x215	215	✓ / ✓	100	340	M24x75	5	6,01
VMZ-A 225 M24-50/315 HCR	32712651	26x240	237	✓ / ✓	50	315	M24x50	5	5,73

Other lengths or threads on demand.

Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M und γ_F) s included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 198.

Loads and performance data **Injection System VMZ, steel zinc plated M8-M12**

				40 M8	50 M8	60 M10	75 M10	75 M12	70 M12	80 M12	95 M12	100 M12	110 M12	125 M12
								cracked concrete						
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	12,3	19,5	28,0	29,5	34,9	41,0	48,2	51,6	67,2	67,2	67,2
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	14,6	14,6	23,2	23,2	33,7	33,7	33,7	33,7	33,7	33,7	33,7
Approved loads, tension	C20/25	appr. N	[kN]	4,1	5,8	7,6	10,7	10,7	9,6	11,7	15,2	16,4	18,9	22,9
	C25/30	appr. N	[kN]	4,6	6,5	8,5	11,9	11,9	10,7	13,1	17,0	18,3	21,1	25,6
	C30/37	appr. N	[kN]	5,1	7,1	9,3	11,9	13,0	11,8	14,3	18,6	20,1	23,2	27,1
	C40/50	appr. N	[kN]	5,9	8,2	10,8	11,9	15,1	13,6	16,6	21,5	23,2	26,7	27,1
	C50/60	appr. N	[kN]	6,6	8,6	11,9	11,9	16,7	15,2	18,5	24,0	25,9	27,1	27,1
								uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,3	8,3	10,9	11,9	15,2	13,7	16,8	19,0	23,4	23,8	23,8
	C25/30	appr. N	[kN]	4,8	8,6	11,9	11,9	16,7	15,3	18,7	21,3	26,2	26,6	26,6
	C30/37	appr. N	[kN]	5,2	8,6	11,9	11,9	16,7	16,8	20,5	23,3	27,1	27,1	27,1
	C40/50	appr. N	[kN]	6,1	8,6	11,9	11,9	16,7	19,4	23,7	25,7	27,1	27,1	27,1
	C50/60	appr. N	[kN]	6,8	8,6	11,9	11,9	16,7	21,7	25,7	25,7	27,1	27,1	27,1
								cracked / uncracked concrete						
Approved loads, shear	≥ C20/25	appr. V	[kN]	8,0	8,0	12,0	12,0	19,4	19,2/19,4	19,4	19,4	19,4	19,4	19,4
Approved loads, shear Type LG	≥ C20/25	appr. V	[kN]	8,0	8,0	12,0	12,0	19,4	19,4	19,4	19,4	19,4	19,4	19,4
Approved bending moments		appr. M	[Nm]	17,1	17,1	34,3	34,3	60,0	60,0	60,0	60,0	60,0	60,0	60
Spacing and edge distance														
Effective anchorage depth		h_{ef} ≥	[mm]	40	50	60	75	75	70	80	95	100	110	125
Characteristic spacing		$s_{cr,N}$	[mm]	120	150	180	225	225	210	240	285	300	330	375
Characteristic edge distance		$c_{cr,N}$	[mm]	60	75	90	112,5	112,5	105	120	142,5	150	165	187,5
								cracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum spacing		s_{min}	[mm]	40	40	40	40	50	55	40	40	50	50	50
Minimum edge distance		c_{min}	[mm]	40	40	40	40	50	55	50	50	50	50	50
								uncracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum spacing		s_{min}	[mm]	40	40	50	50	50	55	55	55	80[1)]	80[1)]	80[1)]
Minimum edge distance		c_{min}	[mm]	40	40	50	50	50	55	55	55	55[1)]	55[1)]	55[1)]
Installation parameters														
Drill hole diameter		d_o	[mm]	10	10	12	12	12	14	14	14	14	14	14
Diameter of clearance hole in the fixture Pre-installation		d_f ≤	[mm]	9	9	12	12	14	14	14	14	14	14	14
Diameter of clearance hole in the fixture Through fastening[2)]		d_f ≤	[mm]	- [4)]	- [4)]	14	14	16[5)]	16	16	16	16	16	16
Depth of drill hole		h_o ≥	[mm]	42	55	65	80	80	75	85	100	105	115	130
Installation torque		Tinst ≤	[Nm]	10	10	15	15	25	25	25	25	30	30	30
Width across nut		SW	[mm]	13	13	17	17	19	19	19	19	19	19	19
Amount of adhesive; Scale on cartridge VMZ 345			[mm]	2	3	4	4	4	4	5	6	6	6	6
Amount of adhesive per drill hole[3)]			[ml]	3,4	4,1	6,1	7,0	7,0	6,8	8,6	9,0	9,2	9,4	9,6
Add. amount of adhesive per drill hole for Through fastening per 10mm of fixture thickness			[ml/ 10mm]	-	-	1,0	1,0	0,7	1,2	1,2	1,2	1,2	1,2	1,2
Drill holes per cartridge[3)] VMZ 150/VMZ 280			[Quan.]	31/70	26/58	18/39	15/34	15/34	16/35	12/27	12/26	11/26	11/25	11/24
Drill holes per cartridge[3)] VMZ 345			[Quan.]	88	73	49	43	43	44	34	33	32	32	31
Drill holes per cartridge[3)] VMZ 420			[Quan.]	111	92	62	54	54	55	44	42	41	40	39

[1)] For edge distance c ≥ 80 mm, minimal spacing distance s_{min} = 55 mm

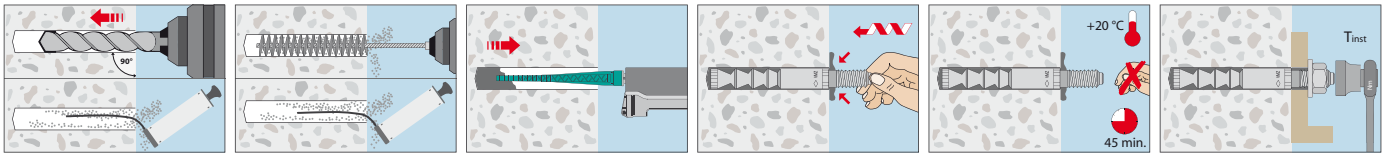
[2)] The annular gap of the clearance hole must be completely filled with adhesive after fixing.

[3)] Values shown are for pre-installation. For through fastening additional adhesive is required to completely fill the clearance hole in the fixture.

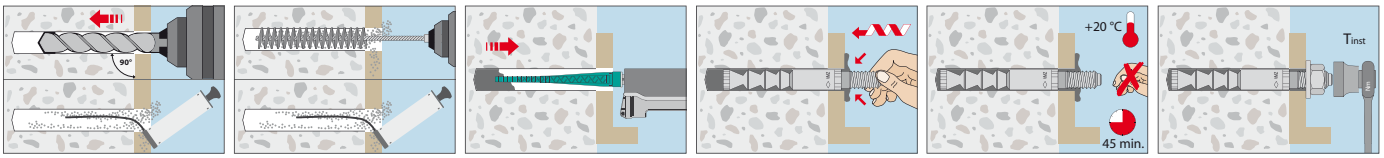
[4)] Not for use in through fastening applications.

[5)] 14mm with offset mounting

Installation (Pre-installation)



Installation (Through fastening)



Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 198.

Loads and performance data **Injection System VMZ, steel zinc plated M16-M24**

				90 M16	105 M16	125 M16	145 M16	160 M16	115 M20	170 M20 170 M20 LG	190 M20 190 M20 LG	170 M24 170 M24 LG	200 M24 200 M24 LG	225 M24 225 M24 LG
								cracked concrete						
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	49,0	74,8	108,7	108,7	114,7	103,3	149,6	149,6	146,2	200,9	200,9
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	62,8	62,8	62,8	62,8	62,8	68,6	150,7(98,0[3])	150,7(98,0[3])	179,5(140,8[3])	179,5(140,8[3])	179,5(140,8[3])
Approved loads, tension	C20/25	appr. N	[kN]	14,0	17,6	22,9	28,6	33,2	20,2	36,3	42,9	36,3	46,4	55,3
	C25/30	appr. N	[kN]	15,7	19,7	25,6	32,0	37,1	22,6	40,6	48,0	40,6	51,9	61,9
	C30/37	appr. N	[kN]	17,1	21,6	28,1	35,1	40,6	24,8	44,5	52,6	44,5	56,8	67,8
	C40/50	appr. N	[kN]	19,8	25,0	32,4	40,5	46,2	28,6	51,4	60,7	51,4	65,6	78,3
	C50/60	appr. N	[kN]	22,1	27,9	36,2	45,3	46,2	32,0	57,4	67,9	57,4	73,3	87,5
								uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	20,0	25,2	32,7	35,7	42,9	28,9	51,9	61,3	51,9	66,2	79,0
	C25/30	appr. N	[kN]	22,4	28,2	36,6	39,9	46,2	32,3	58,0	68,6	58,0	74,1	88,4
	C30/37	appr. N	[kN]	24,5	30,9	40,1	43,7	46,2	35,4	63,6	75,1	63,6	81,1	96,8
	C40/50	appr. N	[kN]	28,3	35,6	46,3	50,5	46,2	40,8	73,4	86,7	73,4	93,7	105,7
	C50/60	appr. N	[kN]	31,6	39,8	51,8	52,9	46,2	40,8	82,1	89,5	82,1	104,7	105,7
								cracked / uncracked concrete						
Approved loads, shear	≥ C20/25	appr. 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	101,8
Approved loads, shear Type LG	≥ C20/25	appr. V	[kN]	28,0/36,0	35,3/36,0	36,0	36,0	36,0	35,7	56,0	56,0	72,7/80,6	80,6	80,6
Approved bending moments		appr. M	[Nm]	152,0	152,0	152,0	152,0	152,0	200,0	296,6	296,6	512,0	512,0	512,0
Spacing and edge distance														
Effective anchorage depth		h_{ef} ≥	[mm]	90	105	125	145	160	115	170	190	170	200	225
Characteristic spacing		$s_{cr,N}$	[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 thickness of concrete slab		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum spacing		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 thickness of concrete slab		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum spacing		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
Installation parameters														
Drill hole diameter		d_o	[mm]	18	18	18	18	18	22	24	24	26	26	26
Diameter of clearance hole in the fixture Pre-installation		d_f ≤	[mm]	18	18	18	18	18	22	24 (22[3])	24 (22[3])	26	26	26
Diameter of clearance hole in the fixture Through fastening[1]		d_f ≤	[mm]	20	20	20	20	20	24	26	26	28	28	28
Depth of drill hole		h_o ≥	[mm]	98	113	133	153	168	120	180	200	185	215	240
Installation torque		Tinst ≤	[Nm]	50	50	50	50	50	80	80	80	100	120	120
Width across nut		SW	[mm]	24	24	24	24	24	30	30	30	36	36	36
Amount of adhesive; Scale on cartridge VMZ 345			[mm]	7	8	9	9	10	12	17	19	20	21	23
Amount of adhesive per drill hole[2]			[ml]	11,1	12,6	14,5	15,8	17,4	20,8	30,1	32,2	33,3	36,6	41,3
Add. amount of adhesive per drill hole for Through fastening per 10mm of fixture 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 150/VMZ 280			[Quan.]	9/21	8/19	7/16	6/15	6/13	5/11	3/7	3/7	3/7	3/6	2/5
Drill holes per cartridge[2] VMZ 345			[Quan.]	27	23	20	19	17	14	10	9	9	8	7
Drill holes per cartridge[2] VMZ 420			[Quan.]	34	30	26	24	21	18	12	11	11	10	9

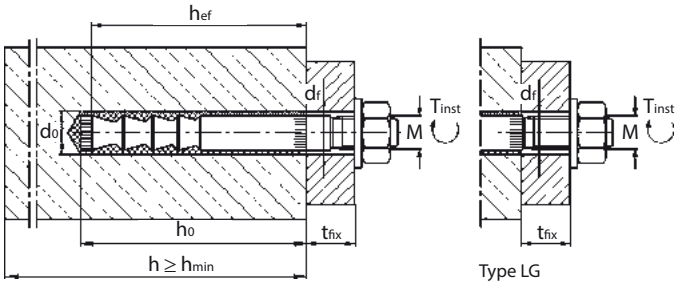
[1] The annular gap of the clearance hole must be completely filled with adhesive after fixing.

[2] Values shown are for pre-installation. For through fastening additional adhesive is required to completely fill the clearance hole in the fixture.

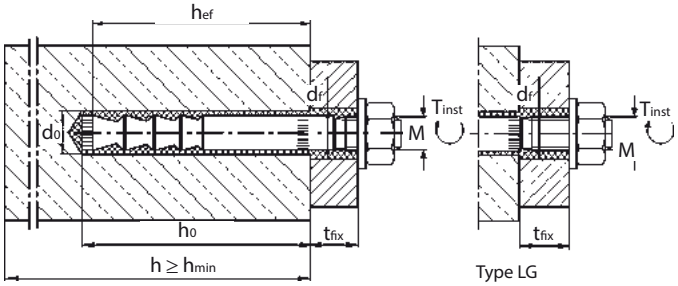
[3] Values in brackets are for Type LG

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

Pre-installation



Through fastening



Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 198.

Loads and performance data **Injection System VMZ Stainless steel A4 / HCR M8-M12**

				40 M8	50 M8	60 M10	75 M10	75 M12	70 M12	80 M12	95 M12	100 M12	110 M12	125 M12
								cracked concrete						
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	12,3	19,5	28,0	29,5	34,9	41,0	48,2	51,6	67,2	67,2	67,2
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	17,6	17,6	27,8	27,8	40,5	40,5	40,5	40,5	40,5	40,5	40,5
Approved loads, tension	C20/25	appr. N	[kN]	4,1	5,8	7,6	10,7	10,7	9,6	11,7	15,2	16,4	18,9	22,9
	C25/30	appr. N	[kN]	4,6	6,5	8,5	11,9	11,9	10,7	13,1	17,0	18,3	21,1	25,6
	C30/37	appr. N	[kN]	5,1	7,1	9,3	11,9	13,0	11,8	14,3	18,6	20,1	23,2	27,1
	C40/50	appr. N	[kN]	5,9	8,2	10,8	11,9	15,1	13,6	16,6	21,5	23,2	26,7	27,1
	C50/60	appr. N	[kN]	6,6	8,6	11,9	11,9	16,7	15,2	18,5	24,0	25,9	27,1	27,1
								uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,3	8,3	10,9	11,9	15,2	13,7	16,8	19,0	23,4	23,8	23,8
	C25/30	appr. N	[kN]	4,8	8,6	11,9	11,9	16,7	15,3	18,7	21,3	26,2	26,6	26,6
	C30/37	appr. N	[kN]	5,2	8,6	11,9	11,9	16,7	16,8	20,5	23,3	27,1	27,1	27,1
	C40/50	appr. N	[kN]	6,1	8,6	11,9	11,9	16,7	19,4	23,7	25,7	27,1	27,1	27,1
	C50/60	appr. N	[kN]	6,8	8,6	11,9	11,9	16,7	21,7	25,7	25,7	27,1	27,1	27,1
								cracked / uncracked concrete						
Approved loads, shear	≥ C20/25	appr. V	[kN]	8,3/8,6	8,6	13,1	13,1	19,4	19,2/19,4	19,4	19,4	19,4	19,4	19,4
Approved loads, shear Type LG	≥ C20/25	appr. V	[kN]	8,3/8,6	8,6	13,1	13,1	19,4	19,2/19,4	19,4	19,4	19,4	19,4	19,4
Approved bending moments		appr. M	[Nm]	17,1	17,1	34,3	34,3	60,0	60,0	60,0	60,0	60,0	60,0	60,0
Spacing and edge distance														
Effective anchorage depth		h_{ef} ≥	[mm]	40	50	60	75	75	70	80	95	100	110	125
Characteristic spacing		$s_{cr,N}$	[mm]	120	150	180	225	225	210	240	285	300	330	375
Characteristic edge distance		$c_{cr,N}$	[mm]	60	75	90	112,5	112,5	105	120	142,5	150	165	187,5
								cracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum spacing		s_{min}	[mm]	40	40	40	40	50	55	40	40	50	50	50
Minimum edge distance		c_{min}	[mm]	40	40	40	40	50	55	50	50	50	50	50
								uncracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	110	130	130	140	160
Minimum spacing		s_{min}	[mm]	40	40	50	50	50	55	55	55	80[1)]	80[1)]	80[1)]
Minimum edge distance		c_{min}	[mm]	40	40	50	50	50	55	55	55	55[1)]	55[1)]	55[1)]
Installation parameters														
Drill hole diameter		d_o	[mm]	10	10	12	12	12	14	14	14	14	14	14
Diameter of clearance hole in the fixture Pre-installation		d_f ≤	[mm]	9	9	12	12	14	14	14	14	14	14	14
Diameter of clearance hole in the fixture Through fastening[2)]		d_f ≤	[mm]	-[4)]	-[4)]	14	14	16[5)]	16	16	16	16	16	16
Depth of drill hole		h_o ≥	[mm]	42	55	65	80	80	75	85	100	105	115	130
Installation torque		T_{inst} ≤	[Nm]	10	10	15	15	25	25	25	25	30	30	30
Width across nut		SW	[mm]	13	13	17	17	19	19	19	19	19	19	19
Amount of adhesive; Scale on cartridge VMZ 345			[mm]	2	3	4	4	4	4	5	6	6	6	6
Amount of adhesive per drill hole[3)]			[ml]	3,4	4,1	6,1	7,0	7,0	6,8	8,6	9,0	9,2	9,4	9,6
Add. amount of adhesive per drill hole for Through fastening per 10mm of fixture thickness			[ml/ 10mm]	-	-	1,0	1,0	0,7	1,2	1,2	1,2	1,2	1,2	1,2
Drill holes per cartridge[3)] VMZ 150/VMZ 280			[Quan.]	31/70	26/58	18/39	15/34	15/34	16/35	12/27	12/26	11/26	11/25	11/24
Drill holes per cartridge[3)] VMZ 345			[Quan.]	88	73	49	43	43	44	34	33	32	32	31
Drill holes per cartridge[3)] VMZ 420			[Quan.]	111	92	62	54	54	55	44	42	41	40	39

[1)] For edge distance c ≥ 80 mm, minimal spacing distance s_{min} = 55 mm

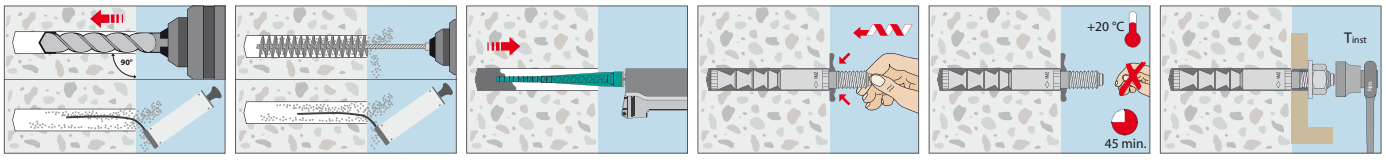
[2)] The annular gap of the clearance hole must be completely filled with adhesive after fixing.

[3)] Values shown are for pre-installation. For through fastening additional adhesive is required to completely fill the clearance hole in the fixture.

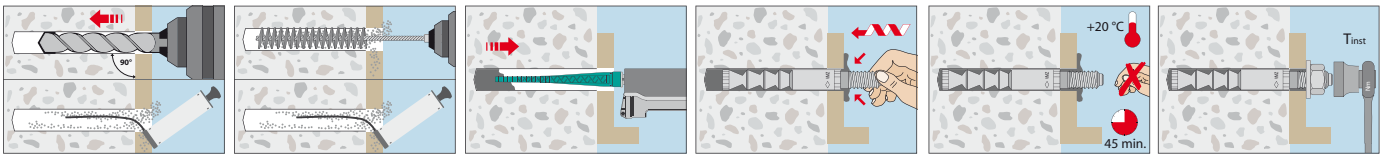
[4)] Not for use in through fastening applications.

[5)] 14mm with offset mounting

Installation (Pre-installation)



Installation (Through fastening)



Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 198.

Loads and performance data **Injection System VMZ Stainless steel A4 / HCR M16-M24**

				90 M16	105 M16	125 M16	145 M16	160 M16	115 M20	170 M20 170 M20 LG	190 M20 190 M20 LG	170 M24 170 M24 LG	200 M 24 200 M 24 LG	225 M24 225 M24 LG
									cracked concrete					
Mean ultimate loads, tension	C25/30	N_{um}	[kN]	49,0	74,8	108,7	108,7	114,7	103,3	149,6	149,6	146,2	200,9	200,9
Mean ultimate loads, shear	C25/30	V_{um}	[kN]	75,4	75,4	75,4	75,4	75,4	102,9	158,2(102,9[3])	158,2(102,9[3])	188,4(147,8[3])	188,4(147,8[3])	188,4(147,8[3])
Approved loads, tension	C20/25	appr. N	[kN]	14,0	17,6	22,9	28,6	33,2	20,2	36,3	42,9	36,3	46,4	55,3
	C25/30	appr. N	[kN]	15,7	19,7	25,6	32,0	37,1	22,6	40,6	48,0	40,6	51,9	61,9
	C30/37	appr. N	[kN]	17,1	21,6	28,1	35,1	40,6	24,8	44,5	52,6	44,5	56,8	67,8
	C40/50	appr. N	[kN]	19,8	25,0	32,4	40,5	46,2	28,6	51,4	60,7	51,4	65,6	78,3
	C50/60	appr. N	[kN]	22,1	27,9	36,2	45,3	46,2	32,0	57,4	67,9	57,4	73,3	87,5
									uncracked concrete					
Approved loads, tension	C20/25	appr. N	[kN]	20,0	25,2	32,7	35,7	42,9	28,9	51,9	61,3	51,9	66,2	79,0
	C25/30	appr. N	[kN]	22,4	28,2	36,6	39,9	46,2	32,3	58,0	68,6	58,0	74,1	88,4
	C30/37	appr. N	[kN]	24,5	30,9	40,1	43,7	46,2	35,4	63,6	75,1	63,6	81,1	92,4
	C40/50	appr. N	[kN]	28,3	35,6	46,3	50,5	46,2	40,9	73,4	78,6	73,4	92,4	92,4
	C50/60	appr. N	[kN]	31,6	39,8	51,8	52,9	46,2	45,7	78,6	78,6	82,1	92,4	92,4
									cracked / uncracked concrete					
Approved loads, shear	≥ C20/25	appr. 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
Approved loads, shear Type LG	≥ C20/25	appr. V	[kN]	28,0/36,0	35,3/36,0	36,0	36,0	36,0	40,4/43,9	49,1	49,1	70,3	70,3	70,3
Approved bending moments		appr. M	[Nm]	152,0	152,0	152,0	152,0	152,0	231,6	259,4	259,4	448,0	448,0	448,0
Spacing and edge distance														
Effective anchorage depth		h_{ef} ≥	[mm]	90	105	125	145	160	115	170	190	170	200	225
Characteristic spacing		$s_{cr,N}$	[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 thickness of concrete slab		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum spacing		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 thickness of concrete slab		h_{min}	[mm]	130	150	170	190	205	160	230	250	230	270	300
Minimum spacing		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
Installation parameters														
Drill hole diameter		d_o	[mm]	18	18	18	18	18	22	24	24	26	26	26
Diameter of clearance hole in the fixture Pre-installation		d_f ≤	[mm]	18	18	18	18	18	22	24 (22[3])	24 (22[3])	26	26	26
Diameter of clearance hole in the fixture Through fastening[1]		d_f ≤	[mm]	20	20	20	20	20	24	26	26	28	28	28
Depth of drill hole		h_o ≥	[mm]	98	113	133	153	168	120	180	200	185	215	240
Installation torque		T_{inst} ≤	[Nm]	50	50	50	50	50	80	80	80	100	120	120
Width across nut		SW	[mm]	24	24	24	24	24	30	30	30	36	36	36
Amount of adhesive; Scale on cartridge VMZ 345			[mm]	7	8	9	9	10	12	17	19	20	21	23
Amount of adhesive per drill hole[2]			[ml]	11,1	12,6	14,5	15,8	17,4	20,8	30,1	32,2	33,3	36,6	41,3
Add. amount of adhesive per drill hole for Through fastening per 10mm of fixture 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 150/VMZ 280			[pcs.]	9/21	8/19	7/16	6/15	6/13	5/11	3/7	3/7	3/7	3/6	2/5
Drill holes per cartridge[2] VMZ 345			[pcs.]	27	23	20	19	17	14	10	9	9	8	7
Drill holes per cartridge[2] VMZ 420			[pcs.]	34	30	26	24	21	18	12	11	11	10	9

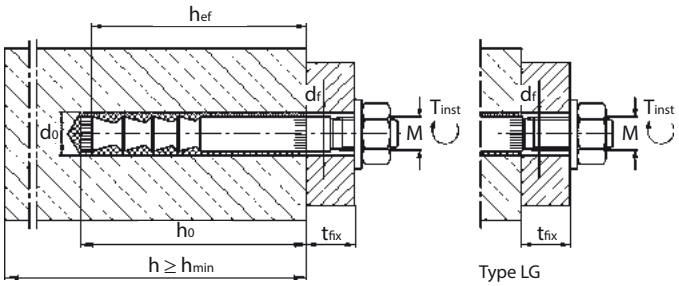
[1] The annular gap of the clearance hole must be completely filled with adhesive after fixing.

[2] Values shown are for pre-installation. For through fastening additional adhesive is required to completely fill the clearance hole in the fixture.

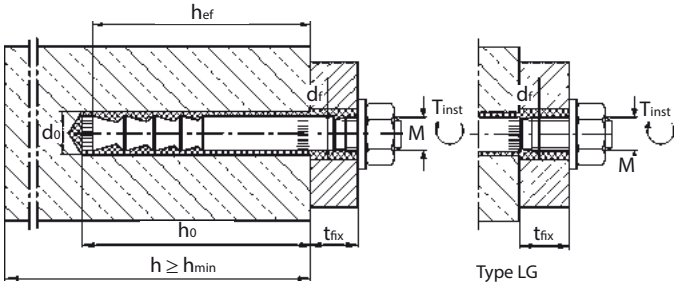
[3] Values in brackets are for Type LG

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

Pre-installation



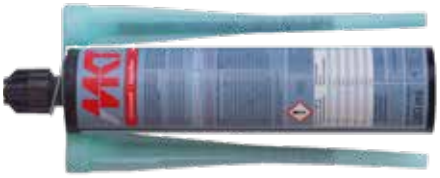
Through fastening



Injection System VMZ-IG

Conical Stud VMZ-IG
with internal thread

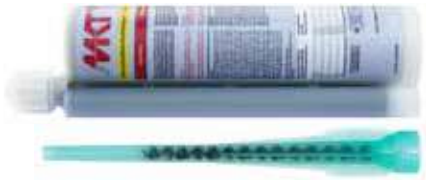
Cartridge VMZ 150
Coaxial Cartridge
for silicone guns
Content: 150ml



Cartridge VMZ 280
Coaxial Cartridge
for silicone guns
Content: 280ml, incl. 2
Static mixer on Cartridge

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

Cartridge VMZ 420
Coaxial Cartridge
Content: 420ml



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

F30-F120

IG M8-
IG M20 HCR

IG M8-
IG M20

system combines the benefits of bonded anchors and expansion anchors in a European technical approved fastening system for both cracked and uncracked concrete. The variety of screws, threaded studs and nuts that can be used for fastening opens up a wide range of application and design options. Hammer drills, diamond drills or suction drills can be used to create the drill holes. When using the hollow drill bit SB, contamination and fine dust exposure of the respiratory tract are reduced to a minimum and subsequent drill hole cleaning is not necessary.

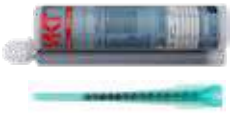
Advantages
- Approved in cracked and uncracked concrete
- Very high loads with low anchorage depths and component thicknesses
- No load reduction for wet or water-filled drill holes (drill holes d_0=14mm and larger)
- Fire test report for all dimensions
- Fire test report according to ZTV tunnel temperature curve for threaded studs VMZ-IG M8 HCR-VMZ-IG M20 HCR
- Wide range of application and design options as various screws, threaded studs and nuts (galvanized steel: FKL ≥8.8, stainless steel A4, HCR: FKL ≥70) can be used for fastening
- Also suitable for architecturally demanding applications
- No projection parts after de-installation of fixture
- Styrene-free 2 component adhesive on vinyl ester basis for approved processing from a substrate temperature of -15°C
- Styrene-free injection adhesive VMZ 345 express for fast curing
- Opened cartridges can be re-used with a new mixer nozzle
- Drill hole creation with hammer drill, diamant drill or suction drill

Applications
Heavy duty fastenings in cracked and uncracked concrete with standards screws or threaded studs: Steel structures, brackets, railings, posts, columns, ladders, gates

Range of loading:	**3,1 kN–51,9 kN**
Range of concrete quality:	**C20/25–C50/60**
Material:	**Steel, zinc plated, Stainless steel A4, Stainless steel HCR**

Description
The Injection System VMZ-IG consists of an internally threaded sleeve 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

Injection Cartridge VMZ



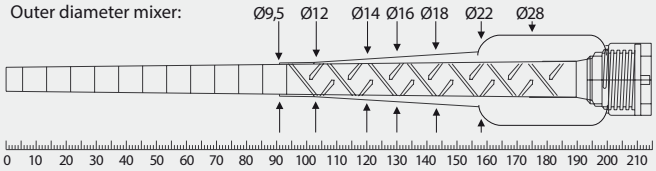
- Two component cartridge, styrene-free
- Various cartridge systems
- Approved for cracked and uncracked concrete

Description	Ref. No.	Content ml	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 VM-X comes with each cartridge.
[1]Cartridge VMZ 280 comes with 2 mixers.

Usable length Static mixer VM-X

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



Curing Time Injection Adhesive VMZ

- Cartridge temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
-15°C to -10°C	45 min	7 d	14 d[1]
-9°C to -5°C	45 min	10:30 h	21:00 h[1]
-4°C to -1°C[1]	45 min	6:00 h	12:00 h[2]
0°C to +4°C	20 min	3:00 h	6:00 h
+5°C to +9°C	12 min	2:00 h	4:00 h
+10°C to +19°C	6 min	1:20 h	2:40 h
+20°C to +29°C	4 min	45 min	1:30 h
+30°C to +34°C	2 min	25 min	50 min
+35°C to +39°C	1,4 min	20 min	40 min
+40°C	1,4 min	15 min	30 min

[1]It must be ensured that icing does not occur in the drill hole.

Curing Time Injection Adhesive VMZ express

- Cartridge temperature when installing min. +5°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
-5°C to -1°C	20 min	4:00 h	8:00 h[1]
0°C to +4°C	10 min	2:00 h	4:00 h
+5°C to +9°C	6 min	1:00 h	2:00 h
+10°C to +19°C	3 min	40 min	80 min
+20°C to +29°C	1 min	20 min	40 min
+30°C	1 min	10 min	20 min

[1]It must be ensured that icing does not occur in the drill hole.

Accessories for Injection System VMZ-IG

VMZ-IG Internally threaded anchor	Drill bit Ø mm	Blow-out pump[1] / Air gun[1]	Cleaning brush RB[1]	Extension tube	Dispenser
VMZ-IG M6	10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
VMZ-IG M8	12	VM-AP 360 VM-ABP 200	RB 12 M6 / RB 12 M8	VM-XE 10	
VMZ-IG M10	14	VM-AP 360 VM-ABP 200	RB 14 M6 / RB 14 M8	VM-XE 10	
VMZ-IG M12	18	VM-AP 360 VM-ABP 200 / 250 / 500	RB 18 M6 / RB 18 M8	VM-XE 10	
VMZ-IG 115 M16	22	VM-ABP 250 / 500	RB 22 M6	VM-XE 10	
VMZ-IG 170 M16	24	VM-ABP 250 / 500	RB 24 M6	VM-XE 10	
VMZ-IG M20	26	VM-ABP 250 / 500	RB 26 M6	VM-XE 10	
See page		**178**	**179**	**180**	**181 / 182**

[1]When using the hollow drill bit SB (see page 177), subsequent cleaning is no longer necessary. In the case of diamond drilled holes, the drill hole is rinsed with water and blown out with compressed air (see ETA-04/0092).

Conical Stud VMZ-IG

Steel, zinc plated

- For use in structures subject to dry internal conditions
- With internal thread, to be used with standard screws or threaded studs (steel strength 8.8)

Description	Ref. No.	Drill hole Ø x depth mm	Effective anchorage depth	Anchor length mm	Thread	Pkg. cont. pcs.	Weight per pkg. kg
VMZ-IG 40 M6	32802101	10x42	40	41	M6x12	10	0,15
VMZ-IG 50 M6	32804101	10x55	50	52	M6x15	10	0,18
VMZ-IG 60 M8	32812101	12x65	60	63	M8x16	10	0,28
VMZ-IG 75 M8	32814101	12x80	75	78	M8x19	10	0,47
VMZ-IG 70 M10	32822101	14x80	70	74	M10x20	10	0,57
VMZ-IG 80 M10	32824101	14x85	80	84	M10x23	10	0,63
VMZ-IG 90 M12	32832101	18x98	90	94	M12x24	10	1,26
VMZ-IG 105 M12	32834101	18x113	105	109	M12x27	10	1,45
VMZ-IG 125 M12	32836101	18x133	125	130	M12x30	10	1,69
VMZ-IG 115 M16	32852101	22x120	115	120	M16x32	5	1,12
VMZ-IG 170 M16	32854101	24x180	170	180	M16x32	5	2,22
VMZ-IG 170 M20	32862101	26x185	170	182	M20x40	5	2,44

Conical Stud VMZ-IG A4

Stainless steel A4 / 316

- For use in structures subject to dry internal conditions or external atmospheric exposure
- With internal thread, to be used with standard screws or threaded studs (steel strength 8.8)

Description	Ref. No.	Drill hole Ø x depth mm	Effective anchorage depth	Anchor length mm	Thread	Pkg. cont. pcs.	Weight per pkg. kg
VMZ-IG 40 M6 A4	32802501	10x42	40	41	M6x12	10	0,15
VMZ-IG 50 M6 A4	32804501	10x55	50	52	M6x15	10	0,18
VMZ-IG 60 M8 A4	32812501	12x65	60	63	M8x16	10	0,28
VMZ-IG 75 M8 A4	32814501	12x80	75	78	M8x19	10	0,47
VMZ-IG 70 M10 A4	32822501	14x80	70	74	M10x20	10	0,57
VMZ-IG 80 M10 A4	32824501	14x85	80	84	M10x23	10	0,63
VMZ-IG 90 M12 A4	32832501	18x98	90	94	M12x24	10	1,26
VMZ-IG 105 M12 A4	32834501	18x113	105	109	M12x27	10	1,45
VMZ-IG 125 M12 A4	32836501	18x133	125	130	M12x30	10	1,69
VMZ-IG 115 M16 A4	32852501	22x120	115	120	M16x32	5	1,12
VMZ-IG 170 M16 A4	32854501	24x180	170	180	M16x32	5	2,22
VMZ-IG 170 M20 A4	32862501	26x185	170	182	M20x40	5	2,44

HCR on demand.

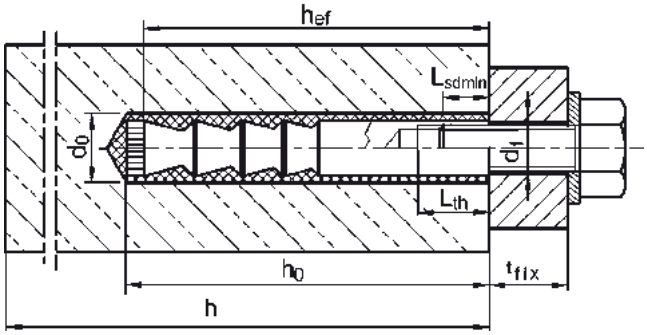
Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA.

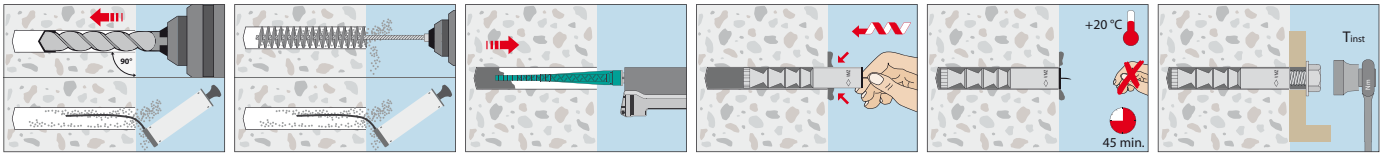
Loads and performance data — **Injection System VMZ-IG, steel zinc plated and stainless steel A4 / HCR**

				40 M6	50 M6	60 M8	75 M8	70 M10	80 M10	90 M12	105 M12	125 M12	115 M16	170 M16	170 M20
VMZ-IG, steel zinc plated									cracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,1	5,8	7,6	10,7	9,6	11,7	14,0	17,6	22,9	20,2	36,3	36,3
									uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,3	7,6	9,0	13,8	13,7	16,7	20,0	25,2	31,9	24,8	51,9	51,4
									cracked and uncracked concrete						
Approved loads, shear	≥ C20/25	appr. V	[kN]	4,6	4,6	5,4	8,6	10,3	10,3	19,4	19,4	19,4	14,9	36,0	30,9
Approved bending moments		appr. M	[Nm]	6,9	6,9	17,1	17,1	34,3	34,3	60,0	60,0	60,0	121,1	152,0	296,6
VMZ-IG, stainless steel A4 /HCR									cracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,1	5,2	7,6	10,0	9,6	11,7	14,0	17,6	22,4	20,2	36,3	36,3
									uncracked concrete						
Approved loads, tension	C20/25	appr. N	[kN]	4,3	5,2	9,0	10,0	13,7	15,7	20,0	22,4	22,4	28,9	41,9	44,8
									cracked and uncracked concrete						
Approved loads, shear	≥ C20/25	appr. V	[kN]	3,1	3,1	5,4	5,7	9,1	9,1	13,7	13,7	13,7	18,3	25,1	26,9
Approved bending moments		appr. M	[Nm]	4,9	4,9	12,0	12,0	24,0	24,0	42,3	42,3	42,3	106,9	106,9	208,6
Spacing and edge distance															
Effective anchorage depth		h_{ef}	[mm]	40	50	60	75	70	80	90	105	125	115	170	170
Characteristic spacing		$s_{cr,N}$	[mm]	120	150	180	225	210	240	270	315	375	345	510	510
Characteristic edge distance		$c_{cr,N}$	[mm]	60	75	90	112,5	105	120	135	157,5	187,5	172,5	255	255
									cracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	130	150	170	160	230	230
Minimum spacing		s_{min}	[mm]	40	40	40	40	55	40	50	50	60	80	80	80
Minimum edge distance		c_{min}	[mm]	40	40	40	40	55	50	50	50	60	80	80	80
									uncracked concrete						
Minimum thickness of concrete slab		h_{min}	[mm]	80	80	100	110	110	110	130	150	170	160	230	230
Minimum spacing		s_{min}	[mm]	40	40	50	50	55	55	50	60	60	80	80	80
Minimum edge distance		c_{min}	[mm]	40	40	50	50	55	55	50	60	60	80	80	80
Installation parameters															
Drill hole diameter		d_o	[mm]	10	10	12	12	14	14	18	18	18	22	24	26
Diameter of clearance hole in the fixture		d_f	[mm]	7	7	9	9	12	12	14	14	14	18	18	22
Depth of drill hole		h_o	[mm]	42	55	65	80	80	85	98	113	133	120	180	185
Installation torque		$T_{inst} \leq$	[Nm]	8	8	10	10	15	15	25	25	25	50	50	80
Minimum screwing depth		L_{sdmin}	[mm]	7	7	9	9	12	12	14	14	14	18	18	22
Maximum screwing depth		L_{th}	[mm]	12	15	16	19	20	23	24	27	30	32	32	40
Amount of adhesive per drill hole			[ml]	3,4	4,1	6,1	7,0	6,8	8,6	11,1	12,6	14,5	20,8	30,1	33,3
Drill holes per cartridge VMZ 150/VMZ 280			pcs.	31/70	26/58	18/39	15/34	16/35	12/27	9/21	8/19	7/16	5/11	3/7	3/7
Drill holes per cartridge VMZ 345			pcs.	88	73	49	43	44	34	27	23	20	14	10	9
Drill holes per cartridge VMZ 420			pcs.	111	92	62	54	55	44	34	30	26	18	12	11

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



Installation



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 280
Coaxial Cartridge
for silicone guns
Content: 280ml, incl. 2 Static mixer on Cartridge

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 uncracked concrete. There are threaded studs available for the various applications for through fastening (pre-assembled) and for pre-installation in galvanized steel, A4 stainless steel and HCR high corrosion resistant stainless steel. The drill holes can also be created with the hollow drill bit SB, the use of which reduces contamination and fine dust exposure of the respiratory tract to a minimum.

Advantages
- Approved in cracked and uncracked concrete under fatigue cyclic loading
- Low anchorage depths and component thicknesses
- Very high loads in axial and oblique tension
- Higher loads, if the number of load cycles is limited
- The design can distinguish between static and non-static loads
- No load reduction for wet or water-filled drill holes
- Approved processing from -15°C substrate temperature
- Two different versions for optimum adaptation to the application conditions:
  - VMZ-A dynamic: pre-assembled for quick through fastening
  - VMZ-AV dynamic: flexible, suitable for pre-installation and through fastening
- Special nut and washer to account for angular misalignment
- Fire test report for all dimensions
- Fire test report according to ZTV tunnel temperature curve for threaded studs of HCR high corrosion resistant stainless steel
- Standard and fast-curing express adhesive made of styrene-free, 2 component adhesive on vinyl ester basis
- Opened cartridges can be re-used with a new mixer nozzle
- Drill hole creation with hammer drill or hollow drill bit

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

Injection Cartridge VMZ

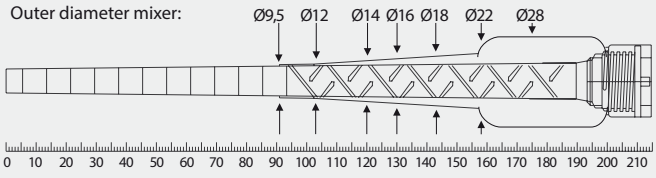
- Two component cartridge, styrene-free
- Various cartridge systems
- Approved for cracked and uncracked concrete

Description	Ref. No.	Content ml	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 comes with each cartridge.
[1)]Cartridge VMZ 280 comes with 2 mixers.

Usable length Static mixer VM-X

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



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
-15°C to -10°C	45 min	7 d	14 d[1)]
-9°C to -5°C	45 min	10:30 h	21:00 h[1)]
-4°C to -1°C[1)]	45 min	6:00 h	12:00 h[2)]
0°C to +4°C	20 min	3:00 h	6:00 h
+5°C to +9°C	12 min	2:00 h	4:00 h
+10°C to +19°C	6 min	1:20 h	2:40 h
+20°C to +29°C	4 min	45 min	1:30 h
+30°C to +34°C	2 min	25 min	50 min
+35°C to +39°C	1,4 min	20 min	40 min
+40°C	1,4 min	15 min	30 min

[1)]It must be ensured that icing does not occur in the drill hole.

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
-5°C to -1°C	20 min	4:00 h	8:00 h[1)]
0°C to +4°C	10 min	2:00 h	4:00 h
+5°C to +9°C	6 min	1:00 h	2:00 h
+10°C to +19°C	3 min	40 min	80 min
+20°C to +29°C	1 min	20 min	40 min
+30°C	1 min	10 min	20 min

[1)]It must be ensured that icing does not occur in the drill hole.

Accessories for injection system VMZ dynamic

VMZ-A Dynamic-, VMZ-AV Dynamic-Threaded stud	Drill bit Ø mm	Blow-out pump / Air gun	Cleaning brush RB	Extension tube	Dispenser
VMZ-A 100 M12 dyn VMZ-AV 100 M12 dyn	14	VM-AP 360 VM-ABP 200	RB 14 M6 / RB 14 M8	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
VMZ-A 125 M16 dyn VMZ-AV 125 M16 dyn	18	VM-AP 360 VM-ABP 200 / 250 / 500	RB 18 M6 / RB 18 M8	VM-XE 10	
VMZ-A 170 M20 dyn VMZ-AV 170 M20 dyn	24	VM-ABP 250 / 500	RB 24 M6	VM-XE 10	
See page		**178**	**179**	**180**	**181 / 182**

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 d_o mm	Drill hole depth h_o mm min	Drill hole depth h_o mm max	Fixture thickness t_{fix} mm min	Fixture thickness t_{fix} mm max	Drill hole depth through fixture h_d mm	Concave washer[1] $d_1 \times h_1$ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 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 dry internal conditions or external atmospheric exposure (Conical Stud: Stainless Steel HCR; concave washer, ball nut, lock nut: Stainless Steel A4)

Description	Ref. No.	Drill hole Ø d_o mm	Drill hole depth h_o mm min	Drill hole depth h_o mm max	Fixture thickness t_{fix} mm min	Fixture thickness t_{fix} mm max	Drill hole depth through fixture h_d mm	Concave washer[1] $d_1 \times h_1$ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 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

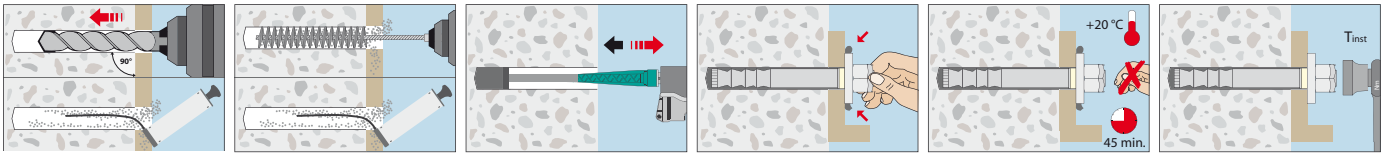
- Through-setting installation: Pre-assembled set of conical Stud, concave washer, ball nut, lock nut and a plastic sleeve as a thread protector.
- Highly corrosion resistant stainless steel 1.4529 for use in structures subject to external atmospheric exposure and in particularly corrosive environments

Description	Ref. No.	Drill hole Ø d_o mm	Drill hole depth h_o mm min	Drill hole depth h_o mm max	Fixture thickness t_{fix} mm min	Fixture thickness t_{fix} mm max	Drill hole depth through fixture h_d mm	Concave washer[1] $d_1 \times h_1$ mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 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

Other lengths on demand.

[1]Outer diameter d_1 x thickness h_1

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 tfix mm min	Fixture thickness tfix mm max	Drill hole depth[1] ho mm	Concave washer[2] d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/160 dyn	36390101	14	12	25	130-tfix	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-tfix	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-tfix	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-tfix	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-tfix	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 dry internal conditions or external atmospheric exposure (Conical Stud: Stainless Steel HCR; Nut, lock nut, washer: Stainless Steel A4)

Description	Ref. No.	Drill hole Ø do mm	Fixture thickness tfix mm min	Fixture thickness tfix mm max	Drill hole depth[1] ho mm	Concave washer[2] d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/153 dyn A4	36390501	14	12	25	130-tfix	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-tfix	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-tfix	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-tfix	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
- Highly corrosion resistant stainless steel 1.4529 for use in structures subject to external atmospheric exposure and in particularly corrosive environments

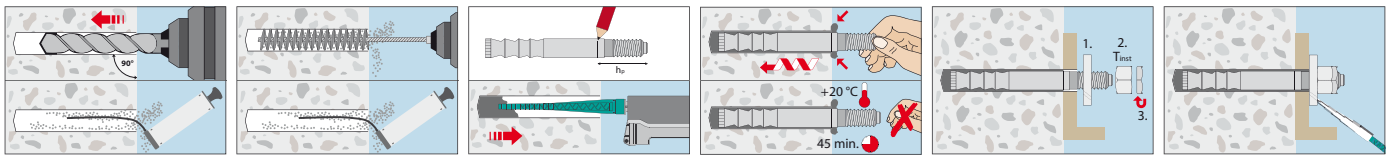
Description	Ref. No.	Drill hole Ø do mm	Fixture thickness tfix mm min	Fixture thickness tfix mm max	Drill hole depth[1] ho mm	Concave washer[2] d1 x h1 mm	Anchor length mm	Pkg. cont. pcs.	Weight per pkg. kg	Amount of adhesive per anchor ml	Anchors per cartridge 150 ml	280 ml	345 ml	420ml
VMZ-AV 100 M12-25/153 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})

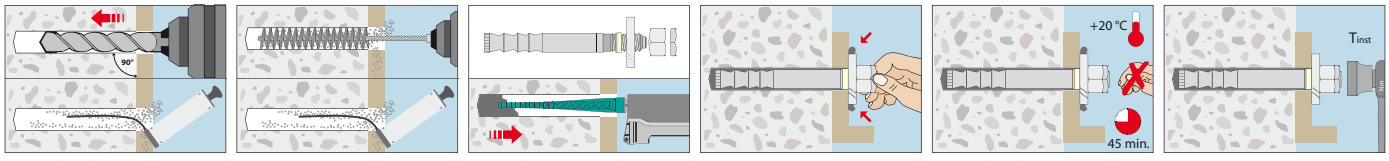
[2]Outer diameter d1 x thickness h1

Other lengths on demand.

Through-fastening installation



Pre-fastening installation



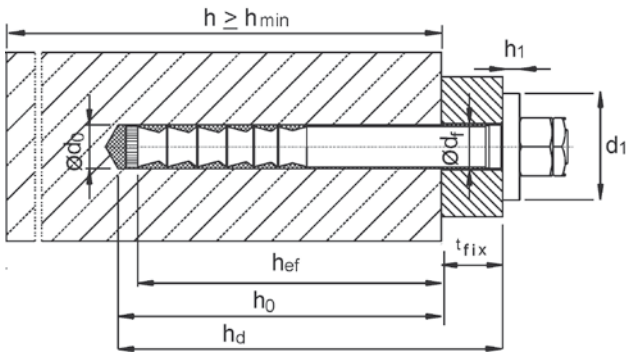
Extract from Permissible Service Conditions of European Technical Assessment ETA-04/0092 for use under fatigue cyclic loading in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range -40°C to +50°C (short term temperature +80°C) . The total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

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 uncracked concrete		
Approved loads, tension	C20/25	$\Delta N_{appr.}$	[kN]	14,9	22,2	32,2	15,7	22,2
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 uncracked 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	12,7	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[1]		h_o	[mm]	105	133	180	105	133
Diameter of clearance hole in the fixture		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 fixture		$t_{fix\geq}$	[mm]	12	16	20	12	16

[1] If the maximum fixture thickness t_{fix} is not completely used, the depth of drill hole and the setting depth of the anchor have to be increased accordingly.
[2] Values in brackets are for uncracked concrete.
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 113/114.



Injection System VMH

Threaded stud V-A

Threaded stud VMU-A

Threaded stud VM-A
1 meter length, to be cut to the required length

Internally threaded sleeve VMU-IG

Cartridge VMH 280
Coaxial cartridge suitable for silicone guns
Content: 280ml
including 2 mixers

Cartridge VMH 345
Side-by-side cartridge
Content: 345ml

Cartridge VMH 420
Coaxial cartridge
Content: 420ml

ETA-17/0716 | ETA-17/0715 | SEISMIC C1: M8-M30, Ø8-Ø32 C2: M12-M24 | 100 YEARS | F30-F120 | Allgemeine Bauartgenehmigung Z-21.8-2126 als Beton-Beton-Verbinder | Allgemeine Bauartgenehmigung Z-74.8-204 in unbeschichteten FD-/FDE-Betonflächen

ESR - 4252 | NSF Certified to NSF/ANSI 61 | EMISSIONS DANS L'AIR INTÉRIEUR A+ | EDELSTAHL Rostfrei

Range of loading: 3,2 kN–221,6 kN
Concrete quality: C20/25–C50/60
Material: Steel zinc plated, hot dip galvanized, stainless steel A4, stainless steel HCR

Description
The Injection System VMH is a universal injection system for heavy duty fastenings, usable in cracked and uncracked concrete. It is composed of a hybrid injection adhesive as well as a threaded stud V-A, a threaded stud VMU-A, or an internally threaded sleeve VMU-IG. A standard threaded stud with strength test certificate 3.1 or a rebar can also be used. The variable anchorage depths allow for a perfect adjustment to the respective installation situation, even under seismic action. The drill holes can also be created with MKT hollow drill bit SB, the use of which reduces contamination and fine dust exposure of the respiratory tract to a minimum and makes subsequent drill hole cleaning unnecessary.

Advantages
- Extremely high loads in cracked and uncracked concrete, strength class C20/25 to C50/60
- Working life 100 years for use in concrete (ETA-17/0716)
- Approved for post-installed rebar connection (Ø8–Ø32)
- Approved with threaded studs V-A, VMU-A, standard threaded studs with strength test certificate and internally threaded sleeves VMU-IG, thus more flexibility in the choice of the fastening
- Variable anchorage depths allow perfect adjustment to the respective installation situation for an economic working process
- Approved for use under seismic action according to the performance categories C1 (Threades studs M8 – M30, Reinforcement Bars Ø8 – Ø32) and C2 (Threades studs M12 Steel, zinc plated ≥8.8, M12 A4, M12 HCR: FKL ≥70
- For higher loads under seismic action, the annular gap between anchor rod and fixture can be filled using the VS backfill disc
- Due to the high short-term temperature resistance up to +160°C, also suitable for fastenings exposed to high temperature
- Fire test report for all diameters
- General design approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany as concrete-to-concrete connector (Z-21.8-2126)
- General design approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany for use in uncoated liquid-tight concrete members in storage-filling-handling plants (Z-74.8-204)
- ICC Evaluation Service listing, USA (ESR-4252)
- Approved for installation in wet concrete or water-filled drill holes
- Base material temperature during installation -5°C to +40°C
- Opened cartridges can be re-used with a new mixer nozzle
- Styrene free
- When using the hollow drill bit SB, the subsequent cleaning of the borehole can be omitted

Applications
Heavy duty fastenings in cracked and uncracked concrete: Steel structures, railings, base plates, supports, brackets, facade structures.

Fastenings with rebar in cracked and uncracked concrete with shear force: Shear connectors, wall connecting reinforcement, concrete overlay.

Injection Cartridge VMH

- Hybrid injection adhesive, styrene free
- Approved for cracked and uncracked concrete

Description	Ref. No.	Content ml	Content of master box	Weight per master box kg	Weight per piece kg
Cartridge VMH 280[1)]	28251501	280	12	6,70	0,56
Cartridge VMH 345	28253501	345	12	8,00	0,65
Cartridge VMH 420	28257501	420	12	10,1	0,83
Static mixer VM-XHP	28305301	-	12	0,18	0,01

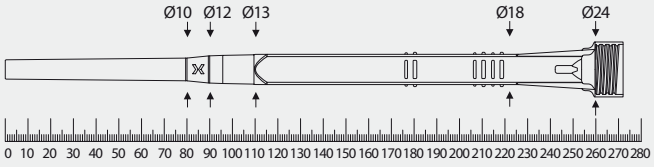
One static mixer comes with each cartridge.

[1)]Cartridge VMH 280 comes with 2 mixers.

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Curing Time Injection Adhesive VMH

- Cartridge temperature when installing + 5°C to + 40°C

Temperature (°C) of the base material	Gel time	Curing time	
		Dry base material	Wet base material
-5°C to - 1°C	50 min	5 h	10 h
0°C to + 4°C	25 min	3,5 h	7 h
+ 5°C to + 9°C	15 min	2 h	4 h
+ 10°C to + 14°C	10 min	1 h	2 h
+ 15°C to + 19°C	6 min	40 min	80 min
+ 20°C to + 29°C	3 min	30 min	60 min
+ 30°C to + 40°C	2 min	30 min	60 min

Storage Box

- Storage Box, the container for various items
- In stackable multi-purpose container
- H x W x D: 220 x 400 x 300 mm

Description	Ref. No.	Contents	Quantity pcs.	Weight per Box kg
Storage box VMH 345	28999646	Cartridge VMH 345	20	15,3
		Static mixer VM-XHP	40	
Storage box VMH 420	28999649	Cartridge VMH 420	12	12,0
		Static mixer VM-XHP	24	

Accessories for Injection System VMH

Threaded stud	Internally threaded stud	Rebar Ø mm	Drill bit Ø mm	Blow-out pump[1)] / Air gun[1)]	Cleaning brush RB[1)]	Retaining Washer VM-IA[3)]	Retaining Washer VM-IA[3)]	Dispenser
M8		8	10	VM-AP 360[2)] VM-ABP 200	RB 10 M6		VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku, VM-P 345 Pneumatic Eco; VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic, VM-P 825 Pneumatic
M10	VMU-IG M6	8 / 10	12	VM-AP 360[2)] VM-ABP 200	RB 12 M6 RB 12 M8		VM-XE 10	
M12	VMU-IG M8	10 / 12	14	VM-AP 360[2)] VM-ABP 200	RB 14 M6 RB 14 M8		VM-XE 10	
		12	16	VM-AP 360[2)] VM-ABP 200	RB 16 M6 RB 16 M8		VM-XE 10	
M16	VMU-IG M10	14	18	VM-AP 360[2)] VM-ABP 200 / 250 / 500 / 1000	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10, VM-XLE 16	
		16	20	VM-AP 360[2)] VM-ABP 200 / 250 / 500 / 1000	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10, VM-XLE 16	
M20	VMU-IG M12		22	VM-ABP 250 / 500 / 1000	RB 22 M6	VM-IA 22	VM-XE 10, VM-XLE 16	
		20	25	VM-ABP 250 / 500 / 1000	RB 25 M8 RB 26 M6	VM-IA 25	VM-XE 10, VM-XLE 16	
M24	VMU-IG M16		28	VM-ABP 250 / 500 / 1000	RB 28 M6	VM-IA 28	VM-XE 10, VM-XLE 16	
M27			30	VM-ABP 250 / 500 / 1000	RB 30 M6	VM-IA 30	VM-XE 10, VM-XLE 16	
		24 / 25	32	VM-ABP 250 / 500 / 1000	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10, VM-XLE 16	
M30	VMU-IG M20	28	35	VM-ABP 250 / 500 / 1000	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10, VM-XLE 16	
		32	40	VM-ABP 250 / 500 / 1000	RB 40 M6	VM-IA 40	VM-XE 10, VM-XLE 16	
See page				**178**	**179**	**181**	**180**	**181 / 182**

[1)]When using the hollow drill bit SB (see page 177), the subsequent cleaning of the borehole can be omitted. (Load reduction see ETA)

[2)]Approved in uncracked concrete up to a maximum drilling depth of 10 times the outer diameter of the anchor rod/anchor sleeve (for cracked concrete and load reduction, see ETA).

[3)]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 18$ mm, retaining washer and extension tube must be used for overhead installation and for drill hole depths > 250 mm.

Threaded studs for the injection system VMH

Threaded Stud VMU-A
Steel, zinc plated 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8 on demand

Threaded Stud VMU-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions

Threaded Stud VMU-A A4
Stainless steel A4
Dimensions see page 172

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel HCR on demand

Internally Threaded Sleeve VMU-IG
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- With internal thread

Internally Threaded Sleeve VMU-IG A4
Stainless steel A4
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- With internal thread

Threaded Stud V-A
Steel, zinc plated 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A 8.8
Steel, zinc plated 8.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A A4
Stainless steel A4-70
Dimensions see page 173

- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded Stud V-A HCR
Stainless steel HCR-70
Dimensions see page 173

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded Stud VM-A
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A 8.8
Steel, zinc plated 8.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- 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

ETA-17/0716

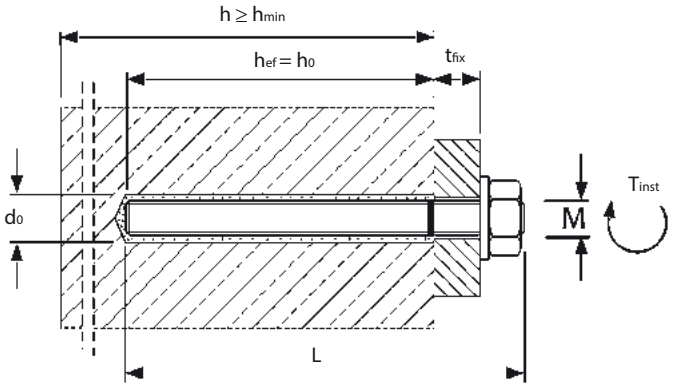
Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0716 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances for working life of up to 50 years in dry and wet concrete with compressed air cleaning for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 199.

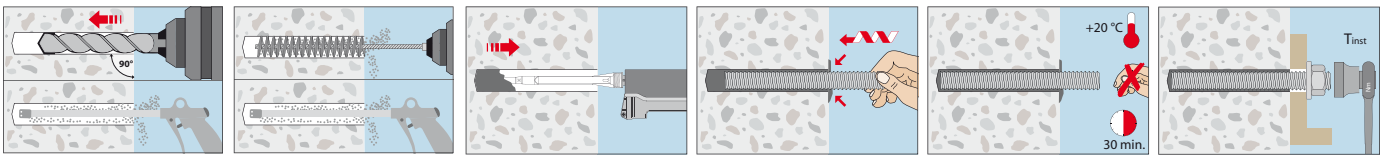
Loads and performance data **Injection system VMH M8-M30**				Temperature range I -40°C to +24°C/+40°C[1)] and temperature range II -40°C to +50°C/+80°C[1)]							
Threaded Studs				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	60 – 160	60 - 200	70 – 240	80 – 320	90 – 400	96 - 480	108 - 540	120 - 600
Injection System VMH, threaded stud steel 5.8											
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. 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
Injection System VMH, threaded stud steel 8.8											
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. 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
Injection System VMH, threaded stud stainless steel A4-70, HCR-70											
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$											
Cracked concrete	C20/25	appr. 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	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	44,1 - 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	134 – 444	152 - 536	168 – 600	190 - 670
Minimum spacing		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
Installation parameters											
Drill hole diameter		d_0	[mm]	10	12	14	18	22	28	30	35
Clearance hole in the fixture for Pre-setting installation		$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Clearance hole in the fixture for Through-setting installation		$d_f \leq$	[mm]	12	14	16	20	24	30	33	40
Range of drill hole depth 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
Installation torque		$T_{inst} \leq$	[Nm]	10	20	40 (FKL4.6: 35)	60	100	170	250	300
Amount of adhesive per 100mm drill hole 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 strength may lead to higher approved loads. Manual cleaning or the use of a suction drill without subsequent cleaning may lead to lower loads. For further information, please refer to the European Technical Assessment ETA-17/0716.
For anchor designing, an easy to operate Software is available on request or can be downloaded at www.mkt.de.



Installation threaded stud in concrete



Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0716 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances for working life of up to 50 years in dry and wet concrete with compressed air cleaning for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data	**Injection system VMH IG M6 - IG M20**			Temperature range I -40°C to +24°C/+40°C[1] and temperature range II -40°C to +50°C/+80°C[1]								
Internally Threaded Sleeve				**IG M6 x 80**	**IG M6 x 90**	**IG M8 x 80**	**IG M8 x 100**	**IG M10 x 80**	**IG M10 x 100**	**IG M12 x 125**	**IG M16 x 170**	**IG M20 x 200**
Anchorage depth h_{ef}			[mm]	80	90	80	100	80	100	125	170	200
Injection System VMH, internally threaded sleeve VMU-IG steel 5.8												
Approved loads, tension for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	11,7	13,8	20,0	36,2	46,4
Uncracked concrete	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	13,8	13,8	20,0	36,2	58,6
Approved loads, shear for h_{ef}												
Cracked concrete	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Uncracked concrete	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Injection System VMH, internally threaded sleeve VMU-IG stainless steel A4-70, HCR-70												
Approved loads, tension for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	11,7	15,7	22,5	36,3	31,0
Uncracked concrete	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	15,7	15,7	22,5	42,0	31,0
Approved loads, shear for h_{ef}												
Cracked concrete	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Uncracked concrete	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Spacing and edge distance												
Min. thickness of concrete slab		h_{min}	[mm]	110	120	110	130	116	136	169	226	270
Minimum spacing		s_{min}	[mm]	50	50	60	60	75	75	95	115	140
Minimum edge distance		c_{min}	[mm]	40	40	45	45	50	50	60	65	80
Installation parameters												
Drill hole diameter		d_0	[mm]	12	12	14	14	18	18	22	28	35
Clearance hole in the fixture		$d_f \leq$	[mm]	7	7	9	9	12	12	14	18	22
Range of drill hole depth for h_{ef}		h_0	[mm]	80	90	80	100	80	100	125	170	200
Installation torque		$T_{inst} \leq$	[Nm]	10	10	10	10	20	20	40	60	100
Amount of adhesive per drill hole			[ml]	6,6	7,4	7,9	9,9	10,9	13,6	22,4	54,9	97,4

[1]Max. long term temperature/max. short term temperature

Higher concrete strength may lead to higher approved loads. Manual cleaning or the use of a suction drill without subsequent cleaning may lead to lower loads. For further information, please refer to the European Technical Assessment ETA-17/0716.
For anchor designing, an easy to operate Software is available on request or can be downloaded at www.mkt.de.

Loads and performance data				Temperature range I -40°C to +24°C/+40°C[1] and temperature range II -40°C to +50°C/+80°C[1]								
Injection System VMH, rebar B500B				**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø24**	**Ø25**	**Ø28**	**Ø32**
Range of anchorage depths $h_{ef,min}$ - $h_{ef,max}$			[mm]	60 – 160	60 – 200	70 – 240	75 – 280	80 – 320	90 – 400	96 - 480	100 – 500	112 – 560	128 - 640
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$													
Cracked concrete	C20/25	appr. N	[kN]	3,9 - 10,5	4,9 - 16,5	7,5 - 25,9	10,2 - 38,1	11,7 - 49,8	14,0 - 77,8	15,4 - 112,0	16,4 - 130,9	19,4 - 164,2	23,7 - 214,5
Uncracked concrete	C20/25	appr. N	[kN]	10,1 - 13,8	10,9 - 21,6	13,7 - 31,2	15,2 - 42,4	16,8 - 55,4	20,0 - 86,6	22,0 - 124,5	23,4 - 135,2	27,8 - 169,6	33,9 - 221,6
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$													
Cracked concrete	C20/25	appr. V	[kN]	6,5	9,9 - 10,1	14,5	19,8	23,5 - 25,9	28,0 - 40,4	30,8 - 58,1	32,8 - 63,1	38,9 - 79,2	47,5 - 103,4
Uncracked concrete	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,0 - 40,4	44,1 - 58,1	46,9 - 63,1	55,5 - 79,2	67,8 - 103,4
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 / 102 - 272[2]	111 – 316	120 – 360	140 – 450	160 - 544	164 – 564	182 - 630	208 - 720
Minimum spacing		s_{min}	[mm]	40	50	60	70	75	95	120	120	130	150
Minimum edge distance		c_{min}	[mm]	35	40	45	50	50	60	70	70	75	85
Installation parameters													
Drill hole diameter		d_0	[mm]	10/12[2]	12/14[2]	14/16[2]	18	20	25	32	32	35	40
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$		h_0	[mm]	60 – 160	60 – 200	70 – 240	75 – 280	80 – 320	90 – 400	96 - 480	100 – 500	112 – 560	128 - 640
Amount of adhesive per 100mm drill hole depth			[ml]	4,16 / 8,46[3]	5,07 / 10,12[3]	5,97 / 11,78[3]	13,44	15,09	23,11	44,65	40,03	44,22	57,32

[1]Max. long term temperature/max. short term temperature

[2]For Ø8, Ø10, Ø12 both drill hole diameters can be used.

[3]The second value applies to the larger drill diameter

Higher concrete strength may lead to higher approved loads. Manual cleaning or the use of a suction drill without subsequent cleaning may lead to lower loads. For further information, please refer to the European Technical Assessment ETA-17/0716.
For anchor designing, an easy to operate Software is available on request or can be downloaded at www.mkt.de.

Injections System VMH

for post-installed rebar connection

Reinforcement Bars B500

Tension Anchor ZA

Cartridge VMH 280
Coaxial cartridge suitable for silicone guns
Content: 280ml
including 2 mixers

Cartridge VMH 345
Side-by-side cartridge
Content: 345ml

Cartridge VMH 420
Coaxial cartridge
Content: 420ml

R30-R120

Injection Cartridge VMH

- Hybrid injection adhesive, styrene free
- for post-installed rebar

Description	Ref. No.	Content ml	Content of master box	Weight per master box kg	Weight per piece kg
Cartridge VMH 280[1)]	28251501	280	12	6,70	0,56
Cartridge VMH 345	28253501	345	12	8,00	0,65
Cartridge VMH 420	28257501	420	12	10,1	0,83
Static mixer VM-XHP	28305301	-	12	0,18	0,01

One static mixer comes with each cartridge.

[1)]Cartridge VMH 280 comes with 2 mixers.

Curing Time Injection Adhesive VMH

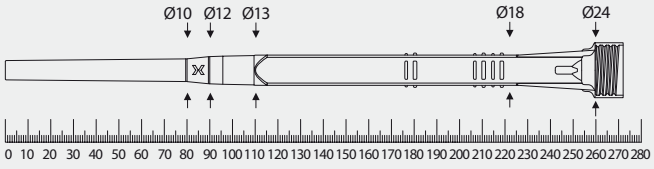
- Cartridge temperature when installing + 5°C to + 40°C

Temperature (°C) of the base material	Gel time	Curing time	
		Dry base material	Wet base material
-5°C to - 1°C	50 min	5 h	10 h
0°C to + 4°C	25 min	3,5 h	7 h
+ 5°C to + 9°C	15 min	2 h	4 h
+ 10°C to + 14°C	10 min	1 h	2 h
+ 15°C to + 19°C	6 min	40 min	80 min
+ 20°C to + 29°C	3 min	30 min	60 min
+ 30°C to + 40°C	2 min	30 min	60 min

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Description

The Injection System VMH also has the European Technical Assessment for post-installed rebar connection. Reinforcement bars with diameters from 8mm to 32mm as well as tension anchors from M12 to M24 with a setting depth up to 2m[1)] can be fixed. Due to the short processing and curing times, the VMH is particularly suitable for low temperatures.

Advantages

- Short processing and curing times, therefore ideal for low temperatures
- Wide range of application, as up to 35mm rebar diameter allowed
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- Approved for installation in dry and wet concrete
- Opened cartridges can be reused with a new static mixer
- Approved for use under fire exposure
- Tie rods ZA with connecting thread M12 - M24 can be supplied in individual lengths on request

Application examples for post-installed rebar connection:
Subsequent connection of stairs, balconies, walls or columns, closing of wall and ceiling openings

Application examples for tension anchors:
Anchoring of railing posts and of supports subject to bending loads, anchoring of cantilevered components

[1)]See table accessories for Injection system VMH

Accessories for Injection System VMH for post-installed rebar connection

Rebar Ø	Tension Anchor	Drill Bit Ø	Blow-out pump / Air gun[1]	Cleaning brush RB[1]	Retaining washer VM-IA[1]	Extension tube[1]	Maximum permissible drilling depth for dispenser: VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku[3]	Maximum permissible drilling depth for dispenser: VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic	Maximum permissible drilling depth for dispenser: VM-P 825 Pneumatic[3]
mm	mm	mm					mm	mm	mm
8		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8	-	VM-XE 10	700	800	800
10		14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14[1]	VM-XE 10	700	1000	1000
12	ZA-M12	16	VM-ABP 200 / 1000 DLS with RS, RS25	RB 16 M6 RB 16 M8	VM-IA 16[1]	VM-XE 10	700	1000	1200
14		18	VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18[1]	VM-XE 10[2], VM-XLE 16	700	1000	1400
16	ZA-M16	20	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20[1]	VM-XE 10[2], VM-XLE 16	700	1000	1600
20	ZA-M20	25	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8 RB 26 M6	VM-IA 25[1]	VM-XE 10[2], VM-XLE 16	500	700	2000
22		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28[1]	VM-XE 10[2], VM-XLE 16	500	700	2000
24 / 25	ZA-M24	32	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32[1]	VM-XE 10[2], VM-XLE 16	500	500	2000
28		35	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35[1]	VM-XE 10[2], VM-XLE 16	500	500	2000
32		40	VM-ABP 250 / 500 / 1000	RB 40 M6	VM-IA 40[1]	VM-XE 10[2], VM-XLE 16	500	500	2000
See page			**178**	**179**	**181**	**180**	**181 / 182**	**182**	**182**

[1]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 14$ mm, retaining washer and extension tube must be used for horizontal and overhead installation and for drill hole depths > 240 mm.

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

[3]Cartridge VMH 825 available on request

Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0715 for post-installed rebar connection with the Injekton System VMH

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

[1]The values fbd,PIR are valid for "good" bond conditions according to EN 1992-1-1:2004.

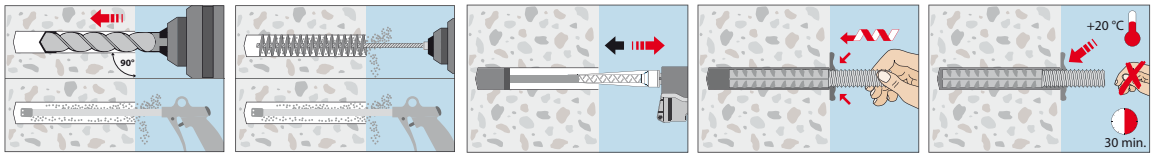
Installation parameters and Amount of adhesive Injection System VMH for post-installed rebar connection

Rebar-Ø	[mm]	8	10	12	14	16	20	22	24	25	28	32
Drill hole-Ø	d_0 [mm]	12	14	16	18	20	25	28	32	32	35	40
Amount of adhesive / 100 mm setting depth	[ml]	8,46	10,12	11,78	13,44	15,09	23,11	30,4	44,65	40,03	44,22	57,32

Installation parameters Injection System VMH with Tension Anchor

Tension Anchor ZA			ZA M12	ZA M16	ZA M20	ZA M24
Rebar		[mm]	12	16	20	25
Drill hole diameter	do	[mm]	16	20	25	32
Diameter of clearance hole	$d_f \leq$	[mm]	14	18	22	26
Effective setting depth	lv	[mm]	according to static calculation			
Installation torque	Tinst ≤	[Nm]	50	100	150	150
Width across nut	SW	[mm]	19	24	30	36
Amount of adhesive / 100 mm setting depth		[ml]	11,78	15,09	23,11	40,03
Tension Anchor ZA see page			**176**	**176**	**176**	**on request**

Installation



Injection System VMU plus

Threaded Stud V-A

Threaded Stud VMU-A

Threaded Stud VM-A
1 meter length, to be cut to the required length

Internally Threaded Sleeve VMU-IG

Perfo Sleeve VM-SH

Cartridge VMU plus 150
Coaxial cartridge
suitable for silicone guns
Content: 150ml

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

Cartridge VMU plus 300
Foil tube cartridge
suitable for silicone guns
Content: 300 ml

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

Range of loading: 0,17 kN–217,0 kN
Concrete quality: C20/25–C50/60
Brickwork: Solid and perforated brick
Material: Steel, zinc plated, Steel, hot dip galvanized, Stainless steel A4, Stainless steel HCR

ETA-11/0415 | ETA-11/0514 | ETA-13/0909 M8 - M16 IG M6 - IG M10 | SEISMIC C1 | F30-F120 | ICC ES ESR - 4004

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Description

The injection system VMU plus is a universal injection system for almost all applications and materials. Besides the use in uncracked concrete and masonry, VMU plus is also approved for fixings in cracked concrete and for post installed rebar connections[1]. The European Technical Assessment ETA-13/0909 includes 6 sizes of perforated sleeves up to 200 mm length and is approved in 15 different types of bricks. To complete the fastening, various anchor rods or internal sleeves can be used from the existing MKT-range (VMU-A, VMU-IG, VM-A and V-A), as well as standard threaded rods or reinforcing bars. In perforated brick, a perfo sleeve is required. The choice between VMU plus and VMU plus Polar injection adhesives allows processing temperatures from -20°C to +40°C for the base material and cartridges.

Advantages

- Approved in cracked and uncracked concrete
- Approved for autoclaved aerated concrete, solid and perforated brickwork
- Approved for post-installed rebar connections (Ø8-Ø32)1)
- Approved for threaded studs V-A, VMU-A, standard threaded studs with strength verification (strength test certificate 3.1), internally threaded sleeves VMU-IG as well as perfo sleeves VM-SH
- Approved for use under seismic action according to the performance category C1
- Only one adhesive for almost all applications, more flexibility, less inventory, greater application safety
- Variable anchorage depths for optimum adaptation to the respective installation situation for maximum economy
- Approved application in wet concrete
- Approved application in wet or water-filled drill holes (Threaded Stud M8–M16, Internally Threaded Sleeve IG M6–IG M10, Rebar Ø8–Ø16)
- Fire test report for all diameters
- ICC Evaluation Service listing, USA (ESR-4004)
- Base material temperature during application for VMU plus from -10°C to + 40°C, for VMU plus Polar from -20°C to +10°C
- Opened cartridges can be re-used with a new mixer nozzle
- Styrene-free vinylester resin

[1]only with Coaxial- and Side-by-side VMU plus cartridge

Cartridge
VMU plus 410
Coaxial cartridge
Content: 410ml

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

Cartridge
VMU plus 300 Polar
Foil tube cartridge
suitable for silicone guns
Content:300 ml

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

Cartridge
VMU plus 420 Polar
Coaxial cartridge
Content: 420ml

Additional advantages VMU plus Polar
- Fast and reliable curing even at low temperatures and minus degrees
- Approved for cracked and uncracked concrete as well as masonry even at icy -20 ° C
- Approved temperature range from + 10 ° C to -20 ° C for base material and cartridge. Heating and keeping the cartridge warm before installation is not necessary.
- The same European Technical Assessments (ETA-11/0415 and ETA-13/0909) for VMU plus and VMU plus Polar; therefore the Installation is possible from + 40 ° C to -20 ° C temperature without recalculation of the application.

Applications

Fastenings in cracked and uncracked concrete:
Base plates, supports, mounting of joint tapes, shelves, brackets, railings, facade substructures, wooden structures, cable trays, etc.

Fastenings with rebars in cracked and uncracked concrete - with shear forces:
Shear connectors, wall connecting reinforcement, concrete overlay

Post-installed rebar connections[1)]:
Ceiling and wall connections, structural reinforcement, structural complement building extensions, connection of balconies and canopies, subsequent attaching of „forgotten or misplaced" reinforcing bars

Fastenings in Brickwork:
Canopies, door and window frames, facade substructures, battens, gates etc.

[1)]Only with Coaxial- and Side-by-side VMU plus cartridge

Injection Cartridge VMU plus

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

Description	Ref. No.	Content ml	Cont. of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VMU plus 150	28255271	150	12	4,20	0,34
Cartridge VMU plus 280[1]	28252401	280	12	6,70	0,56
Cartridge VMU plus 300	28255126	300	12	6,40	0,53
Cartridge VMU plus 300 Polar	28252901	300	12	6,40	0,53
Cartridge VMU plus 345	28254001	345	12	8,00	0,65
Cartridge VMU plus 345 Polar	28253901	345	12	8,00	0,65
Cartridge VMU plus 410	28256041	410	12	10,1	0,83
Cartridge VMU plus 420 Polar	28257121	420	12	10,1	0,83
Cartridge VMU plus 825	28259001	825	8	13,0	1,63
Static mixer VM-X	28305111	-	12	0,12	0,01
Static mixer VM-XL[2]	28305201	-	10	0,28	0,03

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

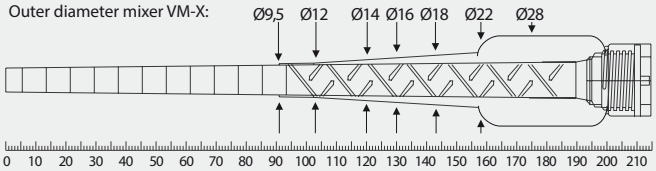
[1]Cartridge VMU plus 280 comes with 2 mixers.

[2]With larger cross section for larger drill holes or post-installed rebar connection.

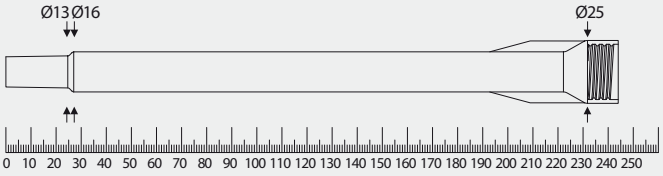
Usable length Static mixer VM-X and VM-XL

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

Outer diameter mixer VM-X:



Outer diameter mixer VM-XL:



Curing Time Injection Adhesive VMU plus

Temperature in drill hole	Cartridge temperature[1]	Max. Gel time	Curing time	
			Dry base material	Wet base material
-10°C – -6°C	+15°C – +40°C	90 min	24 h	48 h
-5°C – -1°C	+5°C – +40°C (+5°C - +25°C)[2]	90 min	14 h	28 h
0°C – +4°C		45 min	7 h	14 h
+5°C – +9°C		25 min	2 h	4 h
+10°C – +19°C		15 min	80 min	160 min
+20°C – +24°C		6 min	45 min	90 min
+25°C – +29°C		6 min (4 min)[2]	45 min (25 min)[2]	90 min (50 min)[2]
+30°C – +34°C	+5°C – +40°C (≤ +20°C)[2]	4 min (2,5 min)[2]	25 min (15 min)[2]	50 min (30 min)[2]
+35°C – +39°C		2 min (2,5 min)[2]	20 min (15 min)[2]	40 min (30 min)[2]
+40°C		1,5 min (2,5 min)[2]	15 min	30 min

[1]When installing

[2]Values in brackets for rebar connection (ETA-11/0514)

Curing Time Injection Adhesive VMU plus Polar[1]

- Cartridge temperature during installing -20°C to + 10°C

Temperature (°C) of the base material	Gel time	Curing time	
		dry base material	wet base material
-20°C to -16°C	75 min	24 h	48 h
-15°C to -11°C	55 min	16 h	32 h
-10°C to -6°C	35 min	10 h	20 h
-5°C to -1°C	20 min	5 h	10 h
0°C to +4°C	10 min	2,5 h	5 h
+5°C to +9°C	6 min	80 min	160 min
+10°C	6 min	60 min	120 min

[1]The injection adhesive VMU plus Polar cannot be used for post-installed rebar connection according to ETA-11/0415.

Storage Box

- In stackable multi-purpose container
- Storage box, the container for various items

Description	Ref. No.	Contents	Quantity pcs.	Weight per Box kg
Storage box VMU plus 280	28999148	Cartridge VMU plus 280 Static mixer VM-X	20 40	12,8
Storage box VMU plus 300 Polar	28999661	Cartridge VMU plus 300 Polar Static mixer VM-X	20 40	12,8
Storage box VMU plus 345	28999640	Cartridge VMU plus 345 Static mixer VM-X	20 40	15,3
Storage box VMU plus 345 Polar	28999670	Cartridge VMU plus 345 Polar Static mixer VM-X	20 40	15,3
Storage box VMU plus 410	28999652	Cartridge VMU plus 410 Static mixer VM-X	20 40	18,0
Storage box VMU plus 420 Polar	28999680	Cartridge VMU plus 420 Polar Static mixer VM-X	20 40	18,0

Dimensions storage box

Description	Height mm	Width mm	Depth mm
Storage box	220	400	300

Accessories for Injection System VMU plus in concrete

Threaded Stud	Internally threaded stud	Rebar Ø	Drill bit Ø	Blow-out pump / Air gun	Cleaning brush RB	Retaining Washer VM-IA[2]	Extension tube[2]	Extension tube[1]
mm	mm	mm	mm					
M8			10	VM-AP360[1] VM-ABP 200	RB 10 M6		VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic, VM-P 825 Pneumatic
M10	VMU-IG M6	8	12	VM-AP360[1] VM-ABP 200	RB 12 M6 RB 12 M8		VM-XE 10	
M12	VMU-IG M8	10	14	VM-AP360[1] VM-ABP 200	RB 14 M6 RB 14 M8		VM-XE 10	
		12	16	VM-AP360[1] VM-ABP 200	RB 16 M6 RB 16 M8		VM-XE 10	
M16	VMU-IG M10	14	18	VM-AP 360[1] VM-ABP 200 / 250 / 500 / 1000	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10, VM-XLE 16[3]	
		16	20	VM-AP 360[1] VM-ABP 200 / 250 / 500 / 1000	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10, VM-XLE 16[3]	
M20	VMU-IG M12	20	24	VM-ABP 250/ 500 / 1000	RB 24 M6	VM-IA 24	VM-XE 10, VM-XLE 16[3]	
M24	VMU-IG M16		28	VM-ABP 250/ 500 / 1000	RB 28 M6	VM-IA 28	VM-XE 10, VM-XLE 16[3]	
M27		25	32	VM-ABP 250/ 500 / 1000	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10, VM-XLE 16[3]	
M30	VMU-IG M20	28	35	VM-ABP 250/ 500 / 1000	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10, VM-XLE 16[3]	
		32	40	VM-ABP 250/ 500 / 1000	RB 40 M6	VM-IA 40	VM-XE 10, VM-XLE 16[3]	
See page				**178**	**179**	**181**	**180**	**181/182**

[1]Approved in uncracked concrete up to a maximum drilling depth of 10 times the outer diameter of the anchor rod/anchor sleeve (for cracked concrete and load reduction, see ETA).

[2]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 18$ mm, retaining washer and extension tube must be used for overhead installation and for drill hole depths > 250 mm.

[3]Only in connection with static mixer VM-XL

Accessories for Injection System VMU plus in brickwork

Threaded Stud (without perfo sleeve)	Internally Threaded Sleeve (without perfo sleeve)	Rebar Ø	Drill bit Ø	Blow-out pump / Air gun	Cleaning brush RB	Extension tube[1]	Extension tube
mm	mm		mm				
M8			10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic, VM-P 825 Pneumatic
M10	VMU-IG M6	VM-SH 12 x 80	12	VM-AP 360 VM-ABP 200	RB 12 M6	VM-XE 10	
M12	VMU-IG M8		14	VM-AP 360 VM-ABP 200	RB 14 M6	VM-XE 10	
		VM-SH 16 x 85 VM-SH 16 x 130	16	VM-AP 360 VM-ABP 200	RB 16 M6	VM-XE 10	
M16	VMU-IG M10		18	VM-AP 360 VM-ABP 200 / 250	RB 18 M6	VM-XE 10 VM-XLE 16[2]	
		VM-SH 20 x 85 VM-SH 20 x 130 VM-SH 20 x 200	20	VM-AP 360 VM-ABP 200 / 250	RB 20 M6	VM-XE 10 VM-XLE 16[2]	
See page				**178**	**179**	**180**	**181 / 182**

[1]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), the extension tube VM-XE 10 must be used.

[2]Only in connection with static mixer VM-XL

Threaded studs for Injection System VMU plus in concrete and brickwork

Threaded Stud VMU-A
Steel, zinc plated 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Stahl verzinkt 8.8 auf Anfrage

Threaded Stud VMU-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions

Threaded Stud VMU-A A4
Stainless steel A4-70
Dimensions see page 172

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel HCR on request

Internally Threaded Sleeve VMU-IG
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- With internal thread

Internally Threaded Sleeve VMU-IG A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- With internal thread

Threaded Stud V-A
Steel, zinc plated 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A 8.8
Steel, zinc plated 8.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A A4
Stainless steel A4-70
Dimensions see page 173

- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded Stud V-A HCR
Stainless steel HCR-70
Dimensions see page 173

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded Stud VM-A
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A 8.8
Steel, zinc plated 8.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- 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

Perfo Sleeve VM-SH
Polypropylen
Dimensions see page 175

- Approved for hollow base material

ETA-11/0415

Extract from Permissible Service Conditions of European Technical Assessment ETA-11/0415 for use in cracked and uncracked concrete (Option 1)

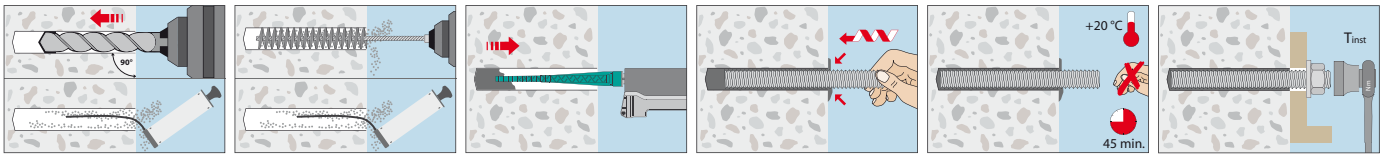
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 199.

Loads and performance data

Injection System VMU plus, threaded stud steel 5.8					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
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 [1]	C20/25	appr. 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	appr. 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
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Injection System VMU plus, threaded stud steel 8.8												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	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	appr. 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
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Injection System VMU plus, threaded stud stainless steel A4-70, HCR-70												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	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	appr. 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
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. 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
Approved loads, shear for für $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	44,1 - 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 for Pre-setting installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Clearance hole in the fixture for Through-setting installation			$d_f \leq$	[mm]	12	14	16	20	25	30	33	38
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			$T_{inst} \leq$	[Nm]	10	20	40	80	120	160	180	200
Amount of mortar per 100 mm drill ole 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 strength may lead to higher approved loads. Technical data for water-filled drill holes see approval.
For anchor designing, an easy to operate Software is available on request or can be downloaded at www.mkt.de

Installation in concrete and solid base material



ETA-11/0415

Extract from Permissible Service Conditions of European Technical Assessment ETA-11/0415 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data													
Internally Threaded Sleeve					**IG M6 x 80**	**IG M6 x 90**	**IG M8 x 80**	**IG M8 x 100**	**IG M10 x 80**	**IG M10 x 100**	**IG M12 x125**	**IG M16 x 170**	**IG M20 x 200**
Anchorage depth h_{ef}				[mm]	80	90	80	100	80	100	125	170	200
Injection System VMU plus, Internally threaded steel VMU-IG, Steel 5.8													
Approved loads, tension for h_{ef}									cracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. N	[kN]	4,8	4,8	6,6	8,1	8,8	11,0	17,1	28,0	38,7
	50°C/80°C[1)]	C20/25	appr. N	[kN]	3,5	3,9	4,8	6,0	6,4	8,0	12,5	20,3	33,7
Approved loads, tension for h_{ef}									uncracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	13,8	13,8	20,0	36,2	55,2
	50°C/80°C[1)]	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	13,8	13,8	20,0	36,2	48,6
Approved loads, shear for h_{ef}									cracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
	50°C/80°C[1)]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Approved loads, shear for h_{ef}									uncracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
	50°C/80°C[1)]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Injection System VMU plus, Internally threaded VMU-IG, Stainless steel A4-70, HCR-70													
Approved loads, tension for h_{ef}									cracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. N	[kN]	5,0	5,3	6,6	8,2	8,8	11,0	17,1	28,0	31,0
	50°C/80°C[1)]	C20/25	appr. N	[kN]	3,5	3,9	4,8	6,0	6,4	8,0	12,5	20,3	31,0
Approved loads, tension for h_{ef}									uncracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	14,0	15,7	22,5	42,0	31,0
	50°C/80°C[1)]	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	14,0	15,7	22,5	42,0	31,0
Approved loads, shear for h_{ef}									cracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
	50°C/80°C[1)]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Approved loads, shear for h_{ef}									uncracked concrete				
Temperature range	24°C/40°C[1)]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
	50°C/80°C[1)]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Spacing and edge distance													
Minimum thickness of concrete slab for h_{ef}			h_{min}	[mm]	110	120	110	130	116	136	173	226	270
Minimum spacing			s_{min}	[mm]	50	50	60	60	80	80	100	120	150
Minimum edge distance			c_{min}	[mm]	50	50	60	60	80	80	100	120	150
Installation parameters													
Drill hole diameter			d_o	[mm]	12	12	14	14	18	18	24	28	35
Clearance hole in the fixture			$d_f \leq$	[mm]	7	7	9	9	12	12	14	18	22
Range of drill hole depth for h_{ef}			h_0	[mm]	80	90	80	100	80	100	125	170	200
Installation			$T_{inst} \leq$	[Nm]	10	10	10	10	20	20	40	60	100
Amount of adhesive per drill hole				[ml]	6,6	7,4	7,9	9,9	10,9	13,6	33,4	54,9	97,4

[1)]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 approval.

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

Injection System VMU plus, reinforcement bars B500B					**ø8**	**ø10**	**ø12**	**ø14**	**ø16**	**ø20**	**ø25**	**ø28**	**ø32**
Range of anchorage depths		$h_{ef,min}$ - $h_{ef,max}$		[mm]	60-160	60-200	70-240	75-280	80-320	90-400	100-500	112-560	128-640
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete					
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	2,9 - 7,7	3,7 - 12,5	5,8 - 19,7	7,2 - 26,9	8,8 - 35,1	11,7 - 54,9	13,7 - 85,7	16,2 - 127,1	19,8 - 166,0
	50°C/80°C [1)]	C20/25	appr. N	[kN]	1,8 - 4,8	2,6 - 8,7	4,2 - 14,4	5,2 - 19,5	6,4 - 25,5	9,0 - 39,9	12,5 - 62,3	16,2 - 88,0	19,8 - 114,9
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete					
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	7,2 - 13,8	9,0 - 21,6	11,4 - 31,2	12,7 - 42,4	14,0 - 55,4	16,7 - 86,6	19,5 - 135,2	23,1 - 169,6	28,3 - 217,0
	50°C/80°C [1)]	C20/25	appr. N	[kN]	5,4 - 13,8	6,7 - 21,6	9,4 - 31,2	11,8 - 42,4	14,0 - 55,4	16,7 - 86,6	19,5 - 124,7	23,1 - 136,8	28,3 - 153,2
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete					
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	5,7 - 6,5	9,0 - 10,1	13,8 - 14,5	17,3 - 19,8	21,1 - 25,9	28,0 - 40,4	32,8 - 63,1	38,9 - 79,2	47,5 - 103,4
	50°C/80°C [1)]	C20/25	appr. V	[kN]	3,6 - 6,5	6,3 - 10,1	10,1 - 14,5	12,6 - 19,8	15,3 - 25,9	21,5 - 40,4	29,9 - 63,1	38,9 - 79,2	47,5 - 103,4
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete					
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,4	46,9 - 63,1	55,5 - 79,2	67,8 - 103,4
	50°C/80°C [1)]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,4	46,9 - 63,1	55,5 - 79,2	67,8 - 103,4
Spacing and edge distance													
Minimum thickness of concrete slab for h_{ef}			h_{min}	[mm]	100-190	100-230	102-272	111-316	120-360	138-448	164-564	182-630	208-720
Minimum spacing			s_{min}	[mm]	40	50	60	70	80	100	125	140	160
Minimum edge distance			c_{min}	[mm]	40	50	60	70	80	100	125	140	160
Installation parameters													
Drill hole diameter			d_o	[mm]	12	14	16	18	20	24	32	35	40
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$			h_o	[mm]	60 - 160	60 - 200	70 - 240	75-280	80 - 320	90 - 400	100 - 500	112 - 560	128-640
Amount of adhesive per 100 mm drill hole depth				[ml]	8,46	10,12	11,78	13,44	15,09	18,41	40,03	44,22	57,32

[1)]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 approval.

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

Extract from Permissible Service Conditions of European Technical Assessment ETA-13/0909 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection system VMU plus, solid base material without perfo sleeve[1)]

Clay solid brick Mz-DF according EN 771-1, Bulk density ρ: 1,6 kg/dm³, Minimum brick size: 240x115x55 mm (e.g. Unipor)										
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**	**IG-M6**	**IG-M8**	**IG-M10**
Anchorage depth		h_{ef}	[mm]	80	90	100	100	90	100	100
Spacing		s_{cr}	[mm]	240	270	300	300	270	300	300
Minimum spacing		s_{min}	[mm]	120	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60	60	60	60
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	1,00	1,00	1,14	1,14	1,00	1,14	1,14
	$f_b \geq 20$ N/mm²	appr. N	[kN]	1,29	1,57	1,71	1,71	1,57	1,71	1,71
	$f_b \geq 28$ N/mm²	appr. N	[kN]	1,57	1,71	1,94	1,94	1,71	1,94	1,94
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	1,00	1,00	1,00	1,57	1,00	1,00	1,57
	$f_b \geq 20$ N/mm²	appr. V	[kN]	1,43	1,43	1,43	2,29	1,43	1,43	2,29
	$f_b \geq 28$ N/mm²	appr. V	[kN]	1,57	1,57	1,57	2,57	1,57	1,57	2,57
Drilling method							Hammer drilling			

Calcium silicate solid brick KS-NF according EN 771-2, Bulk density ρ: 2,0 kg/dm³, Minimum brick size: 240x115x71 mm (e.g. Wemding)										
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**	**IG-M6**	**IG-M8**	**IG-M10**
Anchorage depth		h_{ef}	[mm]	80	90	100	100	90	100	100
Spacing		s_{cr}	[mm]	240	270	300	300	270	300	300
Minimum spacing		s_{min}	[mm]	120	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60	60	60	60
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	1,29	1,29	1,29	1,00	1,29	1,29	1,00
	$f_b \geq 20$ N/mm²	appr. N	[kN]	1,71	1,71	1,71	1,43	1,71	1,71	1,43
	$f_b \geq 27$ N/mm²	appr. N	[kN]	2,00	2,00	2,00	1,71	2,00	2,00	1,71
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,71	0,86	0,71	0,71	0,86	0,71	0,71
	$f_b \geq 20$ N/mm²	appr. V	[kN]	1,14	1,29	1,14	1,14	1,29	1,14	1,14
	$f_b \geq 27$ N/mm²	appr. V	[kN]	1,29	1,57	1,29	1,29	1,57	1,29	1,29
Drilling method							Hammer drilling			

Brickwork of solid lightweight concrete LAC according EN 771-3, Bulk density ρ: 0,6 kg/dm³, Minimum brick size: 300x123x248 mm (e.g. Bisotherm)										
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**	**IG-M6**	**IG-M8**	**IG-M10**
Anchorage depth		h_{ef}	[mm]	80	90	100	100	90	100	100
Spacing		s_{cr}	[mm]	240	270	300	300	270	300	300
Minimum spacing		s_{min}	[mm]	120	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	120	135	150	150	135	150	150
Minimum edge distance		c_{min}	[mm]	60	60	60	60	60	60	60
Approved tension load for compressive strength	$f_b \geq 2$ N/mm²	appr. N	[kN]	0,86	0,86	1,00	0,86	0,86	1,00	0,86
Approved shear load for compressive strength	$f_b \geq 2$ N/mm²	appr. V	[kN]	0,86	0,86	0,86	0,86	0,86	0,86	0,86
Drilling method							Rotary drilling			

Autoclaved aerated concrete AAC6 according EN 771-4, Bulk density ρ: 0,6 kg/dm³, Minimum brick size: 499x240x249 mm (e.g. Porit)										
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**	**IG-M6**	**IG-M8**	**IG-M10**
Anchorage depth		h_{ef}	[mm]	80	90	100	100	90	100	100
Achsabstand		s_{cr}	[mm]	240	270	300	300	270	300	300
Minimum spacing		s_{min}	[mm]	100	100	100	100	100	100	100
Edge distance		c_{cr}	[mm]	120	135	150	150	135	150	150
Minimum edge distance		$c_{min,N}$	[mm]	75	75	75	75	75	75	75
		$c_{min,v,II}$[2)]	[mm]	75	75	75	75	75	75	75
		$c_{min,v,\perp}$[3)]	[mm]	120	135	150	150	135	150	150
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,89	1,43	1,79	2,32	1,43	1,79	2,32
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	2,14	3,57	3,57	3,57	2,86	3,57	3,57
Drilling method							Rotary drilling			

Installation parameters in solid base material (without Perfo Sleeve)										
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**	**IG-M6**	**IG-M8**	**IG-M10**
Drill hole diameter		d_o	[mm]	10	12	14	18	12	14	18
Depth of drill hole		h_o	[mm]	80	90	100	100	90	100	100
Minimum walll thickness		h_{min}	[mm]	110	120	130	130	120	130	130
Clearance hole in the fixture		$d_f \leq$	[mm]	9	12	14	18	7	9	12
Installation torque		$T_{inst,max}$	[Nm]				2 (14 for clay solid brick Mz-DF)			
Amount of adhesive per drill hole			[ml]	5,2	7,3	9,8	13,6	7,3	9,8	13,6
Drill holes per cartridge VMU plus	280 / 300		[pcs.]	46 / 50	33 / 36	24 / 26	18 / 19	33 / 36	24 / 26	18 / 19
Drill holes per cartridge VMU plus	345 / 410		[pcs.]	59 / 71	42 / 51	31 / 38	22 / 27	42 / 51	31 / 38	22 / 27

[1)] Installation with perforated sleeve allowed; technical data, see ETA-13/0909

[2)] Minimum edge distance $c_{min,v,II}$ for shear loads parallel to free edge

[3)] Minimum edge distance $c_{min,v,\perp}$ for shear loads perpendicular to free edge

Extract from Permissible Service Conditions of European Technical Assessment ETA-13/0909 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection system VMU plus, perforated brick with Perfo Sleeve

Clay hollow brick Porotherm Homebric according EN 771-1, Bulk density ρ: 0,7 kg/dm³, Minimum brick size: 500x200x299mm (e.g. Wienerberger)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130		16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130		85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	500	500	500	500	500		500	500
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	299	299	299	299	299		299	299
Minimum spacing		s_{min}	[mm]	100	100	100	100	100		100	100
Edge distance		c_{cr}	[mm]	100	100	100	120	120		100	120
Minimum edge distance		c_{min} [1)]	[mm]	100	100	100	120	120		100	120
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,26	0,26	0,34	0,26	0,34		0,26	0,26
	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,26	0,26	0,34	0,26	0,34		0,26	0,26
	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,34	0,34	0,43	0,34	0,43		0,34	0,34
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,57	0,57	0,57	0,71	0,71		0,57	0,71
	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,71	0,71	0,71	0,86	0,86		0,71	0,86
	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,86	0,86	1,00	1,14	1,14		0,86	1,14

Clay hollow brick HLz-16-DF according EN 771-1, Bulk density ρ: 0,8 kg/dm³, Minimum brick size: 497x240x238 mm (e.g. Unipor)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130	20x200	16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	200	85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	497	497	497	497	497	497	497	497
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	238	238	238	238	238	238	238	238
Minimum spacing		s_{min}	[mm]	100	100	100	100	100	100	100	100
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120	100	120
Minimum edge distance		c_{min} [1)]	[mm]	100	100	100	120	120	120	100	120
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,71	0,71	1,00	0,71	1,00	1,00	0,71	0,71
	$f_b \geq 8$ N/mm²	appr. N	[kN]	0,86	0,86	1,29	0,86	1,29	1,29	0,86	0,86
	$f_b \geq 12$ N/mm²	appr. N	[kN]	1,00	1,00	1,43	1,00	1,43	1,43	1,00	1,00
	$f_b \geq 14$ N/mm²	appr. N	[kN]	1,14	1,14	1,57	1,14	1,57	1,57	1,14	1,14
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,71	1,29	1,29	1,43	1,71	1,71	1,29	1,43
	$f_b \geq 8$ N/mm²	appr. V	[kN]	0,86	1,57	1,57	1,71	2,00	2,00	1,57	1,71
	$f_b \geq 12$ N/mm²	appr. V	[kN]	1,14	1,86	1,86	2,00	2,57	2,57	1,86	2,00
	$f_b \geq 14$ N/mm²	appr. V	[kN]	1,14	1,86	1,86	2,00	2,57	2,57	1,86	2,00

Clay hollow brick Doppio Uni according EN 771-1, Bulk density ρ: 0,9 kg/dm³, Minimum brick size: 250x120x120 mm (e.g. Wienerberger)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130	20x200	16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	200	85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	250	250	250	250	250	250	250	250
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	120	120	120	120	120	120	120	120
Min. spacing parallel to horizontal joint		$s_{min,II}$	[mm]	100	100	100	100	100	100	100	100
Min. Perpendicular to horizontal joint		$s_{min,\perp}$	[mm]	120	120	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120	100	120
Minimum edge distance		c_{min} [1)]	[mm]	60	60	60	60	60	60	60	60
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
	$f_b \geq 16$ N/mm²	appr. N	[kN]	0,21	0,21	0,21	0,21	0,21	0,21	0,21	0,21
	$f_b \geq 20$ N/mm²	appr. N	[kN]	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26
	$f_b \geq 28$ N/mm²	appr. N	[kN]	0,34	0,34	0,34	0,34	0,34	0,34	0,34	0,34
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,43	0,43	0,43	0,43	0,43	0,43	0,43	0,43
	$f_b \geq 16$ N/mm²	appr. V	[kN]	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57
	$f_b \geq 20$ N/mm²	appr. V	[kN]	0,57	0,57	0,57	0,57	0,57	0,57	0,57	0,57
	$f_b \geq 28$ N/mm²	appr. V	[kN]	0,71	0,71	0,71	0,71	0,71	0,71	0,71	0,71

Calcium silicate hollow brick KSL-3DF according EN 771-2, Bulk density ρ: 1,4 kg/dm³, Minimum brick size: 240x175x113 mm (e.g. Wemding)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130	20x200	16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	200	85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	240	240	240	240	240	240	240	240
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	120	120	120	120	120	120	120	120
Minimum spacing		s_{min}	[mm]	120	120	120	120	120	120	120	120
Edge distance		c_{cr}	[mm]	100	100	100	120	120	120	100	120
Minimum edge distance		c_{min} [1)]	[mm]	60	60	60	60	60	60	60	60
Approved tension load for compressive strength	$f_b \geq 8$ N/mm²	appr. N	[kN]	0,43	0,43	0,43	1,29	1,29	1,29	0,43	1,29
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,57	0,57	0,71	1,71	1,71	1,71	0,57	1,71
	$f_b \geq 14$ N/mm²	appr. N	[kN]	0,71	0,71	0,71	1,86	1,86	1,86	0,71	1,86
Approved shear load for compressive strength	$f_b \geq 8$ N/mm²	appr. V	[kN]	0,71	1,14	1,14	1,14	1,14	1,14	1,14	1,14
	$f_b \geq 12$ N/mm²	appr. V	[kN]	0,86	1,29	1,29	1,29	1,29	1,29	1,29	1,29
	$f_b \geq 14$ N/mm²	appr. V	[kN]	1,00	1,71	1,71	1,71	1,71	1,71	1,71	1,71

[1)] For $V_{Rk,c}$: c_{min} see ETAG 029, Annex C

ETA-13/0909

Extract from Permissible Service Conditions of European Technical Assessment ETA-13/0909 for use in masonry

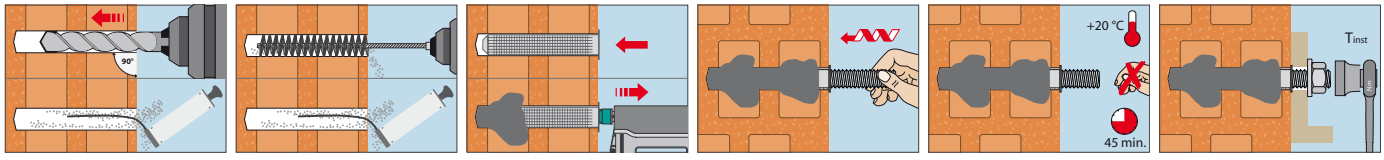
Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection system VMU plus, perforated brick with Perfo Sleeve

Calcium silicate hollow brick KSL-12DF according EN 771-2, Bulk density ρ: 1,4 kg/dm³, Minimum brick size: 498x175x238 mm (e.g. Wemding)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130		16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130		85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	498	498	498	498	498		498	498
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	238	238	238	238	238		238	238
Minimum spacing		s_{min}	[mm]	120	120	120	120	120		120	120
Edge distance		c_{cr}	[mm]	100	100	100	120	120		100	120
Minimum edge distance		c_{min} [1)]	[mm]	100	100	100	120	120		100	120
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,17	0,17	0,71	0,43	0,71		0,17	0,43
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,21	0,21	0,86	0,43	0,86		0,21	0,43
	$f_b \geq 16$ N/mm²	appr. N	[kN]	0,26	0,26	1,14	0,57	1,14		0,26	0,57
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,71	1,57	1,57	1,57	1,57		1,57	1,57
	$f_b \geq 12$ N/mm²	appr. V	[kN]	0,86	1,86	1,86	1,86	1,86		1,86	1,86
	$f_b \geq 16$ N/mm²	appr. V	[kN]	1,00	2,29	2,29	2,29	2,29		2,29	2,29
Hollow lightweight concrete Bloc creux B40 according EN 771-3, Bulk density ρ: 0,8 kg/dm³, Minimum brick size: 494x200x190 mm (e.g. Sepa)											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**		**M12 / M16**			**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130		16x85	20x85
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130		85	85
Spacing parallel to horizontal joint		$s_{cr,II}$	[mm]	494	494	494	494	494		494	494
Spacing perpendicular to horizontal joint		$s_{cr,\perp}$	[mm]	190	190	190	190	190		190	190
Minimum spacing		s_{min}	[mm]	100	100	100	100	100		100	100
Edge distance		c_{cr}	[mm]	100	100	100	120	120		100	120
Minimum edge distance		c_{min} [1)]	[mm]	100	100	100	120	120		100	120
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,34	0,34	0,34	0,34	0,34		0,34	0,34
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,86	0,86	0,86	0,86	0,86		0,86	0,86
Installation parameter in perforated bricks with Perfo Sleeve											
Threaded Stud: Steel: ≥ FKL. 5.8, A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**			**M12 / M16**		**IG-M6**	**IG-M8 / IG-M10**
Perfo Sleeve VM-SH				12x80	16x85	16x130	20x85	20x130	20x200	16x85	20x85
Drill hole diameter		d_o	[mm]	12	16	16	20	20	20	16	20
Depth of drill hole		h_o	[mm]	85	90	135	90	135	205	90	90
Minimum wall thickness		h_{min}	[mm]	115	115	145	115	175	240	115	115
Clearance hole in the fixture		$d_f \leq$	[mm]	9	9 / 12	9 / 12	14 / 18	14 / 18	14 / 18	7	9 / 12
Installation torque		$T_{inst,max}$	[Nm]					2			
Amount of adhesive per drill hole			[ml]	11,2	24,9	38,0	41,1	62,9	96,7	24,9	41,1
Drill holes per cartridge VMU plus 280 / 300			[pcs.]	21 / 23	9 / 10	6 / 6	5 / 6	3 / 4	2 / 2	9 / 10	5 / 6
Drill holes per cartridge VMU plus 345 / 410			[pcs.]	27 / 33	12 / 14	8 / 9	7 / 9	4 / 5	3 / 3	12 / 14	7 / 9
Drilling method								Rotary drilling			

[1)] For $V_{Rk,c}$: c_{min} see ETAG 029, Annex C

Installation in perforated brickwork

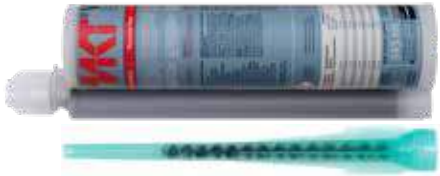


Injection System VMU plus

for post-installed rebar connection

Reinforcement Bars B500

Tension Anchor ZA



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

Cartridge VMU plus 410
Coaxial cartridge
Content: 410ml

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

ETA-11/0514

R30-R120

Injection Cartridge VMU plus

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

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

One static mixer VM-X (VMU plus 825: VM-XL) comes with each cartridge.
[1]Cartridge VMU plus 280 comes with 2 mixers.
[2]With larger cross section for larger drill holes or post-installed rebar connections.

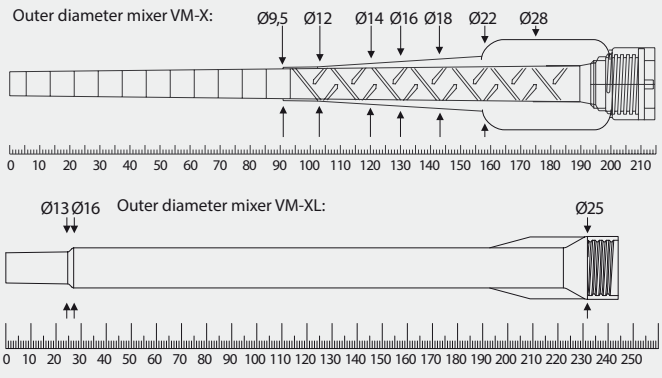
Curing Time Injection Adhesive VMU plus for post-installed rebar connection

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

[1]When installing

Usable length Static mixer VM-X and VM-XL

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



Description

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

Advantages

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

Application examples for post-installed rebar connection:
Subsequent connection of stairs, balconies, walls or columns, closing of wall and ceiling openings.

Application examples for tension anchors:
Anchoring of railing posts and of supports subject to bending loads, anchoring of cantilevered components.

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

Rebar Ø	Tension Anchor	Drill bit Ø	Blow-out pump / Air gun	Cleaning brush RB	Retaining washer VM-IA	Extension tube	Maximum permissible drilling depth for dispenser		
							VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku	VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic	VM-P 825 Pneumatic
mm	mm	mm					mm	mm	mm
8		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	700	800	800
10		14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	700	1000	1000
12	ZA-M12	16	VM-ABP 200 / 1000 DLS with RS, RS25	RB 16 M6 RB 16 M8	VM-IA 16	VM-XE 10	700	1000	1200
14		18	VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10[2], VM-XLE 16[3]	700	1000	1400
16	ZA-M16	20	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10[2], VM-XLE 16[3]	700	1000	1600
20	ZA-M20	25	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8 RB 26 M6	VM-IA 25	VM-XE 10[2], VM-XLE 16[3]	500	700	2000
22		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28	VM-XE 10[2], VM-XLE 16[3]	500	700	2000
24/25	ZA-M24	32	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10[2], VM-XLE 16[3]	500	500	2000
28		35	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10[2], VM-XLE 16[3]	500	500	2000
32		40	VM-ABP 250 / 500 / 1000	RB 40 M6	VM-IA 40	VM-XE 10[2], VM-XLE 16[3]	500	500	2000
See page			**178**	**179**	**181**	**180**	**181 / 182**	**182**	**182**

[1]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 14$ mm, retaining washer and extension tube must be used for horizontal and overhead installation and for drill hole depths > 240 mm.

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

[3]Only in connection with static mixer VM-XL

System case and accessories for post-installed rebar connections

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

Drilling
– Drilling aid device
– Flat- / Ring wrench

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

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

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

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

ETA-11/0514

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

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

[1] The values $f_{bd,PIR}$ are valid for "good" bond conditions according to EN 1992-1-1:2004.
[2] rebar ø28 and ø32

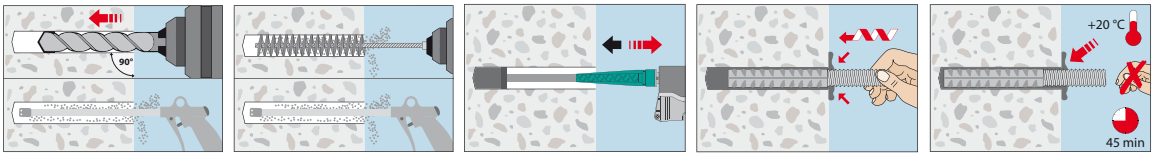
Installation parameters and amount of adhesive for post-installed rebar connection

Rebar-Ø		[mm]	8	10	12	14	16	20	22	24	25	28	32
Drill hole-Ø	d_0	[mm]	12	14	16	18	20	25	28	32	32	35	40
Amount of adhesive/100 mm setting depth		[ml]	8,46	10,12	11,78	13,44	15,09	23,11	30,4	44,65	40,03	44,22	57,32

Installation parameters Injection System VMU plus with Tension Anchor

Tension Anchor ZA			**ZA M12**	**ZA M16**	**ZA M20**	**ZA M24**
Rebar		[mm]	12	16	20	25
Drill hole diameter	d_0	[mm]	16	20	25	32
Diameter of clearance hole	$d_f \leq$	[mm]	14	18	22	26
Effective setting depth	lv	[mm]	according to static calculation			
Installation torque	Tinst ≤	[Nm]	50	100	150	150
Width across nut	SW	[mm]	19	24	30	36
Tension Anchor ZA see page			**176**	**176**	**176**	**on request**

Installation



Injection System VME plus

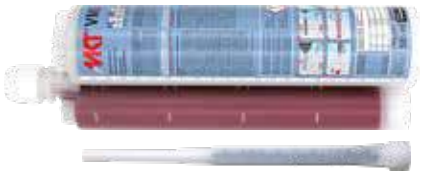
Threaded Stud V-A

Threaded Stud VMU-A

Threaded Stud VM-A
1 meter length, to be cut to the required length

Internally Threaded Sleeve VMU-IG

Cartridge VME plus 440
Side-by-side cartridge
Content: 440ml



Cartridge VME plus 585
Side-by-side cartridge
Content: 585ml

ETA-19/0483 · ETA-19/0671 · SEISMIC C1: M8-M30, Ø8-Ø32 C2: M12-M24 · 100 YEARS · F30-F120 · Allgemeine Bauartgenehmigung Z-21.8-2126 als Beton-Beton-Verbinder · Allgemeine Bauartgenehmigung Z-74.8-210 in beschichteten Betonflächen in LAU-Anlagen

ESR - 4861 · NSF Certified to NSF/ANSI 61 · A+ · EDELSTAHL Rostfrei

Range of loading:	**3,2 kN–221,6 kN**
Concrete quality:	**C20/25–C50/60**
Material:	**Steel, zinc plated, hot dip galvanized, stainless steel A4, stainless steel HCR**

Description
The Injection System VME plus is a slow curing injection system based on an epoxy adhesive. Due to the European Technical Assessment for fixings in cracked and uncracked concrete as well as for post-installed rebar connections, it is highly versatile. As the Injection System VME plus does not shrink during curing, it is particularly suitable for fixings requiring high impermeability.

By using the hollow drill bit SB, contamination and dust exposure of the respiratory tract can be reduced to a minimum and subsequent drill hole cleaning is not necessary. As anchoring elements the threaded studs VMU-A, VM-A and V-A, the internally threaded sleeves VMU-IG also standard threaded studs with strength test certificate 3.1 or reinforcement bars can be used.

Advantages
- European Technical Assessment in cracked and uncracked concrete
- Very high, approved loads
- Long processing time, even at high temperatures
- No shrinkage, therefore very high tightness of the fastenings
- Working life 100 years for use in concrete (ETA-19/0483)
- Approved under seismic action of category C1 (threaded studs M8 - M30, reinforcing steel Ø8 - Ø32) and C2 (threaded studs M12 - M24 galvanized steel: FKL ≥8.8, A4, HCR: FKL ≥70)
- For higher loads under seismic action, the annular gap between the anchor rod and the fixing element can be filled using the Filling Washer VS.
- Fire test report for all diameters
- ICC Evaluation Service listing, USA (ESR-4861)
- General design approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany as concrete-to-concrete connector (Z-21.8-2126)
- General design approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany for use in coated concrete members in storage-filling-handling plants (Z-74.8-210)
- Approved for installation in dry and wet concrete and in water-filled drill holes
- Variable anchorage depths allow flexible adaptation to the respective load situation, reduce the drilling effort and adhesive consumption
- Versatile in application
- The wide range of threaded studs VMU-A, VM-A, V-A and internally threaded sleeves VMU-IG as well as the use of standard threaded studs with strength test certificate 3.1 or reinforcement bars allows any requirement to be met
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- Drill hole creation with diamond drill in uncracked concrete without seismic action
- When using the hollow drill bit SB the subsequent cleaning of the borehole is not necessary
- Opened cartridges can be reused with a new static mixer
- Styrene-free

Applications
Heavy duty fastenings in cracked and uncracked concrete: Steel structures, railings, base plates, supports, brackets, facade structures.
Fastenings with rebar in cracked and uncracked concrete with shear force: Shear connectors, wall connecting reinforcement, concrete joints.

Injection Cartridge VME plus

- Long processing time
- No shrinkage

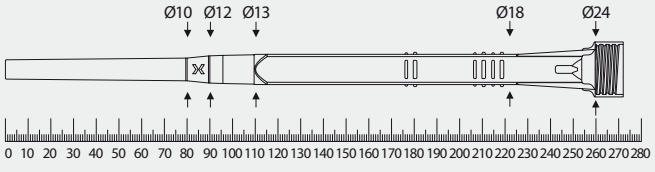
Description	Ref. No.	Content ml	Content of master box pcs.	Weight per master box kg	Weight per piece kg
Cartridge VME plus 440	28258001	440	12	9,79	0,78
Cartridge VME plus 585	28258243	585	12	12,28	1,02
Cartridge VME plus 1400	28258401	1400	5	12,84	2,52
Static mixer VM-XHP	28305301	-	12	0,18	0,01

One static mixer VM-XHP comes with each cartridge

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Curing Time Injection Adhesive VME plus

- Cartridge temperature when installing +5°C to +40°C

Temperature (°C) of the concrete	maximum working time	minimum curing time dry concrete	wet concrete
0°C to +4°C[1]	90 min	144 h	288 h
+5°C to +9°C	80 min	48 h	96 h
+10°C to +14°C	60 min	28 h	56 h
+15°C to +19°C	40 min	18 h	36 h
+20°C to +24°C	30 min	12 h	24 h
+25°C to +34°C	12 min	9 h	18 h
+35°C to +39°C	8 min	6 h	12 h
+40°C	8 min	4 h	8 h

[1]Drill hole temperature 0°C to + 4°C for fastenings in concrete (ETA-19/0483)

Accessories for Injection System VME plus

Threaded stud	Internally threaded stud	Rebar Ø mm	Drill bit Ø mm	Blow-out pump[1] / Air gun[1]	Cleaning brush RB[1]	Retaining Washer VM-IA[2]	Extension tube[1]	Dispenser
M8		8	10	VM-ABP 200	RB 10 M6		VM-XE 10	VM-P 585 Standard, VM-P 585 Profi, VM-P 585 Akku, VM-P 585 Pneumatic VM-P 1400 Pneumatic
M10	VMU-IG M6	8 / 10	12	VM-ABP 200	RB 12 M6 RB 12 M8		VM-XE 10	
M12	VMU-IG M8	10 / 12	14	VM-ABP 200	RB 14 M6 RB 14 M8		VM-XE 10	
		12	16	VM-ABP 200	RB 16 M6 RB 16 M8		VM-XE 10	
M16	VMU-IG M10	14	18	VM-ABP 200 / 250 / 500 / 1000	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10 VM-XLE 16	
		16	20	VM-ABP 200 / 250 / 500 / 1000	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10 VM-XLE 16	
M20	VMU-IG M12		22	VM-ABP 250 / 500 / 1000	RB 22 M6	VM-IA 22	VM-XE 10 VM-XLE 16	
		20	25	VM-ABP 250 / 500 / 1000	RB 25 M8 RB 26 M6	VM-IA 25	VM-XE 10 VM-XLE 16	
M24	VMU-IG M16		28	VM-ABP 250 / 500 / 1000	RB 28 M6	VM-IA 28	VM-XE 10 VM-XLE 16	
M27			30	VM-ABP 250 / 500 / 1000	RB 30 M6	VM-IA 30	VM-XE 10 VM-XLE 16	
		24 / 25	32	VM-ABP 250 / 500 /1000	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10 VM-XLE 16	
M30	VMU-IG M20	28	35	VM-ABP 250 / 500 / 1000	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10 VM-XLE 16	
		32	40	VM-ABP 250 / 500 / 1000	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16	
See page				**178**	**179**	**181**	**180**	**181 / 182**

[1]When using the MKT hollow drill SB (see page 177) the subsequent cleaning of the borehole is not necessary

[2]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 18$ mm, retaining washer and extension tube must be used for overhead installation and for drill hole depths > 250 mm.

Threaded studs for Injection System VME plus

Threaded stud VMU-A
Steel, zinc plated 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8 on demand

Threaded stud VMU-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions

Threaded stud VMU-A A4
Stainless steel A4-70
Dimensions see page 172

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel HCR on request

Internally threaded sleeve VMU-IG
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- With internal thread

Internally threaded sleeve VMU-IG A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- With internal thread

Threaded stud V-A
Steel, zinc plated 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A 8.8
Steel, zinc plated 8.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A A4
Stainless steel A4-70
Dimensions see page 173

- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded stud V-A HCR
Stainless steel HCR-70
Dimensions see page 173

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded stud VM-A
Steel 5.8, zinc plated
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded stud VM-A 8.8
Steel 8.8, zinc plated
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded stud VM-A
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- 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

Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0483 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances for working life of up to 50 years in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +72°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 199.

Loads and performance data

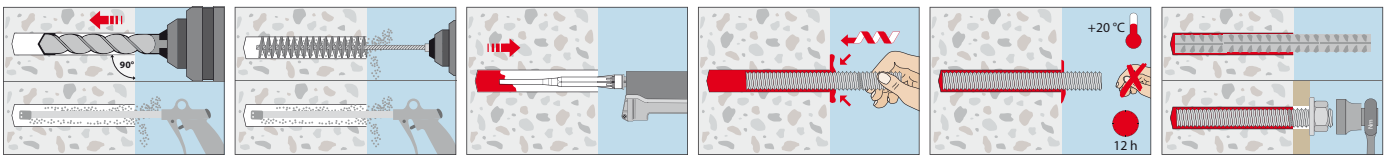
Injection System VME plus, threaded stud steel 5.8					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Range of anchorage depths		$h_{ef,min}$ - $h_{ef,max}$		[mm]	60 - 160	60 - 200	70 - 240	80 - 320	90 - 400	96 - 480	108 - 540	120 - 600
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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
	50°C/72°C [1]	C20/25	appr. N	[kN]	4,3 - 8,6	5,4 - 13,8	8,8 - 20,0	11,7 - 37,1	14,0 - 58,1	15,4 - 83,8	18,4 - 109,5	21,6 - 133,3
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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
	50°C/72°C [1]	C20/25	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	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
	50°C/72°C [1]	C20/25	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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/72°C [1]	C20/25	appr. 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
Injection System VME plus, threaded stud steel 8.8												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,0 - 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
	50°C/72°C [1]	C20/25	appr. N	[kN]	4,3 - 11,5	5,4 - 18,0	8,8 - 30,2	11,7 - 53,6	14,0 - 83,8	15,4 - 120,6	18,4 - 152,7	21,6 - 188,5
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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
	50°C/72°C [1]	C20/25	appr. N	[kN]	10,8 - 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	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
	50°C/72°C [1]	C20/25	appr. V	[kN]	8,6	10,8 - 13,1	17,6 - 19,4	23,5 - 36,0	28,0 - 56,0	30,8 - 80,6	36,8 - 105,1	43,1 - 128,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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/72°C [1]	C20/25	appr. 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
Injection System VME plus, threaded stud stainless steel A4-70, HCR-70												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,0 - 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
	50°C/72°C [1]	C20/25	appr. N	[kN]	4,3 - 9,9	5,4 - 15,7	8,8 - 22,5	11,7 - 42,0	14,0 - 65,3	15,4 - 94,3	18,4 - 57,4	21,6 - 70,2
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. 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
	50°C/72°C [1]	C20/25	appr. 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
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	6,0	9,2	13,7	23,5 - 25,2	28,0 - 39,4	30,8 - 56,8	34,5	42,0
	50°C/72°C [1]	C20/25	appr. V	[kN]	6,0	9,2	13,7	23,5 - 25,2	28,0 - 39,4	30,8 - 56,8	34,5	42,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	44,1 - 56,8	34,5	42,0
	50°C/72°C [1]	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	44,1 - 56,8	34,5	42,0
Spacing and edge distance												
Min. thickness of concrete for $h_{ef,min}$ - $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270	116 - 356	134 - 444	152 - 536	168 - 600	190 - 670
Minimum spacing			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
Installation parameters												
Drill hole diameter			d_o	[mm]	10	12	14	18	22	28	30	35
Clearance hole in the fixture for Pre-setting installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Clearance hole in the fixture for Through-setting installation			$d_f \leq$	[mm]	12	14	16	20	24	30	33	40
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			$T_{inst} \leq$	[Nm]	10	20	40 (FKL4.6: 35)	60	100	170	250	300
Amount of adhesive per 100 mm drill hole 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 strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-19/0483

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

Installation



Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0483 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances for working life of up to 50 years in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +72°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data				Temperature range I -40°C to +24°C/+40°C[1] and temperature range II -40°C to +50°C/+72°C[1]								
Internally Threaded Sleeve				**IG M6 x 80**	**IG M6 x 90**	**IG M8 x 80**	**IG M8 x 100**	**IG M10 x 80**	**IG M10 x 100**	**IG M12 x 125**	**IG M16 x 170**	**IG M20 x 200**
Anchorage depth h_{ef}			[mm]	80	90	80	100	80	100	125	170	200
Injection System VME plus, Internally Threaded Sleeve VMU-IG steel 5.8												
Approved loads, tension for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	11,7	13,8	20,0	36,2	46,4
Uncracked concrete	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	13,8	13,8	20,0	36,2	58,6
Approved loads, shear for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Uncracked concrete	C20/25	appr. N	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Injection System VME plus, Internally Threaded Sleeve VMU-IG Stainless steel A4-70, HCR-70												
Approved loads, tension for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	11,7	15,7	22,5	36,3	31,0
Uncracked concrete	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	15,7	15,7	22,5	42,0	31,0
Approved loads, shear for h_{ef}												
Cracked concrete	C20/25	appr. N	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Uncracked concrete	C20/25	appr. N	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Spacing and edge distance												
Min. thickness of concrete		h_{min}	[mm]	110	120	110	130	116	136	169	226	270
Minimum spacing		s_{min}	[mm]	50	50	60	60	75	75	95	115	140
Minimum edge distance		c_{min}	[mm]	40	40	45	45	50	50	60	65	80
Installation parameters												
Drill hole diameter		d_0	[mm]	12	12	14	14	18	18	22	28	35
Clearance hole in the fixture		$d_f \leq$	[mm]	7	7	9	9	12	12	14	18	22
Drill hole depth		h_0	[mm]	80	90	80	100	80	100	125	170	200
Installation torque		$T_{inst} \leq$	[Nm]	10	10	10	10	20	20	40	60	100
Amount of adhesive per 100mm drill hole			[ml]	6,6	7,4	7,9	9,9	10,9	13,6	22,4	54,9	97,4

[1]Max. long term temperature/max. short term temperature

Higher concrete strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-19/0483.

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

Loads and performance data					Temperature range I -40°C to +24°C/+40°C[1] and temperature range II -40°C to +50°C/+72°C[1]									
Injection System VME plus, rebar B500B					**ø8**	**ø10**	**ø12**	**ø14**	**ø16**	**ø20**	**ø24**	**ø25**	**ø28**	**ø32**
Range of anchorage depths			$h_{ef,min}$ - $h_{ef,max}$	[mm]	60 - 160	60 - 200	70 - 240	75 - 280	80 - 320	90 - 4 00	96 - 480	100 - 500	112 - 560	128 - 640
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$					cracked concrete									
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,0 - 13,4	6,3 - 20,9	9,6 - 31,2	10,7 - 42,4	11,7 - 55,4	14,0 - 86,6	15,4 - 124,6	16,4 - 135,2	19,4 - 169,6	23,7 - 221,6
	50°C/72°C[1]	C20/25	appr. N	[kN]	4,3 - 11,5	5,4 - 18,0	8,8 - 30,2	10,7 - 41,1	11,7 - 53,6	14,0 - 83,8	15,4 - 120,6	16,4 - 130,9	19,4 - 164,2	23,7 - 214,5
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$					uncracked concrete									
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	10,9 - 13,8	10,9 - 21,6	13,7 - 31,2	15,2 - 42,4	16,8 - 55,4	20,0 - 86,6	22,0 - 124,6	23,4 - 135,2	27,8 - 169,6	33,9 - 221,6
	50°C/72°C[1]	C20/25	appr. N	[kN]	8,6 - 13,8	10,8 - 21,6	13,7 - 31,2	15,2 - 42,4	16,8 - 55,4	20,0 - 86,6	22,0 - 124,6	23,4 - 135,2	27,8 - 169,6	33,9 - 221,6
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$					cracked concrete									
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	23,5 - 25,9	28,0 - 40,4	30,8 - 58,2	32,8 - 63,1	38,9 - 79,2	47,5 - 103,4
	50°C/72°C[1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	23,5 - 25,9	28,0 - 40,4	30,8 - 58,2	32,8 - 63,1	38,9 - 79,2	47,5 - 103,4
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$					uncracked concrete									
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,0 - 40,4	44,1 - 58,2	46,9 - 63,1	55,5 - 79,2	67,8 - 103,4
	50°C/72°C[1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,0 - 40,4	44,1 - 58,2	46,9 - 63,1	55,5 - 79,2	67,8 - 103,4
Spacing and edge distance														
Min. thickness of concrete for $h_{ef,min}$ - $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270 / 102 - 272[2]	111 - 316	120 - 360	140 - 450	160 - 544	164 - 564	182 - 630	208 - 720
Minimum spacing			s_{min}	[mm]	40	50	60	70	75	95	120	120	130	150
Minimum edge distance			c_{min}	[mm]	35	40	45	50	50	60	70	70	75	85
Installation parameters														
Drill hole diameter			d_0	[mm]	10/12[2]	12/14[2]	14/16[2]	18	20	25	32	32	35	40
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$			h_0	[mm]	60 - 160	60 - 200	70 - 240	75 - 280	80 - 320	90 - 400	96 - 480	100 - 500	112 - 560	128 - 640
Amount of adhesive per 100mm drill hole depth				[ml]	4,16/8,46[3]	5,07/10,12[3]	5,97/11,78[3]	13,44	15,09	23,11	44,65	40,03	44,22	57,32

[1]Max. long term temperature/max. short term temperature

[2]For rebar Ø8, Ø10 and Ø12 both drill hole diameters are possible

[3]The first value applies to the smaller drill diameter, the second value to the larger drill diameter.

Higher concrete strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-19/0483.

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

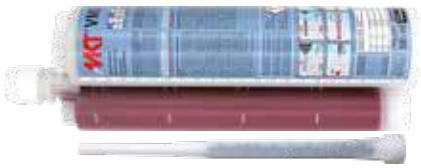
Injection System VME plus

for post-installed rebar connection

Reinforcement Bars B500

Tension Anchor ZA

Cartridge VME plus 440
Side-by-side cartridge
Content: 440ml



Cartridge VME plus 585
Side-by-side cartridge
Content: 585ml

R30-R120

Injection Cartridge VME plus

- Long processing time
- Almost no shrinkage

Description	Ref. No.	Content ml	Content of master box pcs.	Weight per master box kg	Weight per piece kg
Cartridge VME plus 440	28258001	440	12	9,79	0,78
Cartridge VME plus 585	28258243	585	12	12,28	1,02
Cartridge VME plus 1400	28258401	1400	5	12,84	2,50
Static mixer VM-XHP	28305301	-	12	0,18	0,01

Curing Time Injection Adhesive VME plus

- Cartridge temperature when installing +5°C to +40°C

Temperature (°C) of the base material	maximum working time	minimum curing time dry base material	minimum curing time wet base material
+5°C to +9°C	80 min	48 h	96 h
+10°C to +14°C	60 min	28 h	56 h
+15°C to +19°C	40 min	18 h	36 h
+20°C to +24°C	30 min	12 h	24 h
+25°C to +34°C	12 min	9 h	18 h
+35°C to +39°C	8 min	6 h	12 h
+40°C	8 min	4 h	8 h

Description
The Injection System VME plus also has the European Technical Assessment for post-installed rebar connection. Reinforcement Bars with diameters from 8mm to 40mm as well as tension anchors from M12 to M24 with a setting depth of up to 2m can be fixed.

By using the hollow drill bit SB the drilling dust is sucked off during drilling directly at the point of origin. This reduces pollution and dust load of the respiratory tract to a minimum. Subsequent well cleaning - brushing and blowing out - is also no longer necessary.

Advantages
- Long processing time, therefore ideal for large embedment depths and for high temperatures
- Wide range of application, as up to 40mm rebar diameter allowed
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- When using the hollow drill bit SB the subsequent cleaning of the borehole is not necessary
- Approved for installation in dry and wet concrete
- Approved for use under fire exposure
- Opened cartridges can be reused with a new static mixer
- Tie rods ZA with connecting thread M12 - M24 can be supplied in individual lengths on request

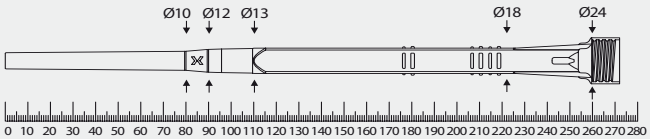
Applications for post-installed rebar connection:
Subsequent connection of stairs, balconies, walls or columns, closing of wall and ceiling openings

Application examples tension anchor:
Anchoring of railing posts and of supports subject to bending loads, anchoring of cantilevered components

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Accessories Injection System VME plus for post-installed rebar connection

Rebar Ø	Tension Anchor	Drill Bit Ø	Blow-out pump / Air gun[1]	Cleaning brush RB[1]	Retaining washer VM-IA[2]	Extension tube[2][3]	Maximum permissible drilling depth for dispenser: VM-P 585 Standard, VM-P 585 Profi, VM-P 585 Akku	Maximum permissible drilling depth for dispenser: VM-P 585 Pneumatic	Maximum permissible drilling depth for dispenser: VM-P 585 Pneumatic
mm		mm					mm	mm	mm
8		10	VM-ABP 200	RB 10 M6		VM-XE 10	250	250	250
8		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	700	800	800
10		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	250	250	250
10		14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	700	1000	1000
12	ZA-M12	14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	250	250	250
12	ZA-M12	16	VM-ABP 200 / 1000 DLS with RS, RS25	RB 16 M6 RB 16 M8	VM-IA 16	VM-XE 10	700	1300[1]	1200[1]
14		18	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10 VM-XLE 16	700	1300[1]	1400[1][3]
16	ZA-M16	20	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10 VM-XLE 16	700	1300[1]	1600[1][3]
20	ZA-M20	25[4]	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8[4]	VM-IA 25	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
22		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
24/25	ZA-M24	32	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
28		35	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
32		40	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
34		40	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16		1000	2000[1][3]
36		45	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 45 M6	VM-IA 45	VM-XE 10 VM-XLE 16		1000	2000[1][3]
40		55	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 55 M6	VM-IA 55	VM-XE 10 VM-XLE 16		1000	2000[1][3]
See page			**178**	**179**	**181**	**180**	**181 / 182**	**182**	**182**

[1] When using the hollow drill SB the subsequent cleaning of the borehole is not necessary (drill-Ø $d_0 \leq 40$ mm, drill hole depth $h_1 \leq 1.000$ mm)

[2] If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 14$ mm, retaining washer and extension tube must be used for horizontal and overhead installation and for drill hole depths > 240 mm.

[3] From an anchoring depth of $l_v > 1300$ mm only the mixer extension VM-XLE 16 is permitted

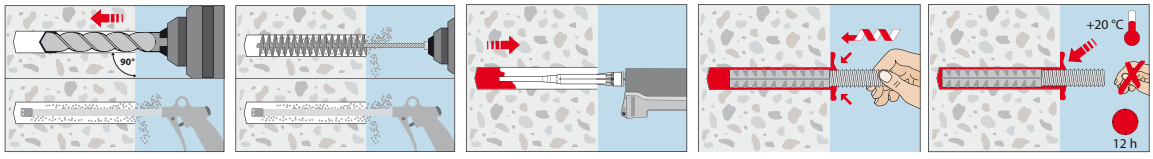
[4] Hammer- or suction drilling. Pneumatic drilling: drill-Ø 26, Cleaning Brush RB 26 M6

Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0671 for post-installed Rebar Connections with VME plus

Rod diameter				**Ø8**	**Ø8**	**Ø10**	**Ø10**	**Ø12**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø20**	**Ø22**	**Ø24**	**Ø25**	**Ø28**	**Ø32**	**Ø34**	**Ø36**	**Ø40**
Tension Anchor ZA / threaded stud									ZA M12		ZA M16	ZA M20				ZA M24					
Drill hole diameter		d_0	[mm]	10	12	12	14	14	16	18	20	25	26	28	32	32	35	40	40	45	55
Design value of bond strength [1] $f_{bd,PIR}$ [N/mm²]																					
Concrete strength	C12/15	$f_{bd,PIR}$	[N/mm²]	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,5	1,5
	C16/20	$f_{bd,PIR}$	[N/mm²]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	1,9	1,8
	C20/25	$f_{bd,PIR}$	[N/mm²]	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,2	2,1
	C25/30	$f_{bd,PIR}$	[N/mm²]	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,6	2,6	2,5
	C30/37	$f_{bd,PIR}$	[N/mm²]	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	2,9	2,9	2,8
	C35/45	$f_{bd,PIR}$	[N/mm²]	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,3	3,3	3,1
	C40/50	$f_{bd,PIR}$	[N/mm²]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,6	3,6	3,4
	C45/55	$f_{bd,PIR}$	[N/mm²]	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	3,9	3,8	3,7
	C50/60	$f_{bd,PIR}$	[N/mm²]	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,2	4,1	4,0
Installation parameters reinforcing steel B500B																					
Amount of adhesive /100 mm setting depth			[ml]	4,16	8,46	5,07	10,12	5,97	11,78	13,44	15,09	23,11	27,99	30,40	44,65	40,03	44,22	57,32	44,88	72,11	138,47
Installation parameters Tension Anchor ZA																					
Tension Anchor ZA / threaded stud									ZA M12		ZA M16	ZA M20				ZA M24					
Clearance hole in the fixture		d_f	[mm]						14		18	22				26					
Effective setting depth		lv	[mm]								according to static calculation										
Installation torque		$T_{inst} \leq$	[Nm]						50		100	150				150					
Width across nut		SW	[mm]						19		24	30				36					
Amount of adhesive /100 mm setting depth			[ml]						11,78		15,09	23,11				40,03					
Different tension anchors see page									**176**		**176**	**176**				**on request**					

[1] The values for $f_{bd,PIR}$ are valid for good bonding conditions according to EN 1992-1-1:2004

Installation



Injection System VME basic

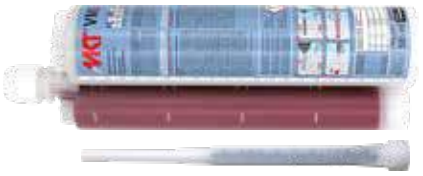
Threaded Stud V-A

Threaded Stud VMU-A

Threaded Stud VM-A
1 meter length, to be cut to the required length

Internally Threaded Sleeve VMU-IG

Cartridge VME basic 440
Side-by-side cartridge
Content: 440 ml



Cartridge VME basic 585
Side-by-side cartridge
Content: 585 ml

ETA-21/0787 ETA-21/0788

Range of loading:	**1,8 kN–221,6 kN**
Concrete quality:	**C20/25–C50/60**
Material:	**Steel, zinc plated, hot dip galvanized, stainless steel A4, stainless steel HCR**

Description
The VME basic injection system is based on a slow curing epoxy adhesive. It has the European Technical Assessments for fixings in cracked and uncracked concrete as well as for post-installed rebar connections. The cost-effective injection mortar for the medium load range is particularly suitable for large diameters and deep boreholes.

By using the hollow drill bit SB, contamination and dust exposure of the respiratory tract can be reduced to a minimum and subsequent drill hole cleaning is not necessary.

As anchoring elements the threaded studs VMU-A, VM-A and V-A, the internally threaded sleeves VMU-IG also standard threaded studs with strength test certificate 3.1 or reinforcement bars can be used.

Advantages
- European Technical Assessment in cracked and uncracked concrete
- Long processing time, even at high temperatures
- No shrinkage, therefore very high tightness of the fastenings
- Approved for installation in dry and wet concrete and in water-filled drill holes
- Variable anchorage depths allow flexible adaptation to the respective load situation, reduce the drilling effort and adhesive consumption
- Versatile in application
- The wide range of threaded studs VMU-A, VM-A, V-A and internally threaded sleeves VMU-IG as well as the use of standard threaded studs with strength test certificate 3.1 or reinforcement bars allows any requirement to be met
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- When using the hollow drill bit SB the subsequent cleaning of the borehole is not necessary
- Opened cartridges can be reused with a new static mixer
- Styrene-free

Applications
Fastenings in cracked and uncracked concrete: Steel structures, railings, base plates, supports, brackets, facade structures.
Fastenings with rebar in cracked and uncracked concrete with shear force: Shear connectors, wall connecting reinforcement, concrete joints.

Injection Cartridge VME basic

- Long processing time
- No shrinkage

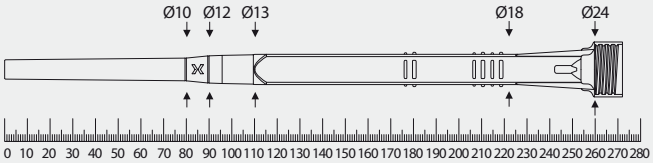
Description	Ref. No.	Content ml	Content of master box pcs.	Weight per master box kg	Weight per piece kg
Cartridge VME basic 440	28258143	440	12	9,79	0,78
Cartridge VME basic 585	28258343	585	12	12,28	1,02
Static mixer VM-XHP	28305301	-	12	0,18	0,01

One static mixer VM-XHP comes with each cartridge

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Curing Time Injection Adhesive VME basic

- Cartridge temperature when installing +5°C to +40°C

Temperature (°C) of the concrete	maximum working time	minimum curing time dry concrete	minimum curing time wet concrete
+5°C bis +9°C	80 min	60 h	120 h
+10°C bis +14°C	60 min	48 h	96 h
+15°C bis +19°C	40 min	24 h	48 h
+20°C bis +24°C	30 min	12 h	24 h
+25°C bis +34°C	12 min	10 h	20 h
+35°C bis +39°C	8 min	7 h	14 h
+40°C	8 min	4 h	8 h

Accessories for Injection System VME basic

Threaded stud	Internally threaded stud	Rebar Ø mm	Drill bit Ø mm	Blow-out pump[1] / Air gun[1]	Cleaning brush RB[1]	Retaining Washer VM-IA[2]	Extension tube[1]	Dispenser
M8		8	10	VM-AP 360[2] VM-ABP 200	RB 10 M6		VM-XE 10	VM-P 585 Standard, VM-P 585 Profi, VM-P 585 Akku, VM-P 585 Pneumatic
M10	VMU-IG M6	8 / 10	12	VM-AP 360[2] VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	
M12	VMU-IG M8	10 / 12	14	VM-AP 360[2] VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8		VM-XE 10	
		12	16	VM-AP 360[2] VM-ABP 200 DLS with RS, RS25	RB 16 M6 RB 16 M8		VM-XE 10	
M16	VMU-IG M10	14	18	VM-AP 360[2] VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10 VM-XLE 16	
		16	20	VM-AP 360[2] VM-ABP 200 / 250 / 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10 VM-XLE 16	
M20	VMU-IG M12		22	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 22 M6	VM-IA 22	VM-XE 10 VM-XLE 16	
		20	25	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8 RB 26 M6	VM-IA 25	VM-XE 10 VM-XLE 16	
M24	VMU-IG M16		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28	VM-XE 10 VM-XLE 16	
M27			30	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 30 M6	VM-IA 30	VM-XE 10 VM-XLE 16	
		24 / 25	32	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10 VM-XLE 16	
M30	VMU-IG M20	28	35	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10 VM-XLE 16	
		32	40	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16	
See page				**178**	**179**	**181**	**180**	**181 / 182**

[1]When using the MKT hollow drill SB (see page 177) the subsequent cleaning of the borehole is not necessary

[2]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 18$ mm, retaining washer and extension tube must be used for overhead installation and for drill hole depths > 250 mm.

Threaded studs for Injection System VME basic

Threaded stud VMU-A
Steel, zinc plated 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8 on demand

Threaded stud VMU-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions

Threaded stud VMU-A A4
Stainless steel A4-70
Dimensions see page 172

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel HCR on request

Internally threaded sleeve VMU-IG
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- With internal thread

Internally threaded sleeve VMU-IG A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- With internal thread

Threaded stud V-A
Steel, zinc plated 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A 8.8
Steel, zinc plated 8.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded stud V-A A4
Stainless steel A4-70
Dimensions see page 173

- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded stud V-A HCR
Stainless steel HCR-70
Dimensions see page 173

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded stud VM-A
Steel 5.8, zinc plated
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded stud VM-A 8.8
Steel 8.8, zinc plated
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded stud VM-A
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- 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

Extract from Permissible Service Conditions of European Technical Assessment ETA-21/0787 for use in cracked and uncracked concrete (Option 1)

Approved loadswithout influence of spacing and edge distance according EN 1992-4 in dry or wet concrete for temperature range I -40°C to + 24°C/+40°C[1)] and for temperature range II -40°C to +43°C/+ 70°C[1)]. The influence of the sustained load has been taken into account by the factor Ψsus = 1.0. A total safety factor (γ_M und γ_F) is included. For further details and temperature ranges, see ETA.

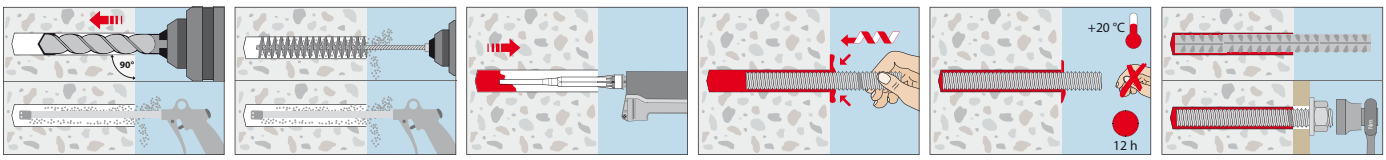
Loads and performance data

Injection System VME basic, threaded stud steel 5.8					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
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[1)]	C20/25	appr. N	[kN]	3,6 - 8,6	4,5 - 13,8	6,3 - 20,0	8,8 - 37,1	10,5 - 58,1	11,5 - 73,9	13,7 - 93,5	16,1 - 115,4
	43°C/70°C[1)]	C20/25	appr. N	[kN]	1,8 - 4,8	2,2 - 7,5	3,1 - 10,8	4,8 - 19,1	6,7 - 29,9	7,4 - 36,9	9,3 - 46,7	11,5 - 57,7
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	7,7 - 8,6	8,0 - 13,8	10,1 - 20,0	12,3 - 37,1	14,7 - 58,1	16,2 - 83,8	19,3 - 109,5	22,6 - 133,3
	43°C/70°C[1)]	C20/25	appr. N	[kN]	3,6 - 8,6	4,5 - 13,8	6,3 - 20,0	8,9 - 35,6	12,5 - 55,6	14,8 - 73,9	18,7 - 93,5	22,6 - 115,4
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	6,3	9,7	14,3	24,5 - 26,9	29,3 - 42,3	32,2 - 60,6	38,5 - 78,9	45,1 - 96,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	5,0 - 6,3	6,3 - 9,7	8,8 - 14,3	13,4 - 26,9	18,8 - 42,3	20,7 - 60,6	26,2 - 78,9	32,3 - 96,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	6,3	9,7	14,3	26,9	41,1 - 42,3	45,2 - 60,6	54,0 - 78,9	63,2 - 96,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	6,3	9,7	14,3	24,9 - 26,9	35,0 - 42,3	41,4 - 60,6	52,3 - 78,9	63,2 - 96,0
Injection System VME basic, threaded stud steel 8.8												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	3,6 - 9,6	4,5 - 15,0	6,3 - 21,5	8,8 - 38,3	10,5 - 59,8	11,5 - 73,9	13,7 - 93,5	16,1 - 115,4
	43°C/70°C[1)]	C20/25	appr. N	[kN]	1,8 - 4,8	2,2 - 7,5	3,1 - 10,8	4,8 - 19,1	6,7 - 29,9	7,4 - 36,9	9,3 - 46,7	11,5 - 57,7
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	7,7 - 13,8	8,0 - 21,9	10,1 - 31,9	12,3 - 59,5	14,7 - 93,3	16,2 - 134,3	19,3 - 175,2	22,6 - 213,8
	43°C/70°C[1)]	C20/25	appr. N	[kN]	3,6 - 9,6	4,5 - 15,0	6,3 - 21,5	8,9 - 35,6	12,5 - 55,6	14,8 - 73,9	18,7 - 93,5	22,6 - 115,4
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	8,6	12,6 - 13,1	17,6 - 19,4	24,5 - 36,0	29,3 - 56,0	32,2 - 80,6	38,5 - 105,1	45,1 - 128,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	5,0 - 8,6	6,3 - 13,1	8,8 - 19,4	13,4 - 36,0	18,8 - 56,0	20,7 - 80,6	26,2 - 105,1	32,3 - 128,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	8,6	13,1	19,4	34,4 - 36,0	41,1 - 56,0	45,2 - 80,6	54,0 - 105,1	63,2 - 128,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	8,6	12,6 - 13,1	17,6 - 19,4	24,9 - 36,0	35,0 - 56,0	41,4 - 80,6	52,3 - 105,1	63,2 - 128,0
Injection System VME basic, threaded stud stainless steel A4-70, HCR-70												
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	3,6 - 9,6	4,5 - 15,0	6,3 - 21,5	8,8 - 38,3	10,5 - 59,8	11,5 - 73,9	13,7 - 57,4	16,1 - 70,2
	43°C/70°C[1)]	C20/25	appr. N	[kN]	1,8 - 4,8	2,2 - 7,5	3,1 - 10,8	4,8 - 19,1	6,7 - 29,9	7,4 - 36,9	9,3 - 46,7	11,5 - 57,7
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. N	[kN]	7,7 - 9,9	8,0 - 15,7	10,1 - 22,5	12,3 - 42,0	14,7 - 65,3	16,2 - 94,3	19,3 - 57,4	22,6 - 70,2
	43°C/70°C[1)]	C20/25	appr. N	[kN]	3,6 - 9,6	4,5 - 15,0	6,3 - 21,5	8,9 - 35,6	12,5 - 55,6	14,8 - 73,9	18,7 - 57,4	22,6 - 70,2
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								cracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	6,0	9,2	13,7	24,5 - 25,2	29,3 - 39,4	32,2 - 56,8	34,5	42,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	5,0 - 6,0	6,3 - 9,2	8,8 - 13,7	13,4 - 25,2	18,8 - 39,4	20,7 - 56,8	26,2 - 34,5	32,3 - 42,0
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$								uncracked concrete				
Range of temperature	24°C/40°C [1)]	C20/25	appr. V	[kN]	6,0	9,2	13,7	25,2	39,4	45,2 - 56,8	34,5	42,0
	43°C/70°C[1)]	C20/25	appr. V	[kN]	6,0	9,2	13,7	24,9 - 25,2	35,0 - 39,4	41,4 - 56,8	34,5	42,0
Spacing and edge distance												
Min. thickness of concrete for $h_{ef,min}$ - $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270	116 - 356	134 - 444	152 - 536	168 - 600	190 - 670
Minimum spacing			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
Installation parameters												
Drill hole diameter			d_o	[mm]	10	12	14	18	22	28	30	35
Clearance hole in the fixture for Pre-setting installation			$d_f \leq$	[mm]	9	12	14	18	22	26	30	33
Clearance hole in the fixture for Through-setting installation			$d_f \leq$	[mm]	12	14	16	20	24	30	33	40
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			$T_{inst} \leq$	[Nm]	10	20	40	60	100	170	250	300
Amount of adhesive per 100 mm drill hole 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 strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-21/0787.

Installation



Extract from Permissible Service Conditions of European Technical Assessment ETA-21/0787 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete with compressed air cleaning for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +43°C (short term temperature +70°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M und γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data

Internally Threaded Sleeve					**IG M6 x 80**	**IG M6 x 90**	**IG M8 x 80**	**IG M8 x 100**	**IG M10 x 80**	**IG M10 x 100**	**IG M12 x125**	**IG M16 x 170**	**IG M20 x 200**
Anchorage depth h_{ef}				[mm]	80	90	80	100	80	100	125	170	200
Injection System VME basic, Internally Threaded Sleeve VMU-IG steel 5.8													
Approved loads, tension for h_{ef}									gerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	4,8	4,8	7,2	8,1	8,4	11,7	16,4	26,0	33,1
	43°C/70°C [1]	C20/25	appr. N	[kN]	3,0	3,4	3,6	4,5	4,8	6,0	9,3	13,1	19,2
Approved loads, tension for h_{ef}									ungerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	12,0	13,8	20,0	36,2	47,3
	43°C/70°C [1]	C20/25	appr. N	[kN]	4,8	4,8	7,2	8,1	8,9	11,1	17,4	26,2	38,5
Approved loads, shear for h_{ef}									gerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
	43°C/70°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Approved loads, shear for h_{ef}									ungerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
	43°C/70°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7	42,3
Injection System VME basic, Internally Threaded Sleeve VMU-IG Stainless steel A4-70, HCR-70													
Approved loads, tension for h_{ef}									gerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,3	5,3	7,2	9,0	8,4	11,7	16,4	26,0	31,0
	43°C/70°C [1]	C20/25	appr. N	[kN]	3,0	3,4	3,6	4,5	4,8	6,0	9,3	13,1	19,2
Approved loads, tension for h_{ef}									ungerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,3	5,3	9,9	9,9	12,0	15,7	22,5	37,1	31,0
	43°C/70°C [1]	C20/25	appr. N	[kN]	5,3	5,3	7,2	9,0	8,9	11,1	17,4	26,2	31,0
Approved loads, shear for h_{ef}									gerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
	43°C/70°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Approved loads, shear for h_{ef}									ungerissener Beton				
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
	43°C/70°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2	18,6
Spacing and edge distance													
Min. thickness of concrete for h_{ef}			h_{min}	[mm]	110	120	110	130	116	136	169	226	270
Minimum spacing			s_{min}	[mm]	50	50	60	60	75	75	95	115	140
Minimum edge distance			c_{min}	[mm]	40	40	45	45	50	50	60	65	80
Installation parameters													
Drill hole diameter			d_o	[mm]	12	12	14	14	18	18	22	28	35
Clearance hole in the fixture			$d_f \leq$	[mm]	7	7	9	9	12	12	14	18	22
Drill hole depth for h_{ef}			h_0	[mm]	80	90	80	100	80	100	125	170	200
Installation torque			$T_{inst} \leq$	[Nm]	10	10	10	10	20	20	40	60	100
Amount of adhesive per 100mm drill hole				[ml]	6,6	7,4	7,9	9,9	10,9	13,6	22,4	54,9	97,4

[1]Max. long term temperature/max. short term temperature

Higher concrete strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-21/0787.

Injection System VME basic, rebar B500B					**ø8**	**ø10**	**ø12**	**ø14**	**ø16**	**ø20**	**ø24**	**ø25**	**ø28**	**ø32**
Range of anchorage depths	$h_{ef,min}$ - $h_{ef,max}$			[mm]	60 - 160	60 - 200	70 - 240	75 - 280	80 - 320	90 - 4 00	96 - 480	100 - 500	112 - 560	128 - 640
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$									cracked concrete					
Range of temperature	24°C/40°C[1]	C20/25	appr. N	[kN]	4,3 - 11,5	6,3 - 20,9	8,8 - 30,2	10,2 - 38,1	12,3 - 49,8	14,6 - 71,8	16,1 - 103,4	17,1 - 112,2	20,3 - 129,0	24,8 - 168,5
	43°C/70°C[1]	C20/25	appr. N	[kN]	1,8 - 4,8	2,2 - 7,5	3,1 - 10,8	3,9 - 14,7	4,8 - 19,1	6,7 - 29,9	8,6 - 43,1	9,3 - 46,7	11,7 - 58,6	15,3 - 76,6
Approved loads, tension for $h_{ef,min}$ - $h_{ef,max}$									uncracked concrete					
Range of temperature	24°C/40°C[1]	C20/25	appr. N	[kN]	10,1 - 13,8	11,2 - 21,6	14,1 - 31,2	15,6 - 42,4	17,2 - 55,4	20,5 - 86,6	22,6 - 124,6	24,0 - 135,2	28,5 - 169,6	34,8 - 221,6
	43°C/70°C[1]	C20/25	appr. N	[kN]	4,3 - 11,5	5,4 - 18,0	7,5 - 25,9	9,4 - 35,2	11,5 - 46,0	14,8 - 65,8	19,0 - 94,8	20,6 - 102,8	23,5 - 117,3	30,6 - 153,2
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$									cracked concrete					
Range of temperature	24°C/40°C[1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	24,5 - 25,9	29,3 - 40,4	32,2 - 58,2	34,3 - 63,1	40,6 - 79,2	49,7 - 103,4
	43°C/70°C[1]	C20/25	appr. V	[kN]	3,6 - 6,5	4,5 - 10,1	6,3 - 14,5	7,9 - 19,8	9,6 - 25,9	13,5 - 40,4	17,2 - 58,2	18,7 - 63,1	23,5 - 79,2	30,6 - 103,4
Approved loads, shear for $h_{ef,min}$ - $h_{ef,max}$									uncracked concrete					
Range of temperature	24°C/40°C[1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	19,8	25,9	40,4	45,2 - 58,2	48,1 - 63,1	57,0 - 79,2	69,6 - 103,4
	43°C/70°C[1]	C20/25	appr. V	[kN]	6,5	10,1	14,5	18,8 - 19,8	23,0 - 25,9	29,6 - 40,4	37,9 - 58,2	41,1 - 63,1	46,9 - 79,2	61,3 - 103,4
Spacing and edge distance														
Min. thickness of concrete for $h_{ef,min}$ - $h_{ef,max}$			h_{min}	[mm]	100 - 190	100 - 230	100 - 270 / 102 - 272[2]	111 - 316	120 - 360	140 - 450	160 - 544	164 - 564	182 - 630	208 - 720
Minimum spacing			s_{min}	[mm]	40	50	60	70	75	95	120	120	130	150
Minimum edge distance			c_{min}	[mm]	35	40	45	50	50	60	70	70	75	85
Installation parameters														
Drill hole diameter			d_o	[mm]	10/12[2]	12/14[2]	14/16[2]	18	20	25	32	32	35	40
Range of drill hole depth for $h_{ef,min}$ - $h_{ef,max}$			h_o	[mm]	60 - 160	60 - 200	70 - 240	75 - 280	80 - 320	90 - 400	96 - 480	100 - 500	112 - 560	128 - 640
Amount of adhesive per 100 mm drill hole depth				[ml]	4,16/8,46[3]	5,07/10,12[3]	5,97/11,78[3]	13,44	15,09	23,11	44,65	40,03	44,22	57,32

[1]Max. long term temperature/max. short term temperature

[2]For rebar Ø8, Ø10 and Ø12 both drill hole diameters are possible

[3]The first value applies to the smaller drill diameter, the second value to the larger drill diameter.

Higher concrete strength may lead to higher approved loads. Using a hollow drill bit without subsequent cleaning can lead to lower loads in uncracked concrete. Technical data see European Technical Assessment ETA-21/0787.

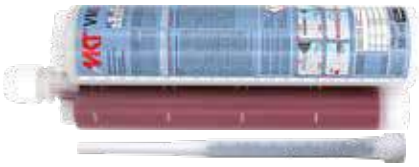
Injection System VME basic

for post-installed rebar connection

Reinforcement Bars BSt 500 S

Tension Anchor ZA

Cartridge VME basic 440
Side-by-side cartridge
Content: 440 ml



Cartridge VME basic 585
Side-by-side cartridge
Content: 585 ml

ETA-21/0788

R30-R120

Injection Cartridge VME basic

- Long processing time
- No shrinkage

Description	Ref. No.	Content ml	Content of master box pcs.	Weight per master box kg	Weight per piece kg
Cartridge VME basic 440	28258143	440	12	9,79	0,78
Cartridge VME basic 585	28258343	585	12	12,28	1,02
Static mixer VM-XHP	28305301	-	12	0,18	0,01

One static mixer VM-XHP comes with each cartridge

Curing Time Injection Adhesive VME basic

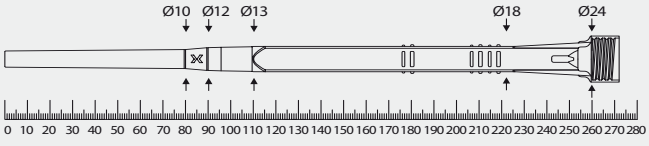
- Cartridge temperature when installing +5°C to +40°C

Temperature (°C) of the base material	maximum working time	minimum curing time dry base material	minimum curing time wet base material
+5°C to +9°C	80 min	60 h	120 h
+10°C to +14°C	60 min	48 h	96 h
+15°C to +19°C	40 min	24 h	48 h
+20°C to +24°C	30 min	12 h	24 h
+25°C to +34°C	12 min	10 h	20 h
+35°C to +39°C	8 min	7 h	14 h
+40°C	8 min	4 h	8 h

Usable length static mixer VM-XHP

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

Outer diameter mixer:



Description
The Injection System VME basic also has the European Technical Assessment for post-installed rebar connection. Reinforcement Bars with diameters from 8 mm to 40 mm as well as tension anchors from M12 to M24 with a setting depth of up to 2 m can be fixed. The required drill holes can be created by hammer drilling, suction drilling or diamond drilling.

By using the hollow drill bit SB the drilling dust is sucked off during drilling directly at the point of origin. This reduces pollution and dust load of the respiratory tract to a minimum. Subsequent well cleaning - brushing and blowing out - is also no longer necessary.

Advantages
- Long processing time, therefore ideal for large embedment depths and for high temperatures
- Wide range of application, as up to 40 mm rebar diameter allowed
- Drill hole creation with hammer drill, compressed air drill or hollow drill bit
- When using the hollow drill bit SB the subsequent cleaning of the borehole is not necessary
- Approved for installation in dry and wet concrete
- Approved for use under fire exposure
- Opened cartridges can be reused with a new static mixer
- Tie rods ZA with connecting thread M12 - M24 can be supplied in individual lengths on request

Applications for post-installed rebar connection:
Subsequent connection of stairs, balconies, walls or columns, closing of wall and ceiling openings

Application examples tension anchor:
Anchoring of railing posts and of supports subject to bending loads, anchoring of cantilevered components

Accessories Injection System VME basic for post-installed rebar connection

Rebar Ø	Tension Anchor	Drill Bit Ø	Blow-out pump / Air gun[1]	Cleaning brush RB[1]	Retaining washer VM-IA[2]	Extension tube[2][3]	Maximum permissible drilling depth for dispenser: VM-P 585 Standard, VM-P 585 Profi, VM-P 585 Akku	Maximum permissible drilling depth for dispenser: VM-P 585 Pneumatic	Maximum permissible drilling depth for dispenser: VM-P 585 Pneumatic
mm		mm					mm	mm	mm
8		10	VM-ABP 200	RB 10 M6		VM-XE 10	250	250	250
8		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	700	800	800
10		12	VM-ABP 200 DLS with RS, RS25	RB 12 M6 RB 12 M8		VM-XE 10	250	250	250
10		14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	700	1000	1000
12	ZA-M12	14	VM-ABP 200 DLS with RS, RS25	RB 14 M6 RB 14 M8	VM-IA 14	VM-XE 10	250	250	250
12	ZA-M12	16	VM-ABP 200 / 1000 DLS with RS, RS25	RB 16 M6 RB 16 M8	VM-IA 16	VM-XE 10	700	1300[1]	1200[1][3]
14		18	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 18 M6 RB 18 M8	VM-IA 18	VM-XE 10 VM-XLE 16	700	1300[1]	1400[1][3]
16	ZA-M16	20	VM-ABP 200 / 250/ 500 / 1000 DLS with RS, RS25	RB 20 M6 RB 20 M8	VM-IA 20	VM-XE 10 VM-XLE 16	700	1300[1]	1600[1][3]
20	ZA-M20	25[4]	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 25 M8[4]	VM-IA 25	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
22		28	VM-ABP 250 / 500 / 1000 DLS with RS, RS25	RB 28 M6	VM-IA 28	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
24/25	ZA-M24	32	VM-ABP 250 / 500 /1000 DLS with RS, RS35	RB 32 M6 RB 32 M8	VM-IA 32	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
28		35	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 35 M6 RB 35 M8	VM-IA 35	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
32		40	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
34		40	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 40 M6	VM-IA 40	VM-XE 10 VM-XLE 16	500	1000	2000[1][3]
36		45	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 45 M6	VM-IA 45	VM-XE 10 VM-XLE 16		1000	2000[1][3]
40		55	VM-ABP 250 / 500 / 1000 DLS with RS, RS35	RB 55 M6	VM-IA 55	VM-XE 10 VM-XLE 16		1000	2000[1][3]
See page			**178**	**179**	**181**	**180**	**181 / 182**	**182**	**182**

[1]When using the hollow drill SB the subsequent cleaning of the borehole is not necessary (drill-Ø $d_0 \leq 40$ mm, drill hole depth $h_1 \leq 1.000$ mm)

[2]If the static mixer does not reach the bottom of the borehole (see usable length of static mixer), a extension tube must be used. From a drill-Ø $d_0 \geq 14$ mm, retaining washer and extension tube must be used for horizontal and overhead installation and for drill hole depths > 240 mm.

[3]From an anchoring depth of $l_v > 1300$ mm only the mixer extension VM-XLE 16 is permitted

[4]Hammer- or suction drilling. Pneumatic drilling: drill-Ø 26, Cleaning Brush RB 26 M6

Extract from Permissible Service Conditions of European Technical Assessment ETA-21/0788 for post-installed Rebar Connections with VME basic

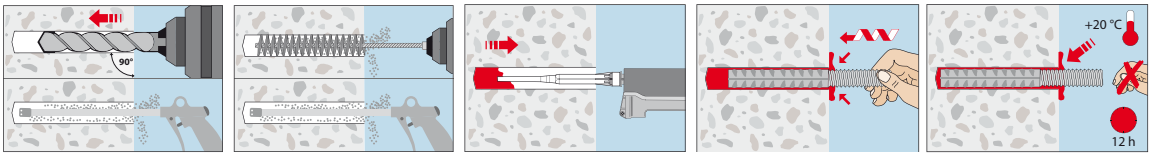
Design values of the bond stress $f_{bd,PIR}$ for the drilling methods hammer drilling, pneumatic drilling and suction drilling.[1]

Rod diameter				Ø8	Ø8	Ø10	Ø10	Ø12	Ø12	Ø14	Ø16	Ø20	Ø22	Ø24	Ø25	Ø28	Ø32	Ø34	Ø36	Ø40
Tension Anchor ZA / threaded stud									ZA M12		ZA M16	ZA M20		ZA M24						
Drill hole diameter		d_0	[mm]	10	12	12	14	14	16	18	20	25	28	32	32	35	40	40	45	55
Design value of bond strength [1] $f_{bd,PIR}$ [N/mm²]																				
Concrete strength	C12/15	$f_{bd,PIR}$	[N/mm²]	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,5	1,5
	C16/20	$f_{bd,PIR}$	[N/mm²]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	1,9	1,8
	C20/25[1]	$f_{bd,PIR}$	[N/mm²]	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,3	2,2	2,1
	C25/30[1]	$f_{bd,PIR}$	[N/mm²]	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,7	2,6	2,6	2,5
	C30/37[1]	$f_{bd,PIR}$	[N/mm²]	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	3,0	2,9	2,9	2,8
	C35/45[1]	$f_{bd,PIR}$	[N/mm²]	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,4	3,3	3,3	3,1
	C40/50[1]	$f_{bd,PIR}$	[N/mm²]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,6	3,6	3,4
	C45/55[1]	$f_{bd,PIR}$	[N/mm²]	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	4,0	3,9	3,8	3,7
	C50/60[1]	$f_{bd,PIR}$	[N/mm²]	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,2	4,1	4,0
Installation parameters reinforcing steel B500B																				
Amount of adhesive /100 mm setting depth			[ml]	4,16	8,46	5,07	10,12	5,97	11,78	13,44	15,09	23,11	30,4	44,65	40,03	44,22	57,32	44,88	72,11	138,47
Installation parameters Tension Anchor ZA																				
Tension Anchor ZA / threaded stud									ZA M12		ZA M16	ZA M20		ZA M24						
Clearance hole in the fixture		d_f	[mm]						14		18	22		26						
Effective setting depth		lv	[mm]								according to static calculation									
Installation torque		$T_{inst} \leq$	[Nm]						50		100	150		150						
Width across nut		SW	[mm]						19		24	30		36						
Amount of adhesive /100 mm setting depth			[ml]						11,78		15,09	23,11		44,65						
Different tension anchors see page									**176**		**176**	**176**		**on request**						

[1]For design values of bond stress fbd,PIR for diamond drilling see ETA-21/0788

[2]The values for $f_{bd,PIR}$ are valid for good bonding conditions according to EN 1992-1-1:2004

Installation



Injection System VM-EA

Threaded Stud V-A

Threaded Stud VMU-A

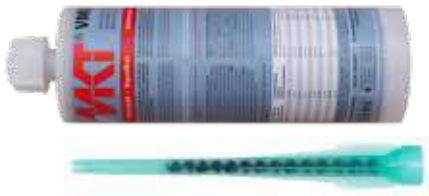
Threaded Stud VM-A
1 meter length, to be cut to the required length

Internally Threaded Sleeve VMU-IG

Perfo sleeve VM-SH

Cartridge VM-EA 300
Foil tube cartridge
suitable for silicone guns
Content: 300 ml

Cartridge VM-EA 345
Side-by-side cartridge
Content: 345ml



Cartridge VM-EA 420
Coaxial cartridge
Content: 420ml

M8-M24
IG M6-IG M16

M8-M16

Advantages
- Versatile injection system for different applications in concrete and masonry
- Approved for uncracked concrete
- Approved application in wet concrete and water-filled drill holes
- Approved for autoclaved aerated concrete, solid and perforated brickwork in wet or dry condition
- Approved with standard threaded studs (test certificate required)
- Approved in uncracked concrete with VMU-IG internally threaded rods
- Approved with shortenable perfo sleeve VM-SH16 x 130/330 for bridging structures over insulation systems and other soft substrates
- Base material temperature during installation -5°C to +40°C
- Ambient temperature when completely cured -40°C to +80°C
- Variable anchorage depths for more flexibility
- Opened cartridges can be re-used with a new mixer nozzle
- Styrene-free

Applications
Fastenings in uncracked concrete:
Base plates, supports, wall brackets, mounting of joint tapes.

Fastenings in brickwork:
Canopies, door and window frames, facade substructures, battens, gates etc.
With the perfo sleeve VM-SH 16 x 130/330, lightweight fixations in perforated brick are also possible on insulation boards.

Range of loading: **0,1 kN–114,9 kN**
Concrete quality: **C20/25–C50/60**
Brickwork: **Solid and perforated bricks**
Material: **Steel zinc plated, stainless steel A4**
On demand: Steel hot dip galvanized, Stainless steel HCR

Description
The Injection System VM-EA is used for fixations in uncracked concrete and brickwork. It is composed of a styrene-free injection adhesive, based on epoxy acrylate, in a cartridge, MKT anchor rods VMU-A, V-A or with threaded studs with manufacturer's certificate (e.g. MKT VM-A) as well as nut and washer. Applications in perforated brick additionally require a perfo sleeve.

Injection Cartridge VM-EA

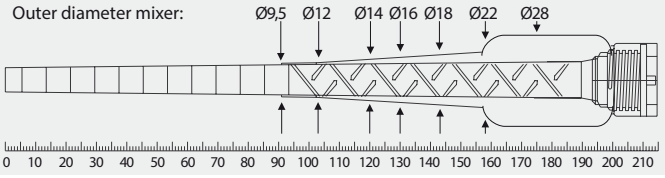
- modified epoxy acrylate, styrene-free
- Approved for use in uncracked concrete and in brickwork

Description	Ref. No.	Content ml	Content of master box pcs	Weight per master box kg	Weight per piece kg
Cartridge VM-EA 300	28253101	300	12	6,40	0,53
Cartridge VM-EA 345	28255211	345	12	8,00	0,65
Cartridge VM-EA 420	28256201	420	12	10,1	0,83
Static mixer VM-X	28305111	-	12	0,12	0,01
Mixer extension VM-XE 10/200 (200mm)	28306011	-	12	-	0,01
Mixer extension VM-XE 10/500 (500mm)	85951101	-	10	-	0,02

One static mixer comes with each cartridge.

Usable length static mixer VM-X

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



Curing Time Injection Adhesive VM-EA

- Cartridge temperature during installing + 5°C to + 40°C

Temperature (°C) in the drill hole	maximum working time	Curing time[1]
-5°C to - 1°C	90 min	6 h
0°C to + 4°C	45 min	3 h
+ 5°C to + 9°C	25 min	2 h
+ 10°C to + 14°C	20 min	100 min
+ 15°C to + 19°C	15 min	80 min
+ 20°C to + 29°C	6 min	45 min
+ 30°C to + 34°C	4 min	25 min
+ 35°C to + 39°C	2 min	20 min

[1] In wet or dry concrete

Storage Box

- In stackable multi-purpose container
- Storage Box, the container for various items
- H x W x D: 220 x 400 x 300 mm

Description	Ref. No.	Content	Quantity Pcs.	Weight per Box kg
Storage Box VM-EA 300	28998201	Cartridge VM-EA 300	20	12,8
		Static mixer VM-X	40	
Storage Box VM-EA 345	28998501	Cartridge VM-EA 345	20	15,3
		Static mixer VM-X	40	
Storage Box VM-EA 420	28998801	Cartridge VM-EA 420	20	18,0
		Static mixer VM-X	40	

Accessories for Injection System VM-EA in concrete

Threaded Stud	Internally Threaded Sleeve	Rebar Ø mm	Blow-out pump / Air gun	Cleaning brush RB	Extension tube[2]	Dispenser
M8		10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
M10	VMU-IG M6	12	VM-AP 360 VM-ABP 200	RB 12 M6 RB 12 M8	VM-XE 10	
M12	VMU-IG M8	14	VM-AP 360 VM-ABP 200	RB 14 M6 RB 14 M8	VM-XE 10	
M16	VMU-IG M10	18	VM-AP 360 VM-ABP 200 / 250 / 500 / 1000	RB 18 M6 RB 18 M8	VM-XE 10	
M20	VMU-IG M12	24	VM-AP 360[1] VM-ABP 250 / 500 / 1000	RB 24 M6	VM-XE 10	
M24	VMU-IG M16	28	VM-AP 360[1] VM-ABP 250 / 500 / 1000	RB 28 M6	VM-XE 10	
See page			**178**	**179**	**180**	**181 / 182**

[1] Can be used up to an anchorage depth of 240 mm ($h_{ef} \leq 240$mm)

[2] If the static mixer does not reach the bottom of the borehole (see usable length of static mixer) or from a anchorage depth of 190 mm, a extension tube must be used.

Accessories for Injection System VM-EA in brickwork

Threaded Stud (without Perfo sleeve)	Perfo sleeve-Ø	Rebar Ø	Blow-out pump / Air gun	Cleaning brush RB	Extension tube[1)]	Dispenser
mm	mm	mm				
M8		10	VM-AP 360 VM-ABP 200	RB 10 M6	VM-XE 10	VM-P 345 Standard, VM-P 345 Profi, VM-P 380 Standard, VM-P 380 Profi, VM-P 345 Akku, VM-P 380 Akku, VM-P 825 Akku, VM-P 345 Pneumatic Eco, VM-P 380 Pneumatic Eco, VM-P 380 Pneumatic
M10	VM-SH 12 x 80	12	VM-AP 360 VM-ABP 200	RB 12 M6	VM-XE 10	
M12		14	VM-AP 360 VM-ABP 200	RB 14 M6	VM-XE 10	
	VM-SH 16 x 85 VM-SH 16 x 130 VM-SH 16 x 130/330[1)]	16	VM-AP 360 VM-ABP 200	RB 16 M6	VM-XE 10	
M16		18	VM-AP 360 VM-ABP 200 / 250	RB 18 M6	VM-XE 10	
	VM-SH 20 x 85 VM-SH 20 x 130 VM-SH 20 x 200	20	VM-AP 360 VM-ABP 200 / 250	RB 20 M6	VM-XE 10	
See page			**178**	**179**	**180**	**181 / 182**

[1)]Required if the static mixer does not reach the bottom of the borehole or the bottom of the perfo sleeve

Threaded Studs for the Injection System VM-EA in uncracked concrete and brickwork

Threaded Stud VMU-A
Steel, zinc plated 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8 on demand

Threaded Stud VMU-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 172

- For use in structures subject to dry internal conditions

Threaded Stud VMU-A A4
Stainless steel A4-70
Dimensions see page 172

- For use in structures subject to dry internal conditions
- Stainless steel HCR on request

Internally Threaded Sleeve VMU-IG
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- Only in uncracked concrete
- With internal thread

Internally Threaded Sleeve VMU-IG A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Only in uncracked concrete
- With internal thread

Threaded Stud V-A
Steel, zinc plated 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A fvz
Steel, hot dip galvanized 5.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A 8.8
Steel, zinc plated 8.8
Dimensions see page 173

- For use in structures subject to dry internal conditions

Threaded Stud V-A A4
Stainless steel A4-70
Dimensions see page 173

- For use in structures subject to dry internal conditions or external atmospheric exposure

Threaded Stud V-A HCR
Stainless steel HCR-70
Dimensions see page 173

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded Stud VM-A
Steel, zinc plated 5.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A 8.8
Steel, zinc plated 8.8
Dimensions see page 174

- For use in structures subject to dry internal conditions
- 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

Threaded Stud VM-A A4
Stainless steel A4-70
Dimensions see page 174

- For use in structures subject to dry internal conditions or external atmospheric exposure
- 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

Perfo sleeve VM-SH
Polypropylene
Dimensions see page 175

- Approved for solid and perforated bricks

ETA-16/0898

Extract from Permissible Service Conditions of European Technical Assessment ETA-19/0483 for use in uncracked concrete (Option 7)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data					uncracked concrete					
Injection System VM-EA, threaded stud Steel 5.8					**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Range of anchorage depth		$h_{ef,min}$ - $h_{ef,max}$		[mm]	60 - 160	60 - 200	70 – 240	80 – 320	90 – 400	96 - 480
Approved tension load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,1 - 8,7	6,0 - 13,8	8,4 - 20,1	12,8 - 37,4	16,7 - 58,3	18,4 - 84,0
	50°C/80°C [1]	C20/25	appr. N	[kN]	3,9 - 8,7	4,5 - 13,8	6,3 - 20,1	9,6 - 37,4	13,5 - 58,3	17,2 - 84,0
Approved shear load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	6,3	9,9	14,5	26,9	40,0 - 42,0	44,1 - 60,5
	50°C/80°C [1]	C20/25	appr. V	[kN]	6,3	9,9	14,5	23,0 - 26,9	32,3 - 42,0	41,4 - 60,5
Injection System VM-EA, threaded stud Steel 8.8										
Approved tension load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,1 - 13,6	6,0 - 19,9	8,4 - 28,7	12,8 - 51,1	16,7 - 79,8	18,4 - 114,9
	50°C/80°C [1]	C20/25	appr. N	[kN]	3,9 - 10,4	4,5 - 15,0	6,3 - 21,5	9,6 - 38,3	13,5 - 59,8	17,2 - 86,2
Approved shear load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	8,4	13,3	19,3	30,6 - 35,9	40,0 - 56,0	44,1 - 80,7
	50°C/80°C [1]	C20/25	appr. V	[kN]	8,4	10,8 - 13,3	15,1 - 19,3	23,0 - 35,9	32,3 - 56,0	41,4 - 80,7
Injection System VM-EA, threaded stud Stainless Steel A4-70, HCR-70										
Approved tension load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. N	[kN]	5,1 - 9,8	6,0 - 15,5	8,4 - 22,6	12,8 - 42,1	16,7 - 65,6	18,4 - 94,6
	50°C/80°C [1]	C20/25	appr. N	[kN]	3,9 - 9,8	4,5 - 15,0	6,3 - 21,5	9,6 - 38,3	13,5 - 59,8	17,2 - 86,2
Approved shear load for $h_{ef,min}$ - $h_{ef,max}$										
Range of temperature	24°C/40°C [1]	C20/25	appr. V	[kN]	5,9	9,3	13,5	25,2	39,4	44,1 - 56,7
	50°C/80°C [1]	C20/25	appr. V	[kN]	5,9	9,3	13,5	23,0 - 25,2	32,3 - 39,4	41,4 - 56,7
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
Minimum spacing			s_{min}	[mm]	40	50	60	80	100	120
Minimum edge distance			c_{min}	[mm]	40	50	60	80	100	120
Installation parameters										
Diameter of drill hole			d_o	[mm]	10	12	14	18	24	28
Clearance hole in the fixture			$d_f \leq$	[mm]	9	12	14	18	22	26
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
Installation torque			$T_{inst,max}$	[Nm]	10	20	40	80	120	160
Amount of adhesive per 100mm drill hole depth				[ml]	6,53	8,16	9,82	13,61	26,71	32,25

[1]Max. long term temperature / max. short term temperature

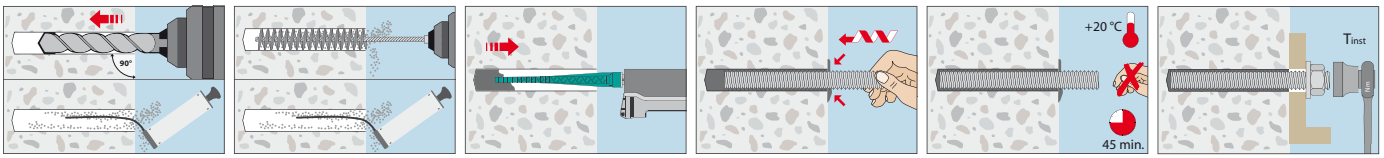
Higher concrete strength may lead to higher approved loads.

Loads and performance data					uncracked concrete							
Internally threaded sleeves					**IG M6 x 80**	**IG M6 x 90**	**IG M8 x 80**	**IG M8 x 100**	**IG M10 x 80**	**IG M10 x 100**	**IG M12 x125**	**IG M16 x 170**
Effective anchorage depth h_{ef}				[mm]	80	90	80	100	80	100	125	170
Injection System VM-EA, Internally threaded sleeve VMU-IG, Steel 5.8												
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C [1]	C20/25	appr. N	[kN]	4,8	4,8	8,1	8,1	12,8	13,8	20,0	36,2
	50°C/80°C [1]	C20/25	appr. N	[kN]	4,8	4,8	7,2	8,1	9,6	12,0	18,7	30,5
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7
	50°C/80°C [1]	C20/25	appr. V	[kN]	3,4	3,4	5,7	5,7	9,7	9,7	14,3	25,7
Injection System VM-EA, Internally threaded sleeve VMU-IG, Stainless steel A4-70, HCR-70												
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C [1]	C20/25	appr. N	[kN]	5,3	5,3	9,6	9,9	12,8	15,7	22,5	40,7
	50°C/80°C [1]	C20/25	appr. N	[kN]	5,3	5,3	7,2	9,0	9,6	12,0	18,7	30,5
Approved loads, tension for h_{ef}												
Temperature range	24°C/40°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2
	50°C/80°C [1]	C20/25	appr. V	[kN]	3,2	3,2	6,0	6,0	9,2	9,2	13,7	25,2
Spacing and edge distance												
Minimum thickness of concrete slab for h_{ef}			h_{min}	[mm]	110	120	110	130	116	136	173	226
Minimum spacing			s_{min}	[mm]	50	50	60	60	80	80	100	120
Minimum edge distance			c_{min}	[mm]	50	50	60	60	80	80	100	120
Installation parameters												
Diameter of drill hole			d_o	[mm]	12	12	14	14	18	18	24	28
Clearance hole in the fixture			$d_f \leq$	[mm]	7	7	9	9	12	12	14	18
Range of drill hole depth for h_{ef}			d_0	[mm]	80	90	80	100	80	100	125	170
Installation torque			$T_{inst} \leq$	[Nm]	10	10	10	10	20	20	40	60
Amount of adhesive per drill hole				[ml]	6,6	7,4	7,9	9,9	10,9	13,6	33,4	54,9

[1]Max. long term temperature / max. short term temperature

Higher concrete strength may lead to higher approved loads.

Installation in concrete



Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, Solid brick without Perfo Sleeve[1)]							
Solid brick Mz-DF according EN 771-1, Bulk density ρ: 1,64 kg/dm³, Minimum brick size: 240x115x55 mm (e.g. Unipor)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,4	0,4	0,4	0,7
	$f_b \geq 20$ N/mm²	appr. N	[kN]	0,7	0,7	0,6	1,0
	$f_b \geq 28$ N/mm²	appr. N	[kN]	0,9	0,9	0,7	1,3
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,9	1,0	1,4	1,4
	$f_b \geq 20$ N/mm²	appr. V	[kN]	1,3	1,6	2,1	2,1
	$f_b \geq 28$ N/mm²	appr. V	[kN]	1,6	1,9	2,6	2,6
Drilling method					Hammer drilling		
Installation torque		$T_{inst,max}$	[Nm]	6	10	10	10
Calcium silicate solid brick KS-NF according EN 771-2, Bulk density ρ: 2,0 kg/dm³, Minimum brick size: 240x115x71 mm (e.g. Wemding)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,9	0,9	1,1	0,9
	$f_b \geq 20$ N/mm²	appr. N	[kN]	1,3	1,3	1,6	1,3
	$f_b \geq 27$ N/mm²	appr. N	[kN]	1,6	1,6	1,9	1,6
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,9	0,9	1,0	1,0
	$f_b \geq 20$ N/mm²	appr. V	[kN]	1,3	1,3	1,4	1,4
	$f_b \geq 27$ N/mm²	appr. V	[kN]	1,4	1,6	1,7	1,7
Drilling method					Hammer drilling		
Installation torque		$T_{inst,max}$	[Nm]	10	20	20	20
Brickwork of solid lightweight concrete according EN 771-3, Bulk density ρ: 0,63 kg/dm³, Minimum brick size: 300x123x248 mm (e.g. Bisotherm)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 2$ N/mm²	appr. N	[kN]	0,6	0,6	0,6	0,6
Approved shear load for compressive strength	$f_b \geq 2$ N/mm²	appr. V	[kN]	0,9	1,0	1,1	1,1
Installation torque		$T_{inst,max}$	[Nm]	6	6	10	14
Brickwork of solid lightweight concrete Leca Lex harkko RUH-200 according EN 771-3, Bulk density ρ: 0,78 kg/dm³, Minimum brick size: 498x200x195 mm (e.g. Saint-Gobain Weber)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 3$ N/mm²	appr. N	[kN]	0,6	0,9	0,9	0,9
Approved shear load for compressive strength	$f_b \geq 3$ N/mm²	appr. V	[kN]	0,9	1,1	1,1	1,1
Drilling method					Rotary drilling		
Installation torque		$T_{inst,max}$	[Nm]	6	12	14	16
Installation parameters in solid brick without perfo sleeve							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Diameter of drill hole		d_0	[mm]	10	12	14	18
Drill hole depth		h_0	[mm]	80	90	100	100
Drilling method					s. brick information		
Minimum wall thickness		h_{min}	[mm]	110	120	130	130
Clearance hole in the fixture		$d_f \leq$	[mm]	9	12	14	18
Diameter of brush		$T_{inst,max}$	[Nm]		s. brick information		
Installation torque			[ml]	5,2	7,3	9,8	13,6
Drill holes per cartridge		VM-EA 300	[Pcs.]	50	36	26	19
		VM-EA 345	[Pcs.]	59	42	31	22
		VM-EA 420	[Pcs.]	73	52	39	28

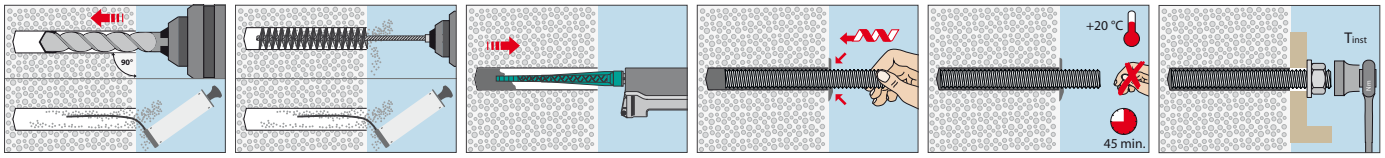
[1)]Installation with perfo sleeve, see ETA-17/0006

Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

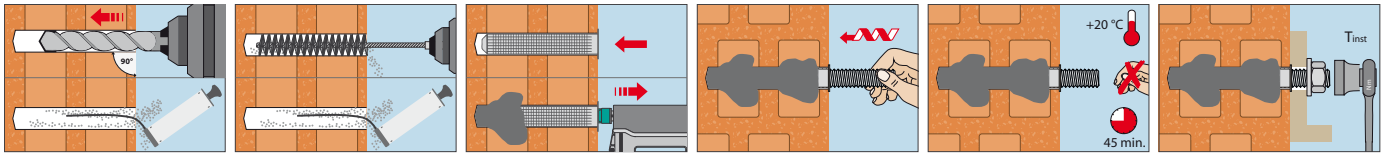
Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick without Perfo Sleeve							
Autoclaved aerated concrete block AAC2 according EN 771-4, Bulk density ρ: 0,35 kg/dm³, Minimum brick size: 599x375x249 mm (e.g. Ytong)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 2$ N/mm²	appr. N	[kN]	0,3	0,3	0,5	0,5
Approved shear load for compressive strength	$f_b \geq 2$ N/mm²	appr. V	[kN]	0,5	0,7	0,9	1,3
Autoclaved aerated concrete block AAC4 according EN 771-4, Bulk density ρ: 0,50 kg/dm³, Minimum brick size: 499x375x249 mm (e.g. Ytong)							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,3	0,9	0,9	1,3
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,5	0,7	0,9	1,3
Autoclaved aerated concrete block AAC6 according EN 771-4, Bulk density ρ: 0,60 kg/dm³, Minimum brick size: 499x240x249 mm (e.g. Porit)							
Threaded stud: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Anchorage depth		h_{ef}	[mm]	80	90	100	100
Spacing = Minimum spacing		$s_{cr} = s_{min}$	[mm]	240	270	300	300
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	135	150	150
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,7	1,1	1,6	2,0
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	2,0	3,2	3,2	3,9
Installation parameters autoclaved aerated concrete without perfo sleeve							
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M10**	**M12**	**M16**
Diameter of drill hole		d_o	[mm]	10	12	14	18
Drill hole depth		h_o	[mm]	80	90	100	100
Drilling method					Drehbohren		
Minimum wall thickness		h_{min}	[mm]	110	120	130	130
Clearance hole in the fixture		$d_f \leq$	[mm]	9	12	14	18
Installation torque		$T_{inst,max}$	[Nm]	2	2	2	2
Amount of adhesive per drill hole			[ml]	5,2	7,3	9,8	13,6
Drill holes per cartridge		VM-EA 300	[Pcs.]	50	36	26	19
		VM-EA 345	[Pcs.]	59	42	31	22
		VM-EA 420	[Pcs.]	73	52	39	28

Installation in autoclaved aerated concrete and solid brick without perfo sleeve



Installation in perforated brick with perfo sleeve



Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick with Perfo Sleeve

Calcium silicate hollow brick KSL-3DF according EN 771-2, Bulk density ρ: 1,4 kg/dm³, Brick size: 240x175x113 mm (e.g. Wemding)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8 / M10			M12/M16	M12			M16	
Perfo sleeves VM-SH				12x80	16x85	16x130 / 16x130/330		20x85	20x130	20x200	20x130	20x200	
Anchorage depth		h_{ef}	[mm]	80	85	130		85	130	200	130	200	
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	240	240	240		240	240	240	240	240	
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	113	113	113		113	113	113	113	113	
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100		120	120	120	120	120	
Approved tension load for compressive strength	$f_b \geq 8$ N/mm²	appr. N	[kN]	0,4	0,4	0,7		0,4	0,7	0,7	0,7	0,7	
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,6	0,6	1,0		0,6	1,0	1,0	1,0	1,0	
	$f_b \geq 14$ N/mm²	appr. N	[kN]	0,7	0,7	1,1		0,7	1,1	1,1	1,1	1,1	
Approved shear load for compressive strength	$f_b \geq 8$ N/mm²	appr. V	[kN]	0,6	0,7	0,9		0,9	0,9	0,9	1,1	1,1	
	$f_b \geq 12$ N/mm²	appr. V	[kN]	0,7	1,0	1,3		1,0	1,3	1,3	1,4	1,4	
	$f_b \geq 14$ N/mm²	appr. V	[kN]	0,9	1,1	1,4		1,3	1,4	1,4	1,7	1,7	
Installation torque		$T_{inst,max}$	[Nm]	8	8	8		8	8	8	8	8	

Calcium silicate hollow brick KSL-12DF according EN 771-2, Bulk density ρ: 1,4 kg/dm³, Brick size: 498x175x238 mm (e.g. Wemding)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8 / M10			M12 / M16	
Perfo sleeves VM-SH				12x80	16x85	16x130 / 16x130/330		20x85	20x130
Anchorage depth		h_{ef}	[mm]	80	85	130		85	130
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	498	498	498		498	498
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	238	238	238		238	238
Minimum spacing vertical to the horizontal joint		$c_{cr} = c_{min}$	[mm]	100	100	100		120	120
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,1	0,3	1,0		0,3	1,0
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,1	0,4	1,3		0,4	1,3
	$f_b \geq 16$ N/mm²	appr. N	[kN]	0,1	0,6	1,6		0,6	1,6
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,9	1,7	2,0		1,7	2,0
	$f_b \geq 12$ N/mm²	appr. V	[kN]	1,0	2,0	2,3		2,0	2,3
	$f_b \geq 16$ N/mm²	appr. V	[kN]	1,1	2,6	2,9		2,4	2,9
Installation torque		$T_{inst,max}$	[Nm]	2	4	4		4	4

Clay hollow brick HLz-16DF according EN 771-1, Bulk density ρ: 0,83 kg/dm³, Brick size: 497x238x240 mm (e.g. Unipor)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8	M8	M10	M10	M12/M16		
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	16x85	16x130 16x130/330	20x85	20x130	20x200
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	85	130	200
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	497	497	497	497	497	497	497	497
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	238	238	238	238	238	238	238	238
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	100	100	120	120	120
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,3	0,4	0,7	0,4	0,7	0,6	0,7	0,7
	$f_b \geq 9$ N/mm²	appr. N	[kN]	0,3	0,6	0,9	0,6	0,9	0,7	0,9	0,9
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,4	0,7	1,0	0,7	1,0	1,0	1,0	1,0
	$f_b \geq 14$ N/mm²	appr. N	[kN]	0,4	0,7	1,0	0,7	1,0	1,0	1,0	1,0
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,7	1,1	1,1	1,1	1,7	1,1	1,7	1,7
	$f_b \geq 9$ N/mm²	appr. V	[kN]	0,9	1,3	1,4	1,4	2,0	1,4	2,0	2,0
	$f_b \geq 12$ N/mm²	appr. V	[kN]	1,0	1,6	1,7	1,7	2,3	1,7	2,3	2,3
	$f_b \geq 14$ N/mm²	appr. V	[kN]	1,1	1,7	1,9	1,7	2,6	1,7	2,6	2,6
Installation torque		$T_{inst,max}$	[Nm]	6	6	6	6	6	6	6	6

Clay hollow brick Porotherm Homebric according EN 771-1, Bulk density ρ: 0,68 kg/dm³, Brick size: 500x200x299 mm (e.g. Wienerberger)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8 / M10			M12 / M16	
Perfo sleeves VM-SH				12x80	16x85	16x130 / 16x130/330		20x85	20x130
Anchorage depth		h_{ef}	[mm]	80	85	130		85	130
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	500	500	500		500	500
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	299	299	299		299	299
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100		120	120
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,3	0,3	0,4		0,3	0,4
	$f_b \geq 8$ N/mm²	appr. N	[kN]	0,3	0,3	0,4		0,3	0,4
	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,3	0,4	0,6		0,4	0,6
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,6	0,6	0,7		0,9	0,9
	$f_b \geq 8$ N/mm²	appr. V	[kN]	0,7	0,7	0,9		1,0	1,0
	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,9	0,9	1,0		1,1	1,1
Installation torque		$T_{inst,max}$	[Nm]	2	6	6		6	6

Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Injection System VM-EA, perforated brick with Perfo Sleeve

Clay hollow brick BGV Thermo according EN 771-1, Bulk density ρ: 0,62 kg/dm3, Brick size: 500x200x314 mm (e.g. Leroux)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8/M10	M8	M10	M12	M16	M12 / M16
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	16x130 16x130/330	20x85	20x85	20x130
Anchorage depth		h_{ef}	[mm]	80	85	130	130	85	85	130
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	500	500	500	500	500	500	500
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	314	314	314	314	314	314	314
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	100	120	120	120
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,1	0,2	0,3	0,3	0,2	0,3	0,3
	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,2	0,3	0,3	0,4	0,3	0,3	0,4
	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,3	0,3	0,4	0,4	0,3	0,4	0,4
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,6	0,6	0,7	0,7	0,6	0,6	0,7
	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,6	0,7	0,9	0,9	0,9	0,9	0,9
	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,9	1,0	1,1	1,1	1,0	1,0	1,1
Installation torque		$T_{inst,max}$	[Nm]	2	4	4	4	4	4	4

Clay hollow brick Calibric Th according EN 771-1, Bulk density ρ: 0,62 kg/dm³, Brick size: 500x200x314 mm (e.g. Terreal)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8/M10	M8	M10	M12	M16	M12	M16
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	16x130 16x130/330	20x85	20x85	20x130	20x130
Anchorage depth		h_{ef}	[mm]	80	85	130	130	85	85	130	130
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	500	500	500	500	500	500	500	500
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	314	314	314	314	314	314	314	314
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	100	120	120	120	120
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,2	0,2	0,3	0,3	0,2	0,3	0,3	0,3
	$f_b \geq 9$ N/mm²	appr. N	[kN]	0,3	0,3	0,3	0,3	0,3	0,4	0,3	0,4
	$f_b \geq 12$ N/mm²	appr. N	[kN]	0,3	0,3	0,3	0,4	0,3	0,4	0,4	0,4
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,7	1,0	1,0	1,0	1,7	1,7	1,7	1,7
	$f_b \geq 9$ N/mm²	appr. V	[kN]	1,0	1,3	1,3	1,3	2,1	2,1	2,1	2,1
	$f_b \geq 12$ N/mm²	appr. V	[kN]	1,1	1,6	1,6	1,6	2,4	2,4	2,4	2,4
Installation torque		$T_{inst,max}$	[Nm]	2	2	2	2	2	2	2	2

Clay hollow brick Urbanbric according EN 771-1, Bulk density ρ: 0,74 kg/dm³, Brick size: 560x200x274 mm (e.g. Imerys)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8 / M10		M12 / M16	
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	20x85	20x130
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	560	560	560	560	560
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	274	274	274	274	274
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	120	120
Approved tension load for compressive strength	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,3	0,3	0,4	0,3	0,4
	$f_b \geq 9$ N/mm²	appr. N	[kN]	0,3	0,4	0,6	0,4	0,6
Approved shear load for compressive strength	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,9	1,0	1,0	1,1	1,1
	$f_b \geq 9$ N/mm²	appr. V	[kN]	1,0	1,1	1,3	1,4	1,4
Installation torque		$T_{inst,max}$	[Nm]	2	2	2	2	2

Clay hollow brick Blocchi Leggeri according EN 771-1, Bulk density ρ: 0,55 kg/dm³, Brick size: 250x120x250 mm (e.g. Wienerberger)

Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				M8	M8 / M10		M12 / M16	
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	20x85	20x130	20x200
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	200
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	250	250	250	250	250	250
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	250	250	250	250	250	250
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	120	120	120
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,1	0,1	0,1	0,1	0,1	0,1
	$f_b \geq 6$ N/mm²	appr. N	[kN]	0,1	0,1	0,2	0,1	0,2	0,2
	$f_b \geq 8$ N/mm²	appr. N	[kN]	0,2	0,2	0,2	0,2	0,2	0,2
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,6	0,6	0,6	0,6	0,6	0,6
	$f_b \geq 6$ N/mm²	appr. V	[kN]	0,6	0,6	0,6	0,7	0,7	0,7
	$f_b \geq 8$ N/mm²	appr. V	[kN]	0,7	0,7	0,7	0,9	0,9	0,9
Installation torque		$T_{inst,max}$	[Nm]	4	4	4	4	4	4

Extract from Permissible Service Conditions of European Technical Assessment ETA-17/0006 for use in masonry

Approved loads for single anchor without influence of spacing and edge distance. Butt joint and horizontal joint with adhesive. Temperature range -40°C to +24°C (short term temperature +40°C) – use category dry/dry. The total safety factor according ETAG 029 (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Perforated brick with Perfo Sleeve

Injection System VM-EA, perforated brick with Perfo Sleeve										
Clay hollow brick Doppio Uni according EN 771-1, Bulk density ρ: 0,92 kg/dm³, Brick size: 250x120x120 mm (e.g. Wienerberger)										
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**			**M12 / M16**		
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	20x85	20x130	20x200	
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130	200	
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	250	250	250	250	250	250	
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	120	120	120	120	120	120	
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	120	120	120	
Approved tension load for compressive strength	$f_b \geq 10$ N/mm²	appr. N	[kN]	0,3	0,3	0,3	0,3	0,3	0,3	
	$f_b \geq 16$ N/mm²	appr. N	[kN]	0,3	0,3	0,3	0,4	0,4	0,4	
	$f_b \geq 20$ N/mm²	appr. N	[kN]	0,3	0,3	0,4	0,4	0,4	0,4	
	$f_b \geq 28$ N/mm²	appr. N	[kN]	0,4	0,4	0,4	0,6	0,6	0,6	
Approved shear load for compressive strength	$f_b \geq 10$ N/mm²	appr. V	[kN]	0,6	0,6	0,6	0,6	0,6	0,6	
	$f_b \geq 16$ N/mm²	appr. V	[kN]	0,7	0,7	0,7	0,7	0,7	0,7	
	$f_b \geq 20$ N/mm²	appr. V	[kN]	0,9	0,9	0,9	0,9	0,9	0,9	
	$f_b \geq 28$ N/mm²	appr. V	[kN]	1,0	1,0	1,0	1,0	1,0	1,0	
Installation torque		$T_{inst,max}$	[Nm]	4	4	4	4	4	4	
Brickwork of hollow lightweight concrete Bloc creux B40 according EN 771-3, Bulk density ρ: 0,8 kg/dm³, Brick size: 494x200x190 mm (e.g. Sepa)										
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**			**M12 / M16**		
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	20x85	20x130		
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130		
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	494	494	494	494	494		
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	190	190	190	190	190		
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	100	100	100	120	120		
Approved tension load for compressive strength	$f_b \geq 4$ N/mm²	appr. N	[kN]	0,1	0,2	0,6	0,3	0,6		
Approved shear load for compressive strength	$f_b \geq 4$ N/mm²	appr. V	[kN]	0,3	0,9	1,0	0,9	1,0		
Installation torque		$T_{inst,max}$	[Nm]	2	2	2	2	2		
Brickwork of hollow lightweight concrete Leca Lex harkko RUH-200 according EN 771-3, Bulk density ρ: 0,7 kg/dm³, Brick size: 498x200x195 mm (e.g. Saint-Gobain Weber)										
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**			**M12 / M16**		
Perfo sleeves VM-SH				12x80	16x85	16x130 16x130/330	20x85	20x130		
Anchorage depth		h_{ef}	[mm]	80	85	130	85	130		
Spacing = Minimum spacing parallel to the horizontal joint		$s_{cr} = s_{min,II}$	[mm]	498	498	498	498	498		
Minimum spacing vertical to the horizontal joint		$s_{cr} = s_{min,\perp}$	[mm]	195	195	195	195	195		
Edge distance = Minimum edge distance		$c_{cr} = c_{min}$	[mm]	120	127	195	127	195		
Approved tension load for compressive strength	$f_b \geq 2,7$ N/mm²	appr. N	[kN]	0,6	0,6	0,7	0,7	0,7		
Approved shear load for compressive strength	$f_b \geq 2,7$ N/mm²	appr. V	[kN]	0,7	1,0	1,0	1,0	1,0		
Installation torque		$T_{inst,max}$	[Nm]	8	8	8	8	8		
Installation parameters in perforated bricks with perfo sleeve										
Threaded studs: Steel: ≥ FKL. 5.8; A4, HCR: ≥ FKL 70				**M8**	**M8 / M10**			**M12 / M16**		
Perfo sleeves VM-SH				12x80	16x85	16x130	16x130 16x130/330	20x85	20x130	20x200
Diameter of drill hole		d_0	[mm]	12	16	16	16	20	20	20
Drill hole depth		h_0	[mm]	85	90	135	135 + t_{fix}	90	135	205
Drilling method							Rotary drilling			
Minimum wall thickness		h_{min}	[mm]	115	115	175	175	115	175	240
Clearance hole in the fixture		$d_f \leq$	[mm]	9	9 / 12	9 / 12	9 / 12	14 / 18	14 / 18	14 / 18
Installation torque		$T_{inst,max}$	[Nm]				s. brick information			
Amount of adhesive per drill hole			[ml]	11,2	24,9	38,0	38 - 68[1)]	41,1	62,9	96,7
Drill holes per cartridge		VM-EA 300	[pcs.]	23	10	6	3 - 6[1)]	6	4	2
		VM-EA 345	[pcs.]	27	12	8	4 - 8[1)]	7	4	3
		VM-EA 420	[pcs.]	33	15	10	5 - 10[1)]	9	6	3

[1)] Dependent on actual perfo sleeve length

Chemical Anchor VZ

Threaded Stud V-A

Threaded Stud V-A A4

Resin Anchor Capsule VZ-P

Range of loading: 3,6 kN–64,4 kN
Range of concrete quality: C20/25–C50/60
Material: Steel, zinc plated, Steel, hot dip galvanized, Stainless steel A4, HCR

F30-F120

Description

The new Chemical Anchor VZ, consisting of the styrene-free Resin Anchor Capsule VZ-P and Threaded Stud V-A, has the European Technical Assessment for cracked and uncracked concrete. Installation is quick and easy: after inserting the composite adhesive cartridge into the cleaned drill hole, the Threaded Stud V-A is driven in using a drill hammer. Since the composite reaction is not started until the threaded stud is driven in, the composite adhesive cartridge and threaded stud can be set independently of each other and it is possible to interrupt work without problem. This makes the Chemical Anchor VZ ideal for series installation. The very short curing time enables heavy components to be fastened quickly without long waiting times. Processing of the Chemical Anchor VZ is permissible from a concrete temperate of -20°C to +40°C. This means that it can be used indoors and outdoors all year round and is also ideally suited for use in cold stores.

Hammer drills, compressed air drills or suction drills can be used to create the drill holes. When using the hollow drill bit SB, fine dust exposure is reduced to a minimum and subsequent drill hole cleaning is not necessary.

Advantages

- European Technical Assessment for cracked and uncracked concrete
- High permissible loads at low anchorage depths and component thicknesses
- Small spacings and very small edge distances
- Fire certificates for all sizes
- General design approval by ‚Deutsches Institut für Bautechnik' in Berlin, Germany as concrete-to-concrete connector (Z-21.8-2126)
- Approved processing from -20°C substrate temperature
- Very fast, reliable curing, thus hardly any waiting time before installation
- No longer curing times in wet concrete
- Threaded Studs V-A with external hexagon for fast and easy installation; every package includes an adapter for the drilling machine
- Also with large washer for crash-barrier mounting
- Economic special lengths without external hexagon available
- When using the hollow drill bit SB, subsequent drill hole cleaning is not necessary
- Styrene free

Applications

Anchoring of large loads in cracked and uncracked concrete: steel structures, railings, shelves, base plates, supports, brackets, crash barriers, noise-protection walls, fastenings in cold stores.

Resin Anchor Capsule VZ-P

- Two component glass capsule, Styrene free
- European Technical Assessment for cracked and uncracked concrete

Description	Ref. No.	Capsule Ø mm	Capsule length mm	Content of master box pcs.	Weight per master box kg	Package content pcs.	Weight per package kg
VZ-P 8	64200801	9	85	500	7,2	10	0,14
VZ-P 10	64201001	11	90	500	9,7	10	0,19
VZ-P 12	64201201	13	95	500	12,8	10	0,25
VZ-P 16	64201601	17	95	500	19,5	10	0,38
VZ-P 20	64202001	17	145	200	12,9	10	0,63

Curing time Chemical Anchor VZ

- Capsule temperature when installing -15°C to +40°C

Temperature (°C) of base material			Curing time
-20°C	to	-16°C	17 h
-15°C	to	-11°C	7 h
-10°C	to	-6°C	4 h
-5°C	to	-1°C	3 h
0°C	to	+4°C	50 min
+5°C	to	+ 9°C	25 min
+10°C	to	+19°C	15 min
+20°C	to	+29°C	6 min
+30°C	to	+40°C	6 min

Accessories for Chemical Anchor VZ

Chemical Anchor	Threaded Stud	Drill hole Ø	Blow-out pump / Air gun	Cleaning brush RB
		mm		
VZ-P 8	M8	10	VM-AP 270 / 360 VM-ABP 200	RB 10 M6
VZ-P 10	M10	12	VM-AP 270 / 360 VM-ABP 200	RB 12 M6 RB 12 M8
VZ-P 12	M12	14	VM-AP 270 / 360 VM-ABP 200	RB 14 M6 RB 14 M8
VZ-P 16	M16	18	VM-AP 270 / 360 VM-ABP 200 / 250 / 500	RB 18 M6 RB 18 M8
VZ-P 20	M20	22	VM-AP 270 / 360 VM-ABP 250 / 500	RB 22 M6
See page			**178**	**179**

Threaded Studs for Chemical Anchor VZ

Threaded Stud V-A

- For use in structures subject to dry internal conditions
- Steel, zinc plated 5.8

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Usable Length mm	Package content pcs.	Weight per package kg
V-A 8-20/110	21101101	10 x 80	20	100	10	0,43
V-A 8-60/150	21105101	10 x 80	60	140	10	0,53
V-A 10-15/115	21202101	12 x 90	15	105	10	0,73
V-A 10-30/130	21203101	12 x 90	30	120	10	0,81
V-A 10-65/165	21207101	12 x 90	65	155	10	0,98
V-A 10-90/190	21210101	12 x 90	90	180	10	1,11
V-A 10-150/250	21216101	12 x 90	150	240	10	1,42
V-A 10-200/300	21221101	12 x 90	200	290	10	1,71
V-A 12-10/135	21304101	14 x 110	10	120	10	1,19
V-A 12-35/160	21306101	14 x 110	35	145	10	1,37
V-A 12-85/210	21312101	14 x 110	85	195	10	1,73
V-A 12-95/220	21313101	14 x 110	95	205	10	1,82
V-A 12-125/250	21316101	14 x 110	125	235	10	2,02
V-A 12-175/300	21321101	14 x 110	175	285	10	2,83
V-A 16-20/165	21507101	18 x 125	20	145	10	2,77
V-A 16-45/190	21510101	18 x 125	45	170	10	2,96
V-A 16-85/230	21514101	18 x 125	85	210	10	3,65
V-A 16-105/250	21516101	18 x 125	105	230	10	3,91
V-A 16-155/300	21521101	18 x 125	155	280	10	4,58
V-A 20-20/220	21613101	22 x 170	20	190	10	5,56
V-A 20-60/260	21617101	22 x 170	60	230	10	6,39
V-A 20-100/300	21621101	22 x 170	100	270	10	7,23

Other lengths on request.

A setting tool is included with each anchor rod package.

Threaded Stud V-A 8.8

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Usable Length mm	Package content pcs.	Weight per package kg
V-A 8-20/110 8.8	21101171	10 x 80	20	100	10	0,43
V-A 8-60/150 8.8	21105171	10 x 80	60	140	10	0,53
V-A 10-15/115 8.8	21202171	12 x 90	15	105	10	0,73
V-A 10-30/130 8.8	21203171	12 x 90	30	120	10	0,81
V-A 10-65/165 8.8	21207171	12 x 90	65	155	10	0,98
V-A 10-90/190 8.8	21210171	12 x 90	90	180	10	1,11
V-A 12-10/135 8.8	21304171	14 x 110	10	120	10	1,19
V-A 12-35/160 8.8	21306171	14 x 110	35	145	10	1,37
V-A 12-85/210 8.8	21312171	14 x 110	85	195	10	1,73
V-A 12-125/250 8.8	21316171	14 x 110	125	235	10	2,02
V-A 12-175/300 8.8	21321171	14 x 110	175	285	10	2,83
V-A 16-20/165 8.8	21507171	18 x 125	20	145	10	2,77
V-A 16-45/190 8.8	21510171	18 x 125	45	170	10	2,96
V-A 16-85/230 8.8	21514171	18 x 125	85	210	10	3,65
V-A 16-105/250 8.8	21516171	18 x 125	105	230	10	3,91
V-A 16-155/300 8.8	21521171	18 x 125	155	280	10	4,58
V-A 20-20/220 8.8	21613171	22 x 170	20	190	10	5,56
V-A 20-60/260 8.8	21617171	22 x 170	60	230	10	6,39
V-A 20-100/300 8.8	21621171	22 x 170	100	270	10	7,23

Other lengths on request.

A setting tool is included with each anchor rod package.

Threaded Stud V-A A4

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless Steel A4

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Package content pcs.	Weight per package kg
V-A 8-20/110 A4	21101501	10 x 80	20	10	0,43
V-A 8-60/150 A4	21105501	10 x 80	60	10	0,53
V-A 10-15/115 A4	21202501	12 x 90	15	10	0,73
V-A 10-30/130 A4	21203501	12 x 90	30	10	0,81
V-A 10-65/165 A4	21207501	12 x 90	65	10	0,98
V-A 10-90/190 A4	21210501	12 x 90	90	10	1,11
V-A 10-150/250 A4	21216501	12 x 90	150	10	1,42
V-A 10-200/300 A4	21221501	12 x 90	200	10	1,71
V-A 12-10/135 A4	21304501	14 x 110	10	10	1,19
V-A 12-35/160 A4	21306501	14 x 110	35	10	1,37
V-A 12-55/180 A4	21309501	14 x 110	55	10	1,51
V-A 12-85/210 A4	21312501	14 x 110	85	10	1,73
V-A 12-95/220 A4	21313501	14 x 110	95	10	1,82
V-A 12-125/250 A4	21316501	14 x 110	125	10	2,02
V-A 12-175/300 A4	21321501	14 x 110	175	10	2,83
V-A 16-5/150 A4	21505501	18 x 125	5	10	2,38
V-A 16-20/165 A4	21507501	18 x 125	20	10	2,77
V-A 16-45/190 A4	21510501	18 x 125	45	10	2,96
V-A 16-65/210 A4	21512501	18 x 125	65	10	3,20
V-A 16-85/230 A4	21514501	18 x 125	85	10	3,65
V-A 16-105/250 A4	21516501	18 x 125	105	10	3,91
V-A 16-155/300 A4	21521501	18 x 125	155	10	4,58
V-A 20-20/220 A4	21613501	22 x 170	20	10	5,56
V-A 20-60/260 A4	21617501	22 x 170	60	10	6,39
V-A 20-100/300 A4	21621501	22 x 170	100	10	7,23

Other lengths on request.

A setting tool is included with each anchor rod package.

Threaded Stud V-A fvz

- Improved corrosion protection
- Steel 5.8, hot dip galvanized ≥ 50 µm (average plating thickness according to EN ISO 10684)

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Package content pcs.	Weight per package kg
V-A 8-20/110 fvz	21101201	10 x 80	20	10	0,43
V-A 10-30/130 fvz	21203201	12 x 90	30	10	0,81
V-A 10-90/190 fvz	21210201	12 x 90	90	10	1,11
V-A 12-35/160 fvz	21306201	14 x 110	35	10	1,37
V-A 12-95/220 fvz	21313201	14 x 110	95	10	1,82
V-A 16-20/165 fvz	21507201	18 x 125	20	10	2,77
V-A 16-45/190 fvz	21510201	18 x 125	45	10	2,96
V-A 16-65/210 fvz	21512201	18 x 125	65	10	3,20
V-A 20-20/220 fvz	21613201	22 x 170	20	10	5,56
V-A 20-60/260 fvz	21617201	22 x 170	60	10	6,39

Other lengths on request.

A setting tool is included with each anchor rod package.

Threaded Stud V-A HCR

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Package content pcs.	Weight per package kg
V-A 8-20/110 HCR	21101651	10 x 80	20	10	0,43
V-A 10-30/130 HCR	21203651	12 x 90	30	10	0,81
V-A 12-35/160 HCR	21306651	14 x 110	35	10	1,37
V-A 16-45/190 HCR	21510651	18 x 125	45	10	2,96

Other lengths on request.

A setting tool is included with each anchor rod package.

Threaded Stud VA-U for anchoring crash barriers

- Threaded Stud VA-U for anchoring crash barriers
- Steel 5.8, hot dip galvanized ≥ 50 µm (average plating thickness according to EN ISO 10684)
- With large washer DIN EN ISO 7093 (DIN 9021, Ø=50 mm)

Description	Ref. No.	Drill hole Ø x depth mm	Fixture thickness t_{fix} mm	Package content pcs.	Weight per package kg	Weight per pcs. kg
VA-U 16-20/165 fvz[1)]	21507791	18x125	M16x165	20	10	2,99

[1)] Suitable Resin Anchor Capsule VZ-P 16 see page 159.

A setting tool is included with each anchor rod package.

Setting Tool V-M

- Only needed for special length and studs without external Hexagon

Description	Ref. No.	Suitable for threaded stud	Package content pcs.	Weight per pcs. kg
V-M 8	27105160	M8	1	0,02
V-M 10	27205160	M10	1	0,03
V-M 12	27305160	M12	1	0,05
V-M 16	27505160	M16	1	0,06
V-M 20	27605160	M20	1	0,20

ETA-20/0533

Extract from Permissible Service Conditions of European Technical Assessment ETA-20/0533 for use in cracked and uncracked concrete (Option 1)

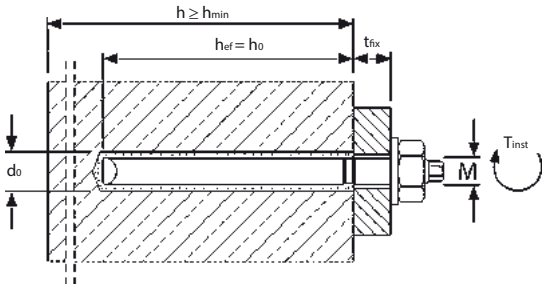
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

Loads and performance data					**M8**	**M10**	**M12**	**M16**	**M20**
Anchorage depth			h_{ef}	[mm]	80	90	110	125	170
Chemical Anchor VZ, Threaded Stud V-A Steel 5.8									
Mean ultimate loads (Range of temperature: 24°C/40°C[1])						cracked concrete / uncracked concrete			
Mean ultimate loads tension		C20/25	$N_{u,m}$	[kN]	18,8 / 19,2	30,5	44,3	64,2 / 82,3	101,8 / 128,5
Mean ultimate loads, shear		C20/25	$V_{u,m}$	[kN]	11,5	18,3	26,6	49,4	77,1
Approved loads, tension							cracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	4,0	7,3	11,5	18,7	30,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	3,6	6,2	9,9	15,0	25,4
Approved loads, tension							uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	8,0	13,8	20,0	27,3	43,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	6,8	12,3	18,1	27,3	43,3
Approved loads, shear							cracked and uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. V	[kN]	6,3	9,7	14,3	26,9	41,7
	50°C/80°C[1]	C20/25	rec. V	[kN]	6,3	9,7	14,3	26,9	41,7
Chemical Anchor VZ, Threaded Stud V-A Steel 8.8									
Mean ultimate loads (Range of temperature: 24°C/40°C[1])						cracked concrete / uncracked concrete			
Mean ultimate loads tension		C20/25	$N_{u,m}$	[kN]	18,8 / 30,7	30,5 / 47,7	44,3 / 70,8	64,2 / 91,7	101,8 / 145,4
Mean ultimate loads, shear		C20/25	$V_{u,m}$	[kN]	15,4	24,4	35,4	65,8	102,8
Approved loads, tension							cracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	4,0	7,3	11,5	18,7	30,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	3,6	6,2	9,9	15,0	25,4
Approved loads, tension							uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	8,0	14,6	21,4	27,3	43,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	6,8	12,3	18,1	27,3	43,3
Approved loads, shear							cracked and uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. V	[kN]	8,6	13,1	19,4	36,0	56,0
	50°C/80°C[1]	C20/25	rec. V	[kN]	8,6	13,1	19,4	35,9[2]	56,0
Chemical Anchor VZ, Threaded Stud V-A Stainless Steel ≥ A4-70, ≥ HCR-70									
Mean ultimate loads (Range of temperature: 24°C/40°C[1])						cracked concrete / uncracked concrete			
Mean ultimate loads tension		C20/25	$N_{u,m}$	[kN]	18,8 / 26,9	32,1 / 42,6	49,9 / 62,0	64,2 / 91,7	101,8 / 145,4
Mean ultimate loads, shear		C20/25	$V_{u,m}$	[kN]	13,5	21,3	31,0	57,6	90,0
Approved loads, tension							cracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	4,0	7,3	11,5	18,7	30,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	3,6	6,2	9,9	15,0	25,4
Approved loads, tension							uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. N	[kN]	8,0	14,6	21,4	27,3	43,3
	50°C/80°C[1]	C20/25	rec. N	[kN]	6,8	12,3	18,1	27,3	43,3
Approved loads, shear							cracked and uncracked concrete		
Range of temperature	24°C/40°C[1]	C20/25	rec. V	[kN]	7,4	11,4	17,1	31,4	49,1
	50°C/80°C[1]	C20/25	rec. V	[kN]	7,4	11,4	17,1	31,4	49,1
Minimum thickness of concrete slab, spacing and edge distance									
Minimum thickness of concrete slab			h_{min}	[mm]	110	120	140	160	220
Minimum spacing			s_{min}	[mm]	40	50	60	75	90
Minimum edge distance			c_{min}	[mm]	40	45	45	50	55
Installation parameters									
Drill hole diameter			d_0	[mm]	10	12	14	18	22
Diameter of clearance hole in the fixture			$d_f \leq$	[mm]	9	12	14	18	22
Depth of drill hole			h_0	[mm]	80	90	110	125	170
Installation torque			$T_{inst} \leq$	[Nm]	10	20	40	80	150
Width across nut (Nut)			SW	[mm]	13	17	19	24	30
Width across nut (Threaded Stud)			SW	[mm]	5	6	8	12	14

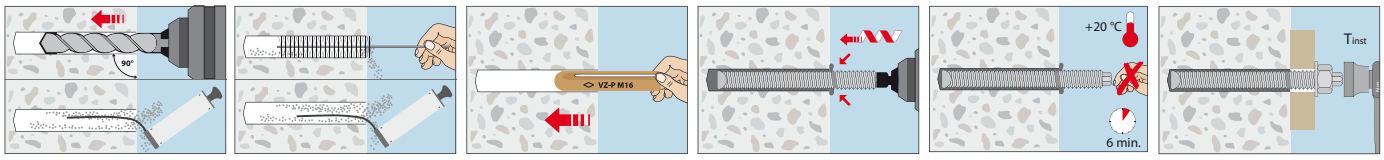
[1] max long term temperature / max short term temperature

[2] 36,0 kN in uncracked concrete

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



Installation



Chemical Anchor VZ-IG

NEW 

Internally Threaded Anchor Rod VZ-IG

NEW 

Internally Threaded Anchor Rod VZ-IG A4

Resin Anchor Capsule VZ-P

Range of loading: 3,2 kN–31,9 kN
Range of concrete quality: C20/25–C50/60
Material: Steel, zinc plated, Stainless steel A4, HCR

Description

The new Chemical Anchor VZ, consisting of the styrene-free Resin Anchor Capsule VZ-P and Internally Threaded Anchor Rod VZ-IG, has the European Technical Assessment for cracked and uncracked concrete. Installation is quick and easy: After inserting the composite mortar cartridge into the cleaned drill hole, the Internally Threaded Anchor Rod VZ-IG is driven in with the help of the enclosed adapter and a hammer drill with drill chuck for cylindrical drills. Since the composite reaction is not started until the internally threaded anchor rod is driven in, the composite adhesive cartridge and internally threaded anchor rod can be set independently of each other and it is possible to interrupt work without problem. The very short curing time enables heavy components to be fastened quickly without long waiting times. As the VZ composite anchor can be used in concrete temperatures from -20 °C to +40 °C, it can be used indoors and outdoors all year round and is ideally suited for use in cold stores.

Hammer drills, compressed air drills or suction drills can be used to create the drill holes. When using the hollow drill bit SB, fine dust exposure is reduced to a minimum and subsequent drill hole cleaning is not necessary.

Advantages

- European Technical Assessment for cracked and uncracked concrete
- High permissible loads at low anchorage depths and component-thicknesses
- Small spacings and very small edge distances
- Approved processing from -20°C substrate temperature
- Very fast, reliable curing, thus hardly any waiting time before installation
- No longer curing times in wet concrete
- Wide range of application and design options, as various screws, threaded rods and nuts (galvanised steel: FKL ≥8.8, stainless steel A4, HCR: FKL ≥70) can be used for fastening.
- Also suitable for architecturally demanding applications
- Can be dismantled flush with the surface
- A setting tool is included with each package
- When using the hollow drill bit SB, subsequent drill hole cleaning is not necessary
- Styrene free

Applications

Anchoring of large loads in cracked and uncracked concrete with standard screws or threaded rods: Steel structures, brackets, railings, posts, supports, ladders, gates, fixings in cold stores.

Resin Anchor Capsule VZ-P

- Two component glass capsule, Styrene free
- European Technical Assessment for cracked and uncracked concrete

Description	Ref. No.	Capsule Ø mm	Capsule length mm	Content of master box pcs.	Weight per master box kg	Package content pcs.	Weight per package kg
VZ-P 8	64200801	9	85	500	7,2	10	0,14
VZ-P 10	64201001	11	90	500	9,7	10	0,19
VZ-P 12	64201201	13	95	500	12,8	10	0,25
VZ-P 16	64201601	17	95	500	19,5	10	0,38
VZ-P 20	64202001	17	145	200	12,9	10	0,63

Curing time Chemical Anchor VZ

- Capsule temperature when installing -15°C to +40°C

Temperature (°C) of base material			Curing time
-20°C	to	-16°C	17 h
-15°C	to	-11°C	7 h
-10°C	to	-6°C	4 h
-5°C	to	-1°C	3 h
0°C	to	+4°C	50 min
+5°C	to	+ 9°C	25 min
+10°C	to	+19°C	15 min
+20°C	to	+29°C	6 min
+30°C	to	+40°C	6 min

Accessories for Chemical Anchor VZ

Chemical Anchor	Internally Threaded Sleeve	Drill hole Ø	Blow-out pump / Air gun	Cleaning brush RB
		mm		
VZ-P 10	VZ-IG M6	12	VM-AP 270 / 360 VM-ABP 200	RB 12 M6 RB 12 M8
VZ-P 12	VZ-IG M8	14	VM-AP 270 / 360 VM-ABP 200	RB 14 M6 RB 14 M8
VZ-P 16	VZ-IG M10	18	VM-AP 270 / 360 VM-ABP 200 / 250 / 500	RB 18 M6 RB 18 M8
VZ-P 20	VZ-IG M12	22	VM-AP 270 / 360 VM-ABP 250 / 500	RB 22 M6
see page			**178**	**179**

Internally Threaded Anchor Rods for Chemical Anchor VZ

Internally Threaded Anchor Rod VZ-IG

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8

NEW

Description	Suitable for capsule	Ref. No.	Drill hole Ø x depth mm	Outer Ø x Length mm	Internal thread	Package content pcs.	Weight per package kg
VZ-IG M6	VZ-P 10	24406171	12 x 90	10 x 90	M6 x 20	10	0,42
VZ-IG M8	VZ-P 12	24408171	14 x 110	12 x 110	M8 x 20	10	0,72
VZ-IG M10	VZ-P 16	24410171	18 x 125	16 x 125	M10 x 25	10	1,53
VZ-IG M12	VZ-P 20	24412171	22 x 170	20 x 170	M12 x 30	10	3,18

Internally Threaded Anchor Rod VZ-IG 5.8 on demand. A setting tool is included with each package.

Internally Threaded Anchor Rod VZ-IG A4

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel A4-70

NEW

Description	Suitable for capsule	Ref. No.	Drill hole Ø x depth mm	Outer Ø x Length mm	Internal thread	Package content pcs.	Weight per package kg
VZ-IG M6 A4	VZ-P 10	24406501	12 x 90	10 x 90	M6 x 20	10	0,42
VZ-IG M8 A4	VZ-P 12	24408501	14 x 110	12 x 110	M8 x 20	10	0,72
VZ-IG M10 A4	VZ-P 16	24410501	18 x 125	16 x 125	M10 x 25	10	1,53
VZ-IG M12 A4	VZ-P 20	24412501	22 x 170	20 x 170	M12 x 30	10	3,18

Internally Threaded Anchor Rod VZ-IG HCR on demand. A setting tool is included with each package.

ETA-20/0533

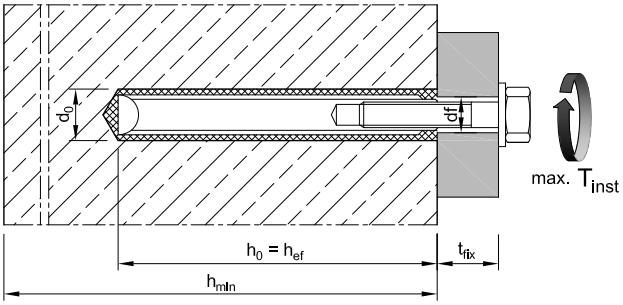
Extract from Permissible Service Conditions of European Technical Assessment ETA-20/0533 for use in cracked and uncracked concrete (Option 1)

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA.

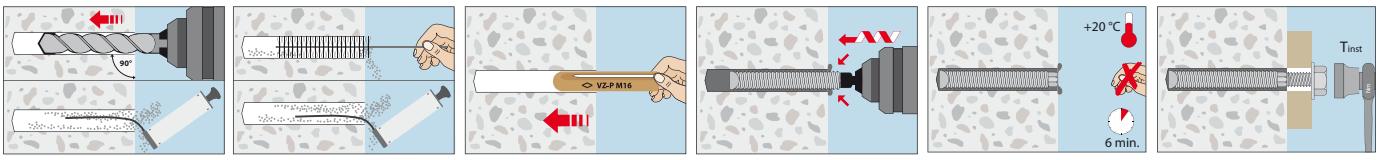
Loads and performance data					**IG M6**	**IG M8**	**IG M10**	**IG M12**
Anchorage depth			h_{ef}	[mm]	90	110	125	170
Chemical Anchor VZ, Internal Threaded Anchor Rod 8.8								
Mean ultimate loads (Range of temperature: 24°C/40°C[1)])						cracked and uncracked concrete		
Mean ultimate loads tension		C20/25	$N_{u,m}$	[kN]	16,1	27,2	46,4	67,4
Mean ultimate loads, shear		C20/25	$V_{u,m}$	[kN]	8,0	13,6	23,2	33,7
Approved loads, tension						cracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. N	[kN]	7,3	11,5	18,7	30,3
	50°C/80°C[1)]	C20/25	rec. N	[kN]	6,2	9,9	15,0	25,4
Approved loads, tension						uncracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. N	[kN]	7,6	12,9	21,9	31,9
	50°C/80°C[1)]	C20/25	rec. N	[kN]	7,6	12,9	21,9	31,9
Approved loads, shear						cracked and uncracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. V	[kN]	4,6	8,0	13,1	19,4
	50°C/80°C[1)]	C20/25	rec. V	[kN]	4,6	8,0	13,1	19,4
Chemical Anchor VZ, Internal Threaded Anchor Rod ≥ A4-70, ≥ HCR-70								
Mean ultimate loads (Range of temperature: 24°C/40°C[1)])						cracked and uncracked concrete		
Mean ultimate loads tension		C20/25	$N_{u,m}$	[kN]	14,1	23,8	40,6	59,0
Mean ultimate loads, shear		C20/25	$V_{u,m}$	[kN]	7,0	11,9	20,3	29,5
Approved loads, tension						cracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. N	[kN]	5,3	9,9	15,7	22,5
	50°C/80°C[1)]	C20/25	rec. N	[kN]	5,3	9,9	15,0	22,5
Approved loads, tension						uncracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. N	[kN]	5,3	9,9	15,7	22,5
	50°C/80°C[1)]	C20/25	rec. N	[kN]	5,3	9,9	15,7	22,5
Approved loads, shear						cracked and uncracked concrete		
Range of temperature	24°C/40°C[1)]	C20/25	rec. V	[kN]	3,2	6,0	9,2	13,7
	50°C/80°C[1)]	C20/25	rec. V	[kN]	3,2	6,0	9,2	13,7
Minimum thickness of concrete slab, spacing and edge distance								
Minimum thickness of concrete slab			h_{min}	[mm]	120	140	160	220
Minimum spacing			s_{min}	[mm]	50	60	75	90
Minimum edge distance			c_{min}	[mm]	45	45	50	55
Installation parameters								
Drill hole diameter			d_0	[mm]	12	14	18	22
Diameter of clearance hole in the fixture			$d_f \leq$	[mm]	7	9	12	14
Depth of drill hole			h_0	[mm]	90	110	125	170
Installation torque			$T_{inst} \leq$	[Nm]	10	10	20	40

[1)]max long term temperature / max short term temperature

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



Installation



Chemical Anchor V

Threaded Stud V-A

Chemical Capsule V-P

Range of loading: 3,0 kN–60,0 kN
Range of concrete quality: C12/15–C50/60
Material: Steel, zinc plated, Steel, hot dip galvanized, Stainless steel A4, HCR

Description

The Chemical Anchor V with ETA assessment consists of a glass capsule filled with resin, hardener and filler-material, as well as the Threaded Stud V-A. The components in the capsule are mixed to a fast curing resin-adhesive when the threaded stud is inserted into the drill-hole. This stress free anchoring system has been tried and tested for decades and allows for mounting of heavy loads even with smaller spacings and edge distances in uncracked concrete. All Sizes of Threaded Stud V-A are also available in grade 8.8 steel on demand.

Advantages

– Anchor-rods with external hexagon for fast and easy installation
– Every package includes an adapter for the drilling machine
– Excellent suitability for high volume fixing
– Sealed drill-hole
– Extensive product range for all uses
– Usable in wet and dry concrete
– Also with large washer for crash-barrier mounting
– Economic special lengths without external hexagon available

Applications

Anchoring of heavy loads in uncracked concrete: trusses, foot and headplates, consoles, crash-barriers, noise-protection walls.

ETA-05/0231

F30-F120
M8-M12
M16-M24

Chemical Capsule V-P

- Two component glass capsule
- European Technical Assessment for uncracked concrete

Description	Ref. No.	Capsule Ø mm	Capsule length mm	Content of master box pcs.	Weight per master box kg	Package content pcs.	Weight per package kg
V-P 8	25100801	9	80	500	7,02	10	0,13
V-P 10	25101001	11	80	500	8,50	10	0,16
V-P 12	25101201	13	95	500	12,30	10	0,25
V-P 14[1)]	25101401	15	95	500	15,82	10	0,27
V-P 16	25101601	17	95	500	19,36	10	0,36
V-P 20	25102001	22	175	-	-	10	1,20
V-P 24	25102401	24	210	-	-	5	0,87
V-P 30[1)]	25103001	33	265	-	-	5	2,64

[1]Not part of European Technical Assessment ETA-05/0231.

Curing time V

- Capsule temperature when installing min. +5°C

Temperature (°C) of base material	curing time	
	dry base material	wet base material
0°C to +4°C	5 h	10 h
+5°C to +19°C	1 h	2 h
+ 20°C to +29°C	20 min	40 min
≥ +30°C	10 min	20 min

Accessories for Chemical Anchor V

Chemical Anchor	Threaded Stud	Drill Bit Ø	Blow-out pump / Air gun	Cleaning brush RB
		mm		
V-P 8	M8	10	VM-AP 270 / 360 VM-ABP 200	RB 10 M6
V-P 10	M10	12	VM-AP 270 / 360 VM-ABP 200	RB 12 M6
V-P 12	M12	14	VM-AP 270 / 360 VM-ABP 200	RB 14 M6
V-P 14	M14	16	VM-AP 270 / 360 VM-ABP 200	RB 16 M6
V-P 16	M16	18	VM-AP 270 / 360 VM-ABP 200 / 250 / 500	RB 18 M6
V-P 20	M20	25	VM-AP 270 / 360 VM-ABP 250 / 500	RB 26 M6
V-P 24	M24	28	VM-AP 270 / 360 VM-ABP 250 / 500	RB 28 M6
V-P 30	M30	35	VM-AP 270 / 360 VM-ABP 250 / 500	RB 35 M6
See page			**178**	**179**

Threaded Studs for Chemical Anchor V

Threaded Stud V-A

- For use in structures subject to dry internal conditions
- Steel, zinc plated 5.8

Description	Ref. No.	Drill hole Ø x depth	Fixture thickness t_{fix}	Package content	Weight per package
		mm	mm	pcs.	kg
V-A 8-20/110	21101101	10 x 80	20	10	0,43
V-A 8-60/150	21105101	10 x 80	60	10	0,53
V-A 10-15/115	21202101	12 x 90	15	10	0,73
V-A 10-30/130	21203101	12 x 90	30	10	0,81
V-A 10-65/165	21207101	12 x 90	65	10	0,98
V-A 10-90/190	21210101	12 x 90	90	10	1,11
V-A 10-150/250	21216101	12 x 90	150	10	1,42
V-A 10-200/300	21221101	12 x 90	200	10	1,71
V-A 12-10/135	21304101	14 x 110	10	10	1,19
V-A 12-35/160	21306101	14 x 110	35	10	1,37
V-A 12-85/210	21312101	14 x 110	85	10	1,73
V-A 12-95/220	21313101	14 x 110	95	10	1,82
V-A 12-125/250	21316101	14 x 110	125	10	2,02
V-A 12-175/300	21321101	14 x 110	175	10	2,83
V-A 14-35/170[1)]	21408101	16 x 120	35	10	1,91
V-A 16-20/165	21507101	18 x 125	20	10	2,77
V-A 16-45/190	21510101	18 x 125	45	10	2,96
V-A 16-85/230	21514101	18 x 125	85	10	3,65
V-A 16-105/250	21516101	18 x 125	105	10	3,91
V-A 16-155/300	21521101	18 x 125	155	10	4,58
V-A 20-20/220	21613101	25 x 170	20	10	5,56
V-A 20-60/260	21617101	25 x 170	60	10	6,39
V-A 20-100/300	21621101	25 x 170	100	10	7,23
V-A 24-15/260	21717101	28 x 210	15	5	4,89
V-A 24-55/300	21721101	28 x 210	55	5	5,54
V-A 30-70/380[1)2)]	21829101	35 x 280	70	5	10,00

Other lengths on request

[1)]Not part of European Technical Assessment ETA-05/0231.

[2)]Setting tool V-A 30-70/380 ref. no. 27805160 to be ordered separately.

Threaded Stud V-A 8.8

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8

Description	Ref. No.	Drill hole Ø x depth	Fixture thickness t_{fix}	Package content	Weight per package
		mm	mm	pcs.	kg
V-A 8-20/110 8.8	21101171	10 x 80	20	10	0,43
V-A 8-60/150 8.8	21105171	10 x 80	60	10	0,53
V-A 10-15/115 8.8	21202171	12 x 90	15	10	0,73
V-A 10-30/130 8.8	21203171	12 x 90	30	10	0,81
V-A 10-65/165 8.8	21207171	12 x 90	65	10	0,98
V-A 10-90/190 8.8	21210171	12 x 90	90	10	1,11
V-A 12-10/135 8.8	21304171	14 x 110	10	10	1,19
V-A 12-35/160 8.8	21306171	14 x 110	35	10	1,37
V-A 12-85/210 8.8	21312171	14 x 110	85	10	1,73
V-A 12-125/250 8.8	21316171	14 x 110	125	10	2,02
V-A 12-175/300 8.8	21321171	14 x 110	175	10	2,83
V-A 16-20/165 8.8	21507171	18 x 125	20	10	2,77
V-A 16-45/190 8.8	21510171	18 x 125	45	10	2,96
V-A 16-85/230 8.8	21514171	18 x 125	85	10	3,65
V-A 16-105/250 8.8	21516171	18 x 125	105	10	3,91
V-A 16-155/300 8.8	21521171	18 x 125	155	10	4,58
V-A 20-20/220 8.8	21613171	25 x 170	20	10	5,56
V-A 20-60/260 8.8	21617171	25 x 170	60	10	6,39
V-A 20-100/300 8.8	21621171	25 x 170	100	10	7,23
V-A 24-15/260 8.8	21717171	28 x 210	15	5	4,89
V-A 24-55/300 8.8	21721171	28 x 210	55	5	5,54

Threaded Stud V-A A4

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless Steel A4-70

Description	Ref. No.	Drill hole Ø x depth	Fixture thickness t_{fix}	Package content	Weight per package
		mm	mm	pcs.	kg
V-A 8-20/110 A4	21101501	10 x 80	20	10	0,43
V-A 8-60/150 A4	21105501	10 x 80	60	10	0,53
V-A 10-15/115 A4	21202501	12 x 90	15	10	0,73
V-A 10-30/130 A4	21203501	12 x 90	30	10	0,81
V-A 10-65/165 A4	21207501	12 x 90	65	10	0,98
V-A 10-90/190 A4	21210501	12 x 90	90	10	1,11
V-A 10-150/250 A4	21216501	12 x 90	150	10	1,42
V-A 10-200/300 A4	21221501	12 x 90	200	10	1,71
V-A 12-10/135 A4	21304501	14 x 110	10	10	1,19
V-A 12-35/160 A4	21306501	14 x 110	35	10	1,37
V-A 12-55/180 A4	21309501	14 x 110	55	10	1,51
V-A 12-85/210 A4	21312501	14 x 110	85	10	1,73
V-A 12-95/220 A4	21313501	14 x 110	95	10	1,82
V-A 12-125/250 A4	21316501	14 x 110	125	10	2,02
V-A 12-175/300 A4	21321501	14 x 110	175	10	2,83
V-A 14-35/170 A4[1)]	21408501	16 x 120	35	10	1,91
V-A 16-5/150 A4	21505501	18 x 125	5	10	2,38
V-A 16-20/165 A4	21507501	18 x 125	20	10	2,77
V-A 16-45/190 A4	21510501	18 x 125	45	10	2,96
V-A 16-65/210 A4	21512501	18 x 125	65	10	3,20
V-A 16-85/230 A4	21514501	18 x 125	85	10	3,65
V-A 16-105/250 A4	21516501	18 x 125	105	10	3,91
V-A 16-155/300 A4	21521501	18 x 125	155	10	4,58
V-A 20-20/220 A4	21613501	25 x 170	20	10	5,56
V-A 20-60/260 A4	21617501	25 x 170	60	10	6,39
V-A 20-100/300 A4	21621501	25 x 170	100	10	7,23
V-A 24-15/260 A4	21717501	28 x 210	15	5	4,89
V-A 24-55/300 A4	21721501	28 x 210	55	5	5,54
V-A 30-70/380 A4[1)2)3)]	21829501	35 x 280	70	5	10,00

Other lengths on demand. A setting tool is included with each anchor rod package.

[1)]Not part of European Technical Assessment ETA-05/0231

[2)]Setting tool V-A 30-70/380 ref. no. 27805160 to be ordered separately.

[3)]Stainless Steel A4-50

Setting Tool V-M

- Only needed for special length and studs without external Hexagon

Description	Ref. No.	Suitable for threaded stud	Package content pcs.	Weight per piece kg
V-M 8	27105160	M8	1	0,02
V-M 10	27205160	M10	1	0,03
V-M 12	27305160	M12	1	0,05
V-M 14	27405160	M14	1	0,05
V-M 16	27505160	M16	1	0,06
V-M 20	27605160	M20	1	0,20
V-M 24	27705160	M24	1	0,33
V-M 30	27805160	M30	1	0,63

Threaded Stud V-A fvz

- Improved corrosion protection
- Steel 5.8, hot dip galvanized ≥ 50 µm (average plating thickness according to EN ISO 10684)

Description	Ref. No.	Drill hole Ø x depth	Fixture thickness t_{fix}	Package content	Weight per package
		mm	mm	pcs.	kg
V-A 8-20/110 fvz	21101201	10 x 80	20	10	0,43
V-A 10-30/130 fvz	21203201	12 x 90	30	10	0,81
V-A 10-90/190 fvz	21210201	12 x 90	90	10	1,11
V-A 12-35/160 fvz	21306201	14 x 110	35	10	1,37
V-A 12-95/220 fvz	21313201	14 x 110	95	10	1,82
V-A 16-20/165 fvz	21507201	18 x 125	20	10	2,77
V-A 16-45/190 fvz	21510201	18 x 125	45	10	2,96
V-A 16-65/210 fvz	21512201	18 x 125	65	10	3,20
V-A 20-20/220 fvz	21613201	25 x 170	20	10	5,56
V-A 20-60/260 fvz	21617201	25 x 170	60	10	6,39
V-A 24-15/260 fvz	21717201	28 x 210	15	5	4,89
V-A 24-55/300 fvz	21721201	28 x 210	55	5	5,54

Other lengths and grade 8.8 on demand.

A setting tool is included with each anchor rod package.

Threaded Stud V-A HCR

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Description	Ref. No.	Drill hole Ø x depth	Fixture thickness t_{fix}	Package content	Weight per package
		mm	mm	pcs.	kg
V-A 8-20/110 HCR	21101651	10 x 80	20	10	0,43
V-A 10-30/130 HCR	21203651	12 x 90	30	10	0,81
V-A 12-35/160 HCR	21306651	14 x 110	35	10	1,37
V-A 16-45/190 HCR	21510651	18 x 125	45	10	2,96

Other lengths on demand. A setting tool is included with each anchor rod package.

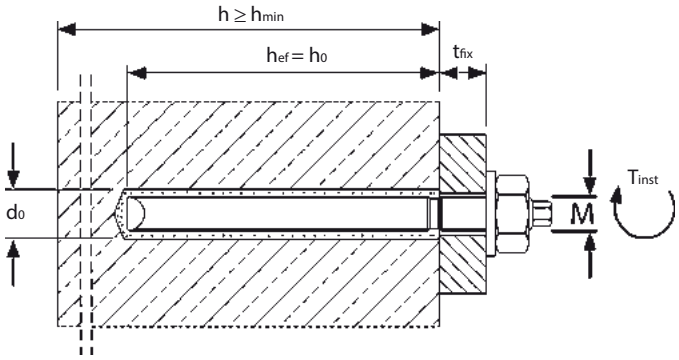
ETA-05/0231

Extract from Permissible Service Conditions of European Technical Assessment ETA-05/0231 for use in uncracked concrete (Option 8)

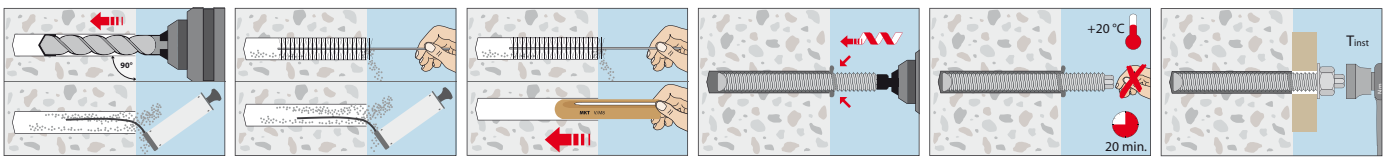
Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances in dry and wet concrete for temperature range I -40°C to +24°C (short term temperature +40°C) and for temperature range II -40°C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M and γ_F) is included. For further details and temperature ranges see ETA. Load capacities under fire exposure see page 199.

Loads and performance data				uncracked concrete							
Chemical Anchor V, steel, zinc plated / hot dip galvanized				**M8**	**M10**	**M12**	**M14[2]**	**M16**	**M20**	**M24**	**M30[2]**
Mean ultimate loads, tension (steel 5.8) C25/30		N_{um}	[kN]	18,3	29,0	42,1	57,7	78,3	123,0	177,0	280,3
Mean ultimate loads, shear (steel 5.8) C25/30		V_{um}	[kN]	11,0	17,4	25,3	34,6	47,0	73,8	106,2	168,2
Mean ultimate loads, tension (steel 8.8) C25/30		N_{um}	[kN]	27,0	38,6	58,2	73,5	104,3	169,8	250,2	442,9
Mean ultimate loads, shear (steel 8.8) C25/30		V_{um}	[kN]	15,0	23,2	33,7	46,2	63,0	98,0	141,0	224,3
Recommended loads, tension		C12/15[2] rec. N	[kN]	3,0	5,0	7,0	8,0	10,0	19,0	26,0	42,0
Approved loads, tension											
Range of temperature	24°C/40°C[1]	≥ C20/25 appr. N	[kN]	8,0	12,3	15,6	12,0	23,7	36,0	47,1	60,0
	50°C/80°C[1]	≥ C20/25 appr. N	[kN]	8,0	12,3	15,6	12,0	19,9	29,7	34,6	60,0
Approved loads, shear											
Range of temperature	24°C/40°C[1]	≥ C20/25 appr. V	[kN]	5,1	8,0	12,0	12,0	22,3	34,9	50,3	60,0
	50°C/80°C[1]	≥ C20/25 appr. V	[kN]	5,1	8,0	12,0	12,0	22,3	34,9	50,3	60,0
Chemical Anchor V, stainless steel A4 / HCR				**M8**	**M10**	**M12**	**M14[2]**	**M16**	**M20**	**M24**	**M30[2]**
Recommended loads, tension		C12/15[2] rec. N	[kN]	3,0	5,0	7,0	8,0	10,0	19,0	26,0	42,0
Approved loads, tension											
Range of temperature	24°C/40°C[1]	≥ C20/25 appr. N	[kN]	8,0	12,3	15,6	12,0	23,7	36,0	47,1	60,0
	50°C/80°C[1]	≥ C20/25 appr. N	[kN]	8,0	12,3	15,6	12,0	19,9	29,7	34,6	60,0
Approved loads, shear											
Range of temperature	24°C/40°C[1]	≥ C20/25 appr. V	[kN]	6,0	9,2	13,3	12,0	25,2	39,4	56,8	60,0
	50°C/80°C[1]	≥ C20/25 appr. V	[kN]	6,0	9,2	13,3	12,0	25,2	39,4	56,8	60,0
Spacing and edge distance											
Effective anchorage depth		h_{ef}	[mm]	80	90	110	120	125	170	210	280
Spacing		$s_{cr,N}$	[mm]	240	270	330	300	375	510	630	700
Edge distance		$c_{cr,N}$	[mm]	120	135	165	150	187,5	255	315	350
Minimum thickness of concrete slab		h_{min}	[mm]	110	120	140	170	160	220	260	330
Minimum spacing		s_{min}	[mm]	40	45	55	120	65	85	105	280
Minimum edge distance		c_{min}	[mm]	40	45	55	60	65	85	105	140
Installation parameters											
Drill hole diameter		d_o	[mm]	10	12	14	16	18	25	28	35
Clearance hole in the fixture		$d_f \leq$	[mm]	9	12	14	16	18	22	26	33
Depth of drill hole		h_o	[mm]	80	90	110	120	125	170	210	280
Installation torque		$T_{inst} \leq$	[Nm]	10	20	40	60	80	120	180	400
Width across nut		SW	[mm]	13	17	19	22	24	30	36	46
Width across nut (Threaded Stud)		SW	[mm]	5	6	8	10	12	14	17	-

[1]max long term temperature / max short term temperature
[2]Not part of assessment, Recommended loads for size M14 and M30 and in concrete C12/15.
For anchor designing an easy to operate CD-ROM is available on request or can be downloaded at www.mkt.de.



Installation



Chemical Anchor V-IG / V-IG A4

Internally Threaded Sleeve V-IG
steel, zinc plated 5.8

Internally Threaded Sleeve V-IG A4
Stainless steel A4

Chemical Capsule V-P

Range of loading: **5,2 kN–25,1 kN**
Range of concrete quality: **C20/25–C50/60**
Material: **Steel, zinc plated, Stainless steel A4**

Description

The Chemical Anchor V-IG / V-IG A4 is the Internally Threaded Version of the Chemical Anchor V. The system consists of a glass capsule and a threaded stud. The two components contained in the capsule are mixed while the threaded stud is driven in, forming a fast setting adhesive. This time proven anchoring system does not apply expansion forces and allows for very close anchor spacing and edge distances in non-cracked concrete. The drill hole is sealed by the adhesive.

Applications

No security-relevant heavy duty anchorings in non-cracked concrete of steel supports, base plates, consoles, anti-noise barriers.

Chemical Capsule V-P

- Two component glass capsule
- Suitable in non-cracked concrete

Description	Ref. No.	Capsule Ø mm	Capsule length mm	Content of master box pcs.	Weight per master box kg	Package content pcs.	Weight per package kg
V-P 12	25101201	13	95	500	12,30	10	0,25
V-P 14	25101401	15	95	500	15,82	10	0,27
V-P 16	25101601	17	95	500	19,36	10	0,36
V-P 16 IG[1)]	25202201	22	115	-	-	10	0,98

[1)]For Internally Threaded Sleeve V-IG M 16.

Curing Time Chemical Anchor V-IG/ V-IG A4

- Capsule temperature when installing min. +5°

Temperature (°C) of base material	curing time	
	dry base material	wet base material
-5°C to +4°C	5 h	10 h
+5°C to +19°C	1 h	2 h
+ 20°C to +29°C	20 min	40 min
≥ +30°C	10 min	20 min

Accessories Chemical Anchor V with Internally Threaded Sleeve V-IG

Chemical Anchor	Internally threaded stud	Drill bit Ø	Blow-out pump / Air gun	Cleaning brush RB
		mm		
V-P 12	V-IG M8	14	VM-AP 270 / 360 VM-ABP 200	RB 14 M6
V-P 14	V-IG M10	16	VM-AP 270 / 360 VM-ABP 200	RB 16 M6
V-P 16	V-IG M12	18	VM-AP 270 / 360 VM-ABP 200 / 250 / 500	RB 18 M6
V-P 16 IG	V-IG M16	22	VM-AP 270 / 360 VM-ABP 200 / 250 / 500	RB 22 M6
See page			**178**	**179**

Internally Threaded Sleeve V-IG

- Steel, zinc plated 5.8
- Fixture easy to remove; sealed drill hole

Description	Ref. No.	Suitable for capsule	Outer-Ø x Anchor length mm	Drill hole Ø x depth mm	Thread mm	Package content pcs.	Weight per package kg
V-IG M 8	24105101	V-P 12	12 x 90	14 x 90	M8 x 25	10	0,50
V-IG M 10	24205101	V-P 14	14 x 90	16 x 90	M10 x 30	10	0,65
V-IG M 12	24305101	V-P 16	16 x 100	18 x 100	M12 x 35	10	1,00

One setting tool is enclosed in every Internally Threaded Sleeve package.

Internally Threaded Sleeve V-IG A4

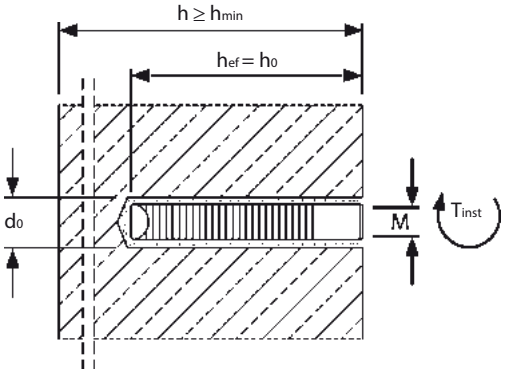
- Stainless steel A4
- Fixture easy to remove; sealed drill hole

Description	Ref. No.	Suitable for capsule	Outer-Ø x Anchor length mm	Drill hole Ø x depth mm	Thread mm	Package content pcs.	Weight per package kg
V-IG M 8 A4	24105501	V-P 12	12 x 90	14 x 90	M8 x 25	10	0,50
V-IG M 10 A4	24205501	V-P 14	14 x 90	16 x 90	M10 x 30	10	0,65
V-IG M 12 A4	24305501	V-P 16	16 x 100	18 x 100	M12 x 35	10	1,00

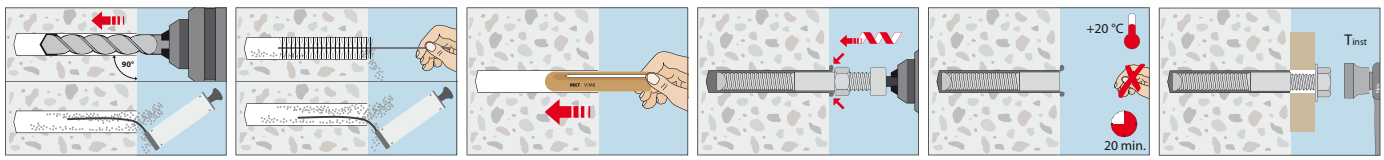
One setting tool is enclosed in every Internally Threaded Sleeve package.

Recommended loads for single anchor without influence of spacing and edge distance for temperature range -40 °C to +50°C (short term temperature +80°C). The influence of the sustained load has been taken into account by the factor Ψsus = 1,0 and the total safety factor (γ_M und γ_F) is included.

Loads and performance data			uncracked concrete C20/25					
Chemical Anchor V-IG			**M8**		**M10**		**M12**	
			Stahl 5.8	A4-70	Stahl 5.8	A4-70	Stahl 5.8	A4-70
Mean ultimate loads, tension	N_{um}	[kN]	20,4	46,7	31,9	54,6	46,2	77,4
Mean ultimate loads, shear	V_{um}	[kN]	12,1	15,5	19,1	24,4	27,8	35,4
Recommended loads, tension	rec. N	[kN]	8,8	9,9	13,2	13,2	16,0	16,0
Recommended loads, shear	rec. V	[kN]	5,2	5,9	8,3	9,3	12,0	13,5
Recommended bending moments	rec. M	[Nm]	10,7	12,1	21,4	24,1	37,4	41,9
Spacing and edge distance								
Effective anchorage depth	h_{ef}	[mm]	90		90		100	
Characteristic spacing	$s_{cr,N}$	[mm]	225		225		250	
Characteristic edge distance	$c_{cr,N}$	[mm]	115		115		125	
Minimum spacing	s_{min}	[mm]	45		45		50	
Minimum edge distance	c_{min}	[mm]	45		45		50	
Minimum thickness of concrete slab	h_{min}	[mm]	140		160		180	
Installation parameters								
Drill hole diameter	d_o	[mm]	14		16		18	
Clearance hole in the fixture	d_f	[mm]	9		12		14	
Depth of drill hole	h_1	[mm]	90		90		100	
Installation torque	$T_{inst} \leq$	[Nm]	10		20		40	



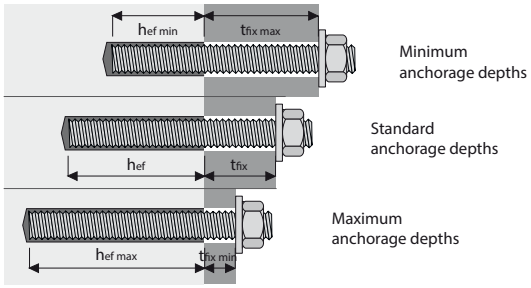
Installation



Threaded Studs, Perfo Sleeves and Tension Anchors for MKT Injection Systems

Threaded Studs for the Injection Systems VMH, VMU plus, VME plus, VME basic and VM-EA in concrete and brickwork: A flexible system means less inventory

The flexible anchoring depths of the Injection Systems VMH, VMU plus, VME plus, VME basic and VM-EA in concrete 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.



$h_{ef} + t_{fix}$ = Usable length of the threaded rod (without nut and washer)

Threaded Stud VMU-A
Steel, zinc plated 5.8

- For use in structures subject to dry internal conditions
- Steel, zinc plated grade 8.8 on demand or as threaded studs VM-A

Threaded Stud VMU-A fvz
Steel, hot dip galvanized 5.8

- For use in structures subject to dry internal conditions

Threaded Stud VMU-A A4
Stainless steel A4-70

- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel HCR on request

Description	Ref. No.			Use in									Package content	Weight per package
				Concrete[1]	Solid base material without Perfo Sleeve		Solid and hollow base material with VM-SH[2]							
	Steel, zinc plated 5.8	Steel, hot dip galvanized 5.8	Stainless steel A4-70	Usable length	Drill hole Ø x depth	Maximum fixture thickness t_{fix}	12x85	16x90	16x135	20x90	20x135	20x205		
							Maximum fixture thickness t_{fix}							
				mm	mm	mm	mm						pcs.	kg
VMU-A 8x100	31510101	-	31510501	90	10x80	10	10	5	-	-	-	-	10	0,42
VMU-A 8x110	31515101	31515201	31515501	100	10x80	20	20	15	-	-	-	-	10	0,46
VMU-A 8x130	31525101	-	31525501	120	10x80	40	40	35	-	-	-	-	10	0,52
VMU-A 8x145	31528101	-	31528501	135	10x80	55	55	50	5	-	-	-	10	0,55
VMU-A 8x160	31530101	-	31530501	150	10x80	70	70	65	20	-	-	-	10	0,60
VMU-A 8x205	31550101	-	31550501	195	10x80	115	115	110	65	-	-	-	10	0,74
VMU-A 10x110	31605101	-	31605501	100	12x90	10	-	15	-	-	-	-	10	0,75
VMU-A 10x130	31625101	31625201	31625501	120	12x90	30	-	35	-	-	-	-	10	0,85
VMU-A 10x150	31630101	31630201	31630501	140	12x90	50	-	55	10	-	-	-	10	0,95
VMU-A 10x165	31635101	-	31635501	155	12x90	65	-	70	25	-	-	-	10	1,02
VMU-A 10x190	31645101	31645201	31645501	180	12x90	90	-	95	50	-	-	-	10	1,15
VMU-A 10x260	31655101	-	31655501	250	12x90	160	-	165	120	-	-	-	10	1,50
VMU-A 12x120	31717101	-	31717501	105	14x100	5	-	-	-	20	-	-	10	1,14
VMU-A 12x130	31718101	-	31718501	115	14x100	15	-	-	-	30	-	-	10	1,21
VMU-A 12x135	31710101	-	31710501	120	14x100	20	-	-	-	35	-	-	10	1,25
VMU-A 12x155	31720101	31720201	31720501	140	14x100	40	-	-	-	55	10	-	10	1,42
VMU-A 12x175	31730101	31730201	31730501	160	14x100	60	-	-	-	75	30	-	10	1,54
VMU-A 12x185	31734101	-	31734501	170	14x100	70	-	-	-	85	40	-	10	1,63
VMU-A 12x210	31740101	31740201	31740501	195	14x100	95	-	-	-	110	65	-	10	1,82
VMU-A 12x225	31748101	-	31748501	210	14x100	110	-	-	-	125	80	10	10	1,89
VMU-A 12x250	31750101	-	31750501	235	14x100	135	-	-	-	150	105	35	10	2,13
VMU-A 12x265	31757101	-	31757501	250	14x100	150	-	-	-	165	120	50	10	2,18
VMU-A 12x300	31760101	-	31760501	285	14x100	185	-	-	-	200	155	85	10	2,50
VMU-A 16x160	31810101	-	31810501	140	18x100	40	-	-	-	55	10	-	10	2,65
VMU-A 16x175	31815101	31815201	31815501	155	18x100	55	-	-	-	70	25	-	10	2,85
VMU-A 16x205	31820101	31820201	31820501	185	18x100	85	-	-	-	100	55	-	10	3,25
VMU-A 16x235	31830101	-	31830501	215	18x100	115	-	-	-	130	85	15	10	3,65
VMU-A 16x300	31840101	-	31840501	280	18x100	180	-	-	-	195	150	80	10	4,53
VMU-A 20x240	31910101	-	31910501	220	-	-	-	-	-	-	-	-	10	5,85
VMU-A 20x260	31915101	-	-	240	-	-	-	-	-	-	-	-	10	6,30
VMU-A 20x285	31920101	-	31920501	265	-	-	-	-	-	-	-	-	10	6,75
VMU-A 20x300	31925101	-	31925501	280	-	-	-	-	-	-	-	-	10	7,15
VMU-A 20x350	31930101	-	-	330	-	-	-	-	-	-	-	-	10	8,10
VMU-A 20x400	31935101	-	-	380	-	-	-	-	-	-	-	-	10	9,10
VMU-A 24x290	31960101	-	31960501	265	-	-	-	-	-	-	-	-	5	4,95
VMU-A 24x350	31965101	-	31965501	325	-	-	-	-	-	-	-	-	5	5,85
VMU-A 24x400	31970101	-	31970501	375	-	-	-	-	-	-	-	-	5	6,60
VMU-A 30x370	31990101	-	31990501[3]	340	-	-	-	-	-	-	-	-	5	9,90

[1] Drill hole Ø and drill depth depend on selected injection system and anchorage depth

[2] Drill hole Ø and drill depth see Perfo Sleeves on page 177

[3] Stainless steel A4-50

Threaded Stud V-A

- For use in structures subject to dry internal conditions
- Steel, zinc plated 5.8

Threaded Stud V-A A4

- For use in structures subject to dry inernal conditions or external atmospheric exposure
- Stainless steel A4-70

Threaded Stud V-A 8.8

- For use in structures subject to dry internal conditions
- Steel, zinc plated 8.8

Threaded Stud V-A HCR

- For use in particularly corrosive environments
- High corrosion resistant steel 1.4529 (HCR)

Threaded Stud V-A fvz

- For use in structures subject to dry internal conditions
- Steel 5.8, hot dip galvanized ≥ 50 µm (average plating thickness according to EN ISO 10684)

Description	Ref. No.					Use in										Package content	Weight per package
						Concrete[1]	Solid base material without Perfo Sleeve		Solid and hollow base material with VM-SH[2]								
	Steel, zinc plated 5.8	Steel, zinc plated 8.8	Steel, hot dip galvanized 5.8	Stainless steel A4-70	Stainless steel HCR-70	Usable Length	Drill hole Ø x depth	Maximum fixture thickness t_{fix}	12x85	16x90	16x135	20x90	20x135	20x205		
									Maximum fixture thickness t_{fix}								
						mm	mm	mm	mm							pcs.	kg
V-A 8-20/110	21101101	21101171	21101201	21101501	21101651	100	10x80	20	20	15	-	-	-	-	10	0,43
V-A 8-60/150	21105101	21105171	-	21105501	-	140	10x80	60	60	55	-	-	-	-	10	0,53
V-A 10-15/115	21202101	21202171	-	21202501	-	105	12x90	15	-	20	-	-	-	-	10	0,73
V-A 10-30/130	21203101	21203171	21203201	21203501	21203651	120	12x90	30	-	35	-	-	-	-	10	0,81
V-A 10-65/165	21207101	21207171	-	21207501	-	155	12x90	65	-	70	25	-	-	-	10	0,98
V-A 10-90/190	21210101	21210171	21210201	21210501	-	180	12x90	90	-	95	50	-	-	-	10	1,11
V-A 10-150/250	21216101	-	-	21216501	-	240	12x90	150	-	155	110	-	-	-	10	1,42
V-A 10-200/300	21221101	-	-	21221501	-	290	12x90	200	-	205	160	-	-	-	10	1,71
V-A 12-10/135	21304101	21304171	-	21304501	-	120	12x90	20	-	-	-	35	-	-	10	1,19
V-A 12-35/160	21306101	21306171	21306201	21306501	21306651	145	14x100	45	-	-	-	60	15	-	10	1,37
V-A 12-55/180	-	-	-	21309501	-	165	14x100	65	-	-	-	80	35	-	10	1,51
V-A 12-85/210	21312101	21312171	-	21312501	-	195	14x100	95	-	-	-	110	65	-	10	1,73
V-A 12-95/220	21313101	-	-	21313501	-	205	14x100	105	-	-	-	120	75	5	10	1,82
V-A 12-125/250	21316101	21316171	-	21316501	-	235	14x100	135	-	-	-	150	105	35	10	2,02
V-A 12-175/300	21321101	21321171	-	21321501	-	285	14x100	185	-	-	-	200	155	85	10	2,40
V-A 16-5/150	-	-	-	21505501	-	130	18x100	30	-	-	-	45	-	-	10	2,38
V-A 16-20/165	21507101	21507171	21507201	21507501	-	145	18x100	45	-	-	-	60	15	-	10	2,77
V-A 16-45/190	21510101	21510171	21510201	21505501	21510651	170	18x100	70	-	-	-	85	40	-	10	2,96
V-A 16-65/210	-	-	21512201	21512501	-	190	18x100	90	-	-	-	105	60	-	10	3,20
V-A 16-85/230	21514101	21514171	-	21514501	-	210	18x100	110	-	-	-	125	80	10	10	3,65
V-A 16-105/250	21516101	21516171	-	21516501	-	230	18x100	130	-	-	-	145	100	30	10	3,91
V-A 16-155/300	21521101	21521171	-	21521501	-	280	18x100	180	-	-	-	195	150	80	10	4,58
V-A 20-20/220	21613101	21613171	21613201	21613501	-	190	-	-	-	-	-	-	-	-	10	5,56
V-A 20-60/260	21617101	21617171	21617201	21617501	-	230	-	-	-	-	-	-	-	-	10	6,39
V-A 20-100/300	21621101	21621171	-	21621501	-	270	-	-	-	-	-	-	-	-	10	7,23
V-A 24-15/260	21717101	21717171	21717201	21717501	-	225	-	-	-	-	-	-	-	-	5	4,89
V-A 24-55/300	21721101	21721171	21721201	21721501	-	265	-	-	-	-	-	-	-	-	5	5,54
V-A 30-70/380[2]	21829101	-	-	21829501[4]	-	350	-	-	-	-	-	-	-	-	5	10,00

[1] Drill hole Ø and drill depth depend on selected injection system and anchorage depth.

[2] Drill hole Ø and drill depth see Perfo Sleeves on page 177

[3] Setting tool V-A 30-70/380 ref. no. 27805160 to be ordered separately.

[4] Stainless steel A4-50

Other lengths 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 EN 10204) in every package

Description	Ref. No.	Threaded Studs	Length mm	Package content pcs.	Weight per package kg
VM-A 8x1000	31199101	M8	1000	10	3,91
VM-A 10x1000	31299101	M10	1000	10	5,5
VM-A 12x1000	31399101	M12	1000	10	7,76
VM-A 16x1000	31599101	M16	1000	10	13,6
VM-A 20x1000	31699101	M20	1000	5	10,8
VM-A 24x1000	31799101	M24	1000	5	15,35

Threaded Stud VM-A A4

Stainless steel A4-70

- 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.	Threaded Studs	Length mm	Package content pcs.	Weight per package kg
VM-A 8x1000 A4	31199501	M8	1000	10	3,77
VM-A 10x1000 A4	31299501	M10	1000	10	5,43
VM-A 12x1000 A4	31399501	M12	1000	10	8,03
VM-A 16x1000 A4	31599501	M16	1000	10	13,95
VM-A 20x1000 A4	31699501	M20	1000	5	11,0
VM-A 24x1000 A4	31799501	M24	1000	5	15,6

Threaded Stud VM-A 8.8

Steel, zinc plated 8.8

- Threaded studs, of 1 meter length, to be cut to the required length
- Comes with manufacturer's certificate (3.1 EN 10204) in every package

Description	Ref. No.	Threaded Studs	Length mm	Package content pcs.	Weight per package kg
VM-A 8x1000 8.8	31199181	M8	1000	10	3,91
VM-A 10x1000 8.8	31299181	M10	1000	10	5,5
VM-A 12x1000 8.8	31399181	M12	1000	10	7,76
VM-A 16x1000 8.8	31599181	M16	1000	10	13,6

Internally Threaded Sleeve VMU-IG

Steel, zinc plated 5.8

- For use in structures subject to dry internal conditions

Internally Threaded Sleeve VMU-IG A4

Stainless steel A4-70

- For use in structures subject to dry internal conditions or external atmospheric exposure

Description	Ref. No.		Use in			Outer Ø x Length	Thread depth min / max	Package content	Weight per package
			Concrete	**Solid base material without Perfo Sleeve**	**Solid and hollow base material with VM-SH[2)]**				
	Steel, zinc plated 5.8	Stainless steel A4	Drill hole Ø x depth	Drill hole Ø x depth					
			mm	mm		mm	mm	pcs.	kg
VMU-IG M6x80	31502101	31502501	12 x 80	-	VM-SH 16x85	10 x 80	8 / 20	10	0,38
VMU-IG M6x90	31503101	31503501	12 x 90	12x90	-	10 x 90	8 / 20	10	0,42
VMU-IG M8x80	31562101	31562501	14 x 80	-	VM-SH 20x85	12 x 80	8 / 20	10	0,52
VMU-IG M8x100	31563101	31563501	14 x 100	14x100	-	12 x 100	8 / 20	10	0,66
VMU-IG M10x80	31601101	31601501	18 x 80	-	VM-SH 20x85	16 x 80	10 / 25	10	0,92
VMU-IG M10x100	31602101	31602501	18 x 100	18x100	-	16 x 100	10 / 25	10	1,18
VMU-IG M12x125	31652101	31652501	22/24[1)] x 125	-	-	20 x 125	12 / 30	10	2,51
VMU-IG M16x170	31702101	31702501	28 x 170	-	-	24 x 170	16 / 32	5	2,41
VMU-IG M20x200	31802101	31802501	35 x 200	-	-	30 x 200	20 / 40	5	4,18

[1)]Drill hole Ø depend on selected injection system

[2)]Drill hole Ø and drill depth see Perfo Sleeves on page 175

Internally Threaded Anchor Rod VZ-IG

Steel, zinc plated 8.8

- For use in structures subject to dry internal conditions

Internally Threaded Anchor Rod VZ-IG A4

Stainless steel A4-70

- For use in structures subject to dry internal conditions or external atmospheric exposure

NEW

Description	Ref. No.		Drill hole Ø x depth	Outer Ø x Length	Internal thread	Thread depth min / max	Package content	Weight per package
	Steel, zinc plated 8.8	Stainless steel A4						
				mm		mm	pcs.	kg
VZ-IG M6 A4	24406171	24406501	12 x 90	10 x 90	M6 x 20	8 / 20	10	0,42
VZ-IG M8 A4	24408171	24408501	14 x 110	12 x 110	M8 x 20	8 / 20	10	0,72
VZ-IG M10 A4	24410171	24410501	18 x 125	16 x 125	M10 x 25	10 / 25	10	1,53
VZ-IG M12 A4	24412171	24412501	22 x 170	20 x 170	M12 x 30	12 / 30	10	3,18

A setting tool is included with each package.

Internally Threaded Sleeve V-IG

- Steel, zinc plated 5.8
- Flush with concrete surface; with internal thread
- For fastenings not subject to approval

Description	Ref. No.	Suitable for capsule	Outer-Ø x Length mm	Drill hole Ø x depth mm	Thread mm	Package content pcs.	Weight per package kg
V-IG M 8	24105101	V-P 12	12 x 90	14 x 90	M8 x 25	10	0,50
V-IG M 10	24205101	V-P 14	14 x 90	16 x 90	M10 x 30	10	0,65
V-IG M 12	24305101	V-P 16	16 x 100	18 x 100	M12 x 35	10	1,00
V-IG M 16	24505101	V-P 16 IG	22 x 120	25 x 120	M16 x 40	10	1,65

A setting tool is included with each internally threaded sleeve package.

Internally Threaded Sleeve V-IG A4

- Stainless steel A4
- Flush with concrete surface; with internal thread
- For fastenings not subject to approval

Description	Ref. No.	Suitable for capsule	Outer-Ø x Length mm	Drill hole Ø x depth mm	Thread mm	Package content pcs.	Weight per package kg
V-IG M 8 A4	24105501	V-P 12	12 x 90	14 x 90	M8 x 25	10	0,50
V-IG M 10 A4	24205501	V-P 14	14 x 90	16 x 90	M10 x 30	10	0,65
V-IG M 12 A4	24305501	V-P 16	16 x 100	18 x 100	M12 x 35	10	1,00
V-IG M 16 A4	24505501	V-P 16 IG	22 x 120	25 x 120	M16 x 40	10	1,65

A setting tool is included with each internally threaded sleeve package.

Internally Threaded Sleeve VM-IG

- Steel, zinc plated
- Installation in hollow base material
- For fastenings not subject to approval

Description	Ref. No.	Suitable for perfo sleeve	Internal thread	Outer Ø mm	Length mm	Package content pcs.	Weight per package kg
VM-IG M 6	28101001	VM-SH 12 / 16	M 6	8	45	10	0,11
VM-IG M 8	28102001	VM-SH 16 / 22	M 8	12	80	10	0,38
VM-IG M 10	28103001	VM-SH 20 / 22	M 10	14	80	10	0,45
VM-IG M 12	28104001	VM-SH 22	M 12	16	80	10	0,52

Perfo Sleeve VM-SH

- Material: Polypropylene
- Installation in hollow base material

Description	Ref. No.	Drill hole Ø x depth mm	suitable for		Amount of mortar per 100 mm drill hole depth ml	Package content pcs.	Weight per package kg
			Threaded Studs	Threaded Sleeve			
VM-SH 12 x 50[1)]	28151001	13 x 55	M8	-	7,5	10	0,01
VM-SH 12 x 80	28151201	12 x 85	M8	-	11,9	10	0,02
VM-SH 16 x 85	28152001	16 x 90	M8 / M10	VMU-IG M6x80	24,9	10	0,03
VM-SH 16 x 130	28153001	16 x 135	M8 / M10	-	38,0	10	0,04
VM-SH 16 x 130/330[2)]	28153201	16 x 135 + t_{fix}[2)]	M8 / M10	-	96,5	10	0,16
VM-SH 20 x 85	28154001	20 x 90	M12 / M16	VMU-IG M8x80 / M10x80	41,1	10	0,04
VM-SH 20 x 130	28154301	20 x 135	M12 / M16	-	62,9	10	0,07
VM-SH 20 x 200	28154601	20 x 205	M12 / M16	-	96,7	10	0,10

[1)] For fastenings not subject to approval

[2)] VM-SH 16 x 130/330 is only approved in combination with VM-EA. t_{fix} = shortened length perfo sleeves -130 mm

Perfo Sleeve VM-SH

- Steel, zinc plated
- Metal, to be cut to required length
- Installation in hollow base materials

Description	Ref. No.	Drill hole Ø x depth mm	suitable for		Amount of mortar per 100 mm drill hole depth ml	Package content pcs.	Weight per package kg
			Threaded Studs	Threaded Sleeve			
VM-SH 12 x 1000	28403001	12	M6 / M8	VM-IG M6	15,0	50	2,88
VM-SH 16 x 1000	28404001	16	M10	VM-IG M6 / M8	29,3	50	3,38
VM-SH 22 x 1000	28405001	22	M12 / M16	VM-IG M8 - M12	68,4	25	2,70

Tension Anchor ZA

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

Description

The Tension Anchor ZA consists of a connection thread made of stainless steel A4 or HCR which is welded to a reinforcement bar B 500 B. It is part of the European Technical Assessments for post-installed reinforcement connections of the injections systems VMH, VMU plus, VME plus and VME basic and may be used in cracked and uncracked concrete. The absorbable tensile force or the required anchorage length can be determined according to EN 1992-1 (EC2). If the full anchorage depth is not required, the reinforcement bar end can be shortened.

Applications

– Connection of structural elements to reinforced concrete
– Introduction of highest tensile loads with minimal edge distances
– Fastening of brackets, canopies, traffic signs, stairs

Tension Anchor ZA

- Stainless steel A4
- Approved for cracked and uncracked concrete

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

Stainless steel HCR and other lengths on demand.

Hollow drill bit SB

Description

The hollow drill bit SB combines two steps in one: it drills and at the same time removes the drilling dust from the hole. As a result, it significantly reduces the dust created, resulting in a cleaner work space and reduces air contamination. Contamination in the work area is also avoided, making it the ideal hammer drill for indoors. Many MKT injection systems eliminate the need for additional cleaning, increasing efficiency and installation safety. Thanks to its SDS shank and its 38mm suction pipe connection, it can be used universally and flexibly with any SDS hammer drill and industrial vacuum cleaners.

Advantages

- 98% less air borne dust than during conventional drilling processes
- Permitted for use with approved anchors
- The separate cleaning of the drill hole can be omitted if this is permitted in the ETA
- Easy handling, insert in a hammer drill and connect to an industrial vacuum cleaner
- Efficient dust extraction and drilling thanks to extra large vacuum holes
- Optimum health and safety at the workplace, reduce respiratory complaints of dust particles by using an industrial vacuum cleaner of the M-Class
- Save money and time: there is no dirt generated, so no need to clean up afterwards
- Can be used with all standard SDS-max and SDS-plus hammer drills in conjunction with commercial industrial vacuum cleaners

Applications

For dust-free drilling in concrete, solid brick, solid lime and stone and natural stone indoors and outdoors.

Hollow drill bit with SDS-plus shank

→ 2-cutter with big vacuum holes for a fast drilling

Description	Ref.No.	Ø mm	Drilling depth mm	Total length mm	Adaptor	Type	Pkg. Content pcs.	Weight per pcs. kg
Hollow drill bit SB plus 8x270	50235501	8	150	270	SDS-plus	2-cutter	1	0,21
Hollow drill bit SB plus 10x270	50245501	10	150	270	SDS-plus	2-cutter	1	0,24
Hollow drill bit SB plus 12x320	50256001	12	200	320	SDS-plus	2-cutter	1	0,31
Hollow drill bit SB plus 14x370	50266501	14	250	370	SDS-plus	2-cutter	1	0,39
Hollow drill bit SB plus 16x370	50286501	16	250	370	SDS-plus	2-cutter	1	0,43
Hollow drill bit SB plus 18x370	50296501	18	250	370	SDS-plus	2-cutter	1	0,53
Hollow drill bit SB plus 20x370	50306501	20	250	370	SDS-plus	2-cutter	1	0,64
Hollow drill bit SB plus 24x370	50326501	24	250	370	SDS-plus	2-cutter	1	0,81

Hollow drill bit with SDS-max shank

→ Y-Cutter for more stable drilling

Description	Ref.No.	Ø mm	Drilling depth mm	Total length mm	Adaptor	Type	Pkg. Content pcs.	Weight per pcs. kg
Hollow drill bit SB max 18x600	50698001	18	400	600	SDS-max	Y-cutter	1	0,99
Hollow drill bit SB max 24x600	50728001	24	400	600	SDS-max	Y-cutter	1	1,21
Hollow drill bit SB max 25x600	50738001	25	400	600	SDS-max	Y-cutter	1	1,23

Suction bell ASG

Description	Ref.No.	Connection diameter to a vacuum cleaner Ø [mm]	Suitable for drill hole Ø [mm]	Pkg. Content pcs.	Weight per pc. kg
Suction bell ASG	29980001	30-38	6-32	1	0,06

Description

For removing drilling dust when drilling or cleaning holes.

Advantages

- Easy handling, connection to a vacuum cleaner is su cient
- No mounting is necessary, because the suction bell sticks tight to floor, wall and ceiling by a strong vacuum
- Prevents contamination and provides a clear visibility due to almost dust-free drilling
- Reduce respiratory complaints due to tiny dust particles by using a vacuum cleaner of the M-Class

Accessories for MKT Injection Systems

Blow-out pump VM-AP

- For assessment-compliant drill hole cleaning of many anchor systems
- For best drill hole cleaning, the hose must reach the bottom of the drill hole

Description	Ref. No.	For drill hole Ø mm	Max. drill hole depth[1] mm	Length mm	Pkg. cont. pcs.	Weight per piece kg
Blow-out pump VM-AP 270	29990002	12 - 20	200	270	1	0,22
Blow-out pump VM-AP 360	33200101	8[2] - 20	330	360	1	0,27

[1]For through fastening: Maximum drill hole depth through fixture
[2]With extension tube Ø6 x 100mm

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	18-55	240	1	1,00
VM-ABP 500	33106101	16	18-55	480	1	1,30

[1]For through fastening: Maximum drill hole depth through fixture

Air gun VM-ABP 1000

- For assessment-compliant drill hole cleaning with compressed air for drill holes with a diameter larger than 16 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 1000	85806101	14	16-55	1000	1	0,32

[1]For through fastening: Maximum drill hole depth through fixture

Compressed Air System DLS

- For blowing out drill holes up to 3 m deep
- The connection set RS for connection to a compressor, an air hose RS and, for the injection system VME, the corresponding blow-out nozzle RD are required

Air Valve RS

- Connection set RS with manual slide valve with air valve and connector for connection to a compressor

Air hose RS

- Air hose RS, pre-assembled with connectors for connection between connection set RS and blow-out nozzle RD

Blow-out nozzle RD

- Blow-out nozzles RD for optimum cleaning of the drill hole and the drill hole walls
- Fits on the air hose RS

Description	Ref. No.	For drill hole Ø mm	Max. drill hole depth[1] mm	Length mm	Pkg. cont. pcs.	Weight per piece kg
Air hose RS	85890101	12 - 35	-	-	1	0,42
Air Valve RS 25	85802101	12 - 28	2000	2000	1	0,11
Air Valve RS 35	85804101	30 - 55	3000	3000	1	0,44
Blow-out nozzle RD 12/14	85852101	12 - 14	-	-	1	0,01
Blow-out nozzle RD 16/18	85854101	16 - 18	-	-	1	0,02
Blow-out nozzle RD 20/25	85856101	20 - 25	-	-	1	0,03
Blow-out nozzle RD 30/35	85858101	30 - 35	-	-	1	0,05

[1]For through fastening: Maximum drill hole depth through fixture

Cleaning Brush RB M6

- For machine cleaning of drill holes
- Stainless steel trim for a long service life
- With connection thread M6
- For drilling machines with keyed chuck
- SDS plus adapter for use in a hammer drill
- Use brush extensions according to the drilling depth. Several brush extensions can be screwed together for further extension.

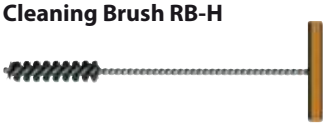
Description	Ref. No.	Suitable for drill hole Ø mm	Length mm	Filling length mm	Pkg. cont. pcs.	Weight per piece kg
RB 10 M6	33510101	10	130	80	1	0,03
RB 12 M6	33512101	12	140	80	1	0,03
RB 14 M6	33514101	14	180	80	1	0,04
RB 16 M6	33516101	16	200	100	1	0,05
RB 18 M6	33518101	18	200	100	1	0,06
RB 20 M6	33520101	20	220	100	1	0,10
RB 22 M6	33522101	22	220	100	1	0,10
RB 24 M6	33524101	24	250	100	1	0,11
RB 26 M6	33526101	25 / 26	290	100	1	0,12
RB 28 M6	33528101	28	260	100	1	0,11
RB 30 M6	33530101	30	350	100	1	0,12
RB 32 M6	33532101	32	350	100	1	0,13
RB 35 M6	33535101	35	350	100	1	0,14
RB 40 M6	33537101	40	350	100	1	0,15
RB 45 M6	on request	45	-	-	1	-
RB 55 M6	on request	55	-	-	1	-
Brush extention RBL M6	33968101	-	150	-	1	0,09
SDS Plus adapter RBL M6 SDS	33350101	-	110	-	1	0,06

Cleaning Brush RB M8

- Extra sturdy construction for machine cleaning of particularly deep drill holes
- Stainless steel trim for a long service life
- With connection thread M8
- For drilling machines with keyed chuck
- SDS plus adapter for use in a hammer drill
- Use brush extensions according to the drilling depth. Several brush extensions can be screwed together for further extension.

Description	Ref. No.	Suitable for drill hole Ø mm	Length mm	Filling length mm	Pkg. cont. pcs.	Weight per piece kg
RB 12 M8	85812101	12	180	140	1	0,05
RB 14 M8	85814101	14	180	140	1	0,05
RB 16 M8	85816101	16	180	140	1	0,05
RB 18 M8	85818101	18	180	140	1	0,05
RB 20 M8	85820101	20	180	140	1	0,05
RB 25 M8	85825101	25	180	140	1	0,06
RB 32 M8	85832101	32	180	140	1	0,08
RB 35 M8	85835101	35	180	140	1	0,08
Brush extention RBL M8	85871101	-	550	-	1	0,32
SDS Plus adapter RBL M8 SDS	85881101	-	110	9	1	0,07

Cleaning Brush RB-H



- For manual drill hole cleaning of non-approved systems in solid and perforated masonry
- Nylon trim
- With wooden handle

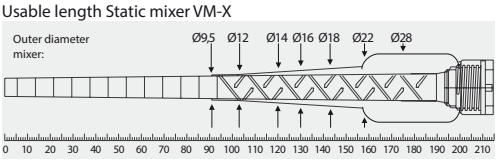
Description	Ref. No.	Suitable for drill hole Ø mm	Length mm	Pkg. cont. pcs.	Weight per piece kg
RB-H 12/250	29914501	8-12	250	1	0,04
RB-H 18/250	29918501	10-18	250	1	0,04
RB-H 18/400	33618101	10-18	400	1	0,05
RB-H 28/280	29928501	20-28	280	1	0,05
RB-H 28/400	33628101	20-28	400	1	0,06

Static mixer

- To mix the two components of the injection adhesive
- Before each application, squeeze out an approx. 10cm long strand (initial strand). The initial strand is not suitable for fastening. (See European Technical Assessment and Installation Instructions)
- Usable length static mixer: Drill holes must always be filled from the bottom of the hole to ensure no air pockets are trapped in the adhesive. This is only possible when the tip of the mixing nozzle reaches the very bottom of the drill hole before injecting the adhesive. If the mixing nozzle does not reach the bottom of the drill hole, a mixer extension tube must be used.

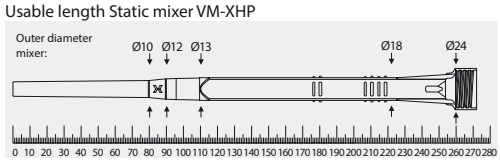
VM-X

Usable length Static mixer VM-X



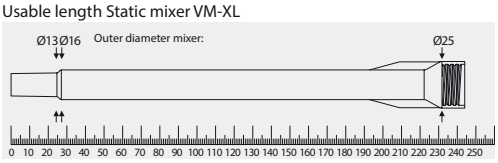
VM-XHP

Usable length Static mixer VM-XHP



VM-XL

Usable length Static mixer VM-XL



Description	Ref. No.	Suitable for Injection Systems / Cartridges	Length mm	Package content pcs.	Weight per pkg. kg
VM-X	28305111	VMZ: all Cartridges, VMU plus: 150ml, 280ml, 300ml, 345ml, 410ml VMU plus Polar: all Cartridges VM-EA: all Cartridges	215	12	0,12
VM-XHP	28305301	VME plus: all Cartridges VME basic: all Cartridges VMH: all Cartridges	272	12	0,18
VM-XL[1)]	28305201	VMU plus: all Cartridges	245	10	0,28

[1)]Static mixer VM-XL comes with a reducers / extension tube. Suitable for drill holes from 12mm diameter.

Extension tubes

VM-XE 10

VM-XLE 16

- Extension tubes for deeper drill holes
- Extension tubes VM-XE and VM-XLE can be cut to the required length

Possible combinations static mixer / Extension tube / Retaining Washer:

Description	Ref. No.	Diameter mm	Length mm	Drill hole-Ø mm	Suitable for static mixer	Package content pcs.	Weight per pkg. kg
VM-XE 10/200	28306011	10	200	12 - 40	VM-X VM-XHP VM-XL	12	0,12
VM-XE 10/500	85951101	10	500	12 - 40		10	0,20
VM-XE 10/1000	85952101	10	1000	12 - 40		10	0,30
VM-XE 10/2000	85954101	10	2000	12 - 40		10	0,65
VM-XLE 16/250	85959101	16	250	18 - 55	VM-XHP VM-XL	10	0,30
VM-XLE 16/1000	85956101	16	1000	18 - 55		10	1,15
VM-XLE 16/2000	85958101	16	2000	18 - 55		10	3,50

Retaining Washer VM-IA

- For bubble-free filling of the drill hole
- Suitable for extension tubes VM-XE 10 and VM-XLE 16

Description	Ref. No.	Suitable for drill hole Ø mm	Pkg. cont. pcs.	Weight per pkg. kg
VM-IA 14	85914201	14	20	0,04
VM-IA 16	85916201	16	20	0,04
VM-IA 18	85918201	18	20	0,04
VM-IA 20	85920201	20	20	0,06
VM-IA 22	85922201	22	20	0,06
VM-IA 24	85924101	24	20	0,06
VM-IA 25	85925201	25 / 26	20	0,06
VM-IA 28	85928101	28	20	0,06
VM-IA 30	on request	30	-	-
VM-IA 32	85932201	32	20	0,08
VM-IA 35	85935201	35	20	0,10
VM-IA 40	85938201	40	20	0,10
VM-IA 45	on request	45	-	-
VM-IA 55	on request	55	-	-

Dispenser VM-P Standard

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

Description	Ref. No.	Suitable for cartridge		Pkg. cont.	Weight per piece kg
VM-P 345 Standard	28350505	150ml, 280ml, 300ml, 345ml	also suitable for silicone cartriges	1	1,00
VM-P 380 Standard	28353005	380ml, 410ml, 420ml		1	1,15
VM-P 585 Standard	28352151	385ml, 440ml, 585ml		1	1,60

Dispenser VM-P Profi

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

Description	Ref. No.	Suitable for cartridge		Pkg. cont.	Weight per piece kg
VM-P 345 Profi	28350511	150ml, 280ml, 300ml, 345ml	also suitable for silicone cartriges	1	1,00
VM-P 380 Profi	28351001	380ml, 410ml, 420ml		1	1,10

Dispenser VM-P 585 Profi

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

Description	Ref. No.	Suitable for cartridge		Pkg. cont.	Weight per piece kg
VM-P 585 Profi	28353201	280ml, 300ml, 330ml, 380ml, 385ml, 410ml, 420ml, 440ml, 585ml	also suitable for silicone cartriges	1	1,67

Dispenser VM-P Akku

- Professional, solid battery cartridge dispenser
- Repeat function, for retrieving the last fill quantity
- Stepless variable pressing speed
- Overrun-quantity-stop by automatic return after release of the dispending switch

Description	Ref. No.	Suitable for cartridge	Press-out force kN	Weight[1] kg	Dimensions[1] L x B x H mm	Pkg. cont.	Weight pro pcs. kg
VM-P 345 Akku	28350801	345ml	5,0	3,53	395 x 180 x 285	1	7,72
VM-P 380 Akku	28352601	380ml, 410ml, 420ml	3,95	3,62	375 x 180 x 285	1	7,80
VM-P 585 Akku	28353301	385ml, 440ml, 585ml	5,0	3,86	440 x 180 x 285	1	8,05
VM-P 825 Akku	28353501	825 ml	5,0	4,14	410 x 180 x 285	1	8,34
Accessories (for all models)							
Replacement battery	28352411		18 V/2,0 Ah			1	1,00
Shoulder strap	28359991		adjustable			1	0,18

[1] with Akku 18V/2,0 Ah

Dispenser VM-P Pneumatic

VM-P 345 Pneumatic Eco

VM-P 380 / 585 Pneumatic

VM-P 1400 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
- VM-P 825 Pneumatic and VM-P 1400 Pneumatic with additional handle

Description	Ref. No.	Suitable for cartridge	Maximum working pressure bar	Maximum Luftverbrauch l/min	Maximum Press-out force kN	Pkg. cont. pcs	Weight per piece kg
VM-P 345 Pneumatic Eco	28351601	280 ml, 300 ml, 345 ml	6,8	40	2,2	1	2,55
VM-P 380 Pneumatic	28352002	380 ml, 410 ml, 420 ml	8	40	4,0	1	2,80
VM-P 380 Pneumatic Eco	28351701	380 ml, 410 ml, 420 ml	6,8	40	2,2	1	2,50
VM-P 585 Pneumatic	28352101	385 ml, 440 ml, 585 ml	8	40	4,0	1	3,20
VM-P 825 Pneumatic	28352110	825 ml	8	40	4,0	1	5,00
VM-P 1400 Pneumatic	28352201	1400 ml	8	40	8,3	1	7,00

Filling Washer VS

Filling Washer VS

Description

The VS filling washer is used for subsequent filling of the annular gap between fastening element (wedge anchor, concrete screw or anchor rod) and attachment. With the wedge anchors BZ3 and BZ plus as well as the BSZ concrete screw, the filling washer VS is additionally mounted, with injection systems in exchange to the existing washers of the anchor rods. After assembly, injection adhesive (VMZ, VMH, VMU plus or VME plus) is injected into the cross-section drill hole injected with the enclosed mixer reduction, until adhesive emerges.

Advantages

The filling washer enables filling of the annular gap as the final step to set the anchor.
– Larger holes are possible in the item being attached
– Increased allowable shear loads under seismic loading

Application

For fastenings made using the MKT Wedge Anchors BZ3 and BZ plus, the Concrete screw BSZ, as well as the MKT Injection Systems VMZ, VMH, VMU plus or VME plus.

Note

When choosing an anchor, observe that the fixture thickness of the anchor must be reduced by up to 6mm.

Filling Washer VS

→ Steel, zinc plated

→ Every 20-pack includes 10, every 10-pack includes 5 and every 4-pack includes 2 mixer tips

Description	Ref. No.	Suitable for thread	Internal-Ø	Outer-Ø	Filling Washer VS thickness	Reduction of fixture thickness t_{fix} by		Package content	Weight per package
						BZ3, BZ plus, BSZ	VMZ, VMH, VMU plus, VME plus		
			mm	mm	mm	mm	mm	pcs.	kg
VS M8	56084101	M8	9	23	5	5	3,4	20	0,32
VS M10	56104101	M10	12	26	5	5	3	20	0,37
VS M12	56124101	M12	14	28	5	5	2,5	20	0,40
VS M16	56164101	M16	17	34	5	5	2	10	0,30
VS M20	56204101	M20	21	41	5	5	2	10	0,41
VS M24	56244101	M24	25	48	6	6	2	4	0,30

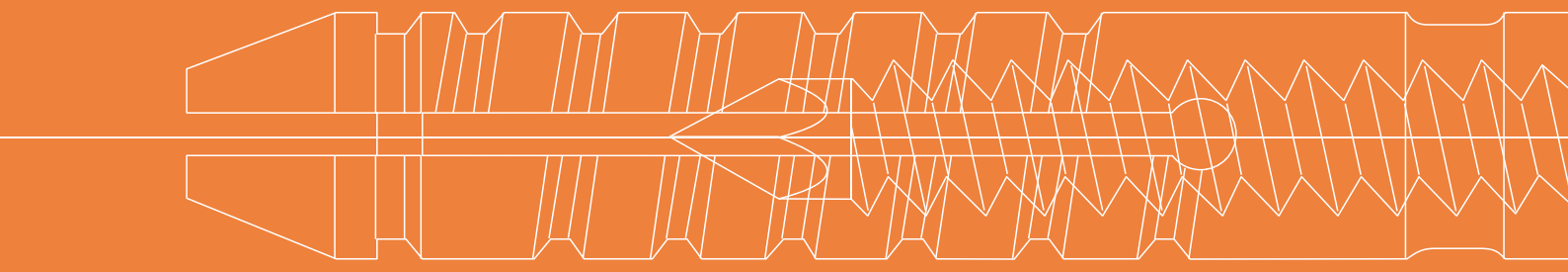
Filling Washer VS A4

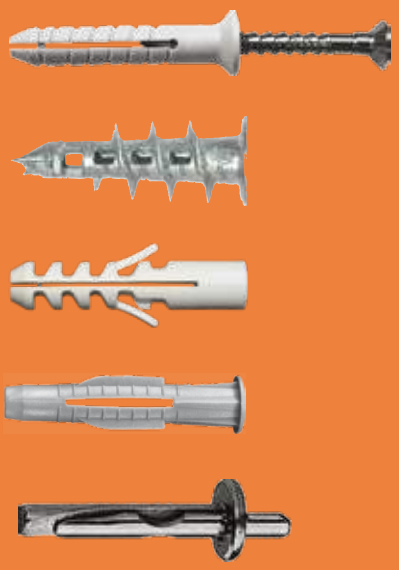
→ Stainless Steel A4

→ Every 20-pack includes 10, every 10-pack includes 5 and every 4-pack includes 2 mixer tips

Description	Ref. No.	Suitable for thread	Internal-Ø	Outer-Ø	Filling Washer VS thickness	Reduction of fixture thickness t_{fix} by		Package content	Weight per package
						BZ3 A4, BZ plus A4, BSZ2 A4	VMZ, VMH, VMU plus, VME plus		
			mm	mm	mm	mm	mm	pcs.	kg
VS M8 A4	56084501	M8	9	23	5	5	3,4	20	0,32
VS M10 A4	56104501	M10	12	26	5	5	3	20	0,37
VS M12 A4	56124501	M12	14	28	5	5	2,5	20	0,40
VS M16 A4	56164501	M16	17	34	5	5	2	10	0,30
VS M20 A4	56204501	M20	21	41	5	5	2	10	0,41
VS M24 A4	56244501	M24	25	48	6	6	2	4	0,30

Light Duty Anchors





Nail Plug ND

Nail Plug ND-S

Nail Plug ND-Z

Range of loading: **0,04 kN–0,36 kN**

Description

The Nail Plug ND is a time saving hammer-in nylon plug with pre-assembled zinc plated nail-screw, suitable for most types of base materials. It is weather-proof and temperaure-resistant from -40°C to 80°C. The Nailplug can be unscrewed for readjustment or removing.

Applications

Frames, skirting boards, wood battens, pipe clips, angles, brackets.

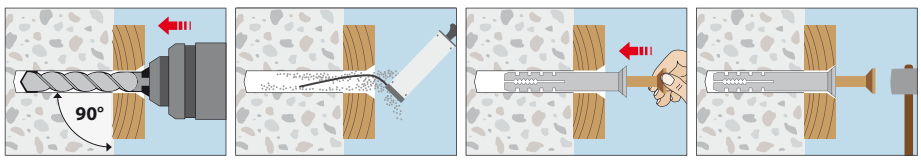
Nail Plug ND

- High grade polyamide with zinc plated nailscrew
- With countersunk head and cylindrical head

Description	Ref. No. Typ ND-S counter sunk	Ref. No. Typ ND-Z cheese head	Anchor length mm	Fixture thickness tfix mm	Head Ø Plasticsleeve ND-S/ND-Z mm	Head Ø Nail ND-S/ND-Z mm	Package content ND-S/ND-Z pcs.	Packages per master box ND-S/ND-Z	Weight per master box ND-S/ND-Z kg
ND 5/30	70105101	70105181	30	5	9	8,4	100 / 100	36 / 36	9,9 / 9,9
ND 5/40	70115101	-	40	15	9	8,4	100 / -	27 / -	9,6 / -
ND 6/35	70205101	70205181	35	5	10	9	100 / 100	16 / 16	6,4 / 6,4
ND 6/50	70220101	70220181	50	20	10	9	100 / 100	16 / 16	8,3 / 8,3
ND 6/60	70230101	-	60	30	10	9	100 / -	16 / -	8,3 / -
ND 6/75	70245101	-	75	45	10	9	100 / -	16 / -	11,8 / -
ND 8/60	70305101	70305181	60	20	13	12	100 / 100	8 / 9	8,7 / 9,8
ND 8/80	70315101	70315181	80	40	13	12	100 / 100	8 / 8	10,6 / 10,6
ND 8/100	70325101	-	100	60	13	12	100 / -	8 / -	12,9 / -
ND 8/120	70335101	-	120	80	13	12	100 / -	8 / -	13,8 / -
ND 8/140	70345101	70345181	140	100	13	12	100 / 50	6 / 8	10,1 / 13,5

Loads, any direction			**ND 5**	**ND 6**	**ND 8**
Recommended loads, concrete C20/25	rec. F	[kN]	0,18	0,26	0,36
Recommended loads, solid brick MZ 12	rec. F	[kN]	0,16	0,22	0,30
Recommended loads, aerated concrete G2	rec. F	[kN]	0,04	0,06	0,08
Effective anchorage depth	h_{ef}	[mm]	25	30	40
Installation parameters					
Drill hole diameter	d_o	[mm]	5	6	8
Depth of drill hole	h_1	[mm]	35	40	50

Installation



Universal Plug UD

Universal Plug UD

Universal Plug UD-K

Range of loading: **0,12 kN–1,14 kN**

Description

The time proven design of the Universal Plug UD guarantees reliable and safe fastenings in practically all types of base materials. To be used with woodscrews.

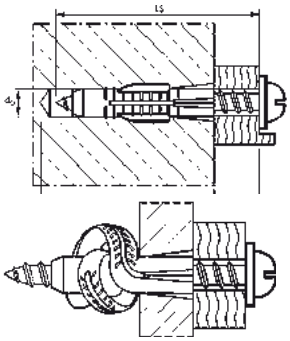
Applications

Electric switches, cables, curtain rails, battens, bathroom appliances, shelves, lightweight cupboards.

Universal Plug UD

- High quality plastic material
- For nearly all types of base materials

Description	Ref. No. Type UD	Ref. No. Type UD-K	Anchor length	Screw Ø	Package content	Packages per master box		Weight per master box kg	
			mm	mm	pcs.	UD	UD-K	UD	UD-K
UD 5/31	71010101	71010181	31	3-4	100	54	54	2,8	2,8
UD 6/36	71110101	71110181	36	4-5	100	36	36	3,0	3,0
UD 8/51	71210101	71210181	51	5-6	50	27	27	3,0	3,0
UD 10/61	71310101	71310181	61	7-8	25	54	54	4,5	4,5
UD 12/71	71410101	71410181	71	8-10	25	36	27	3,5	2,7
UD 14/75	71510101	71510181	75	10-12	20	27	27	3,5	3,5



Min. screw length

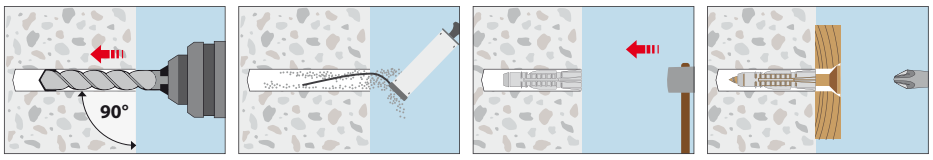
anchor length
+ thickness of plaster, tile, etc.
+ fixture thickness (accessory)
+ 1 x screw diameter

= min. screw length LS

Loads and performance data			UD 5/31	UD 6/36	UD 8/51	UD 10/61	UD 12/71	UD 14/75
Mean ultimate loads, concrete C20/25	N_{um}	[kN]	0,70	1,50	3,40	3,75	4,70	5,70
Recommended loads, concrete C20/25	rec. F	[kN]	0,14	0,30	0,68	0,75	0,94	1,14
Recommended loads, aircrete P4	rec. F	[kN]	0,12	0,18	0,32	0,42	0,42	-
Recommended loads, hollow brick HLz12	rec. F	[kN]	0,14	0,17	0,24	0,26	0,27	-
Recommended loads, gypsum plasterboard 12,5 mm	rec. F	[kN]	0,12	0,14	0,2	0,2	0,22	0,44[1)]
Effective anchorage depth	h_{ef}	[mm]	31	36	51	61	71	75
Installation parameters								
Drill hole diameter[2)]	d_o	[mm]	5	6	8	10	12	14
Depth of drill hole	h_1	[mm]	40	45	60	75	85	90

[1)] 2 x gypsum plasterboard 12,5 mm
[2)] Aerated concrete: Use 1 mm smaller drill bit; hollow base materials: Drill without hammer action.

Installation



Nylon Standard Plug NSD

Nylon Standard Plug NSD

Description

The nylon standard plug NSD with 2-way expansion is suitable for quick fixings with low loads in concrete and solid masonry. As the hammer-in stop prevents premature spreading, the nylon standard plug NSD is particularly suitable for through fastening, even with pre-assembled screw. The high reliability of assembly is due to large rotation locks that prevent turning in the hole.

Applications

Surface mount boxes, images, letter boxes, curtain rails, towel racks, lamps, baseboards, motion detectors, smoke and fi re alarms as well as light panels, plates, hanging cabinets and wall shelves and much more.

Material:

– High-quality polyamide (nylon)
– Halogen-free and silicone-free
– Temperature resistant from -40°C to +80°C

Range of loading: **0,03 kN–1,9 kN**

Nylon Standard NSD

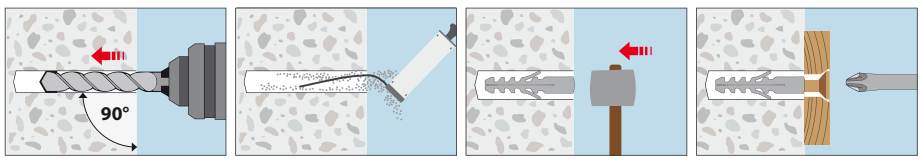
- Suitable for pre-installation and through fastening
- Hold due to high material strength and manufacturing quality

Description	Ref. No.	Ø [mm]	Length [mm]	Woodscrew -Ø [mm]	Chipboard screw-Ø [mm]	Package content [pcs.]	Weight per pck. kg	Packages per master box
NSD 5	65125001	5	25	2,5 - 4	4	100	0,046	4.800
NSD 6	65225001	6	30	3,5 - 5	5	100	0,070	4.800
NSD 8	65425001	8	40	4,5 - 6	6	100	0,145	2.400
NSD 10	65525001	10	50	6 - 8	-	50	0,135	1.200
NSD 12	65625001	12	60	8 - 10	-	25	0,110	600
NSD 14	65725001	14	75	10 - 12	-	20	0,160	480
NSD 16	65825001	16	80	12 - 14	-	10	0,111	240
NSD 20	65925001	20	90	16	-	5	0,200	120

Loads and performance data

Recommended loads, any direction			**NSD 5**	**NSD 6**	**NSD 8**	**NSD 10**	**NSD 12**	**NSD 14**
With Woodscrew-ø	**d_S**	**[mm]**	**4**	**5**	**6**	**8**	**10**	**12**
Concrete B25; C20/25	rec. F	[kN]	0,25	0,38	0,6	0,9	1,4	1,9
Solid brick Mz12	rec. F	[kN]	0,25	0,3	0,5	-	-	-
Solid sand-slim KS12	rec. F	[kN]	0,25	0,3	0,5	-	-	-
Aerated concrete PP4, PB4	rec. F	[kN]	0,03	0,06	0,1	0,15	0,2	-
Spacing and edge distance								
Setting depth	h_S	[mm]	25	30	40	50	60	75
Spacing	a	[mm]	50	60	80	100	120	140
Edge distance	ar	[mm]	25	30	40	50	60	70
Installation parameters								
Drill hole diameter	d_o	[mm]	5	6	8	10	12	14
Depth of drill hole	h_o	[mm]	35	40	50	65	75	85
Minimum length of screw	ls	[mm]	fixture thickness + anchor length + 1 x screw diameter					

Installation



User tip
Since the plug spreads in two directions only, turn the plug, when using close to the edge, so that the spreading force acts parallel to the edge.

Safety Nail TDN

Safety Nail TDN

Safety Nail TDN-O

Description

The Safety Nail TDN is a hammer-in steel anchor for cracked and uncracked concrete, with fire resistance classification, vandal-proof. Supplied pre-assembled.

Applications

Suspended ceilings, ventilation systems, claddings, brackets, metal sheet.

Load Range: **0,5 kN–2,4 kN**

ETA-06/0259

Safety Nail TDN

- Steel, zinc plated
- For cracked and uncracked concrete

Description	Ref. No.	Drill hole Ø mm	Fixture thickness mm	Eye - Ø mm	Package content pcs.	Weight per package kg
TDN 6/5	72210101	6 x 40	5	-	100	1,0
TDN 6/35	72230101	6 x 40	35	-	100	1,8
TDN-O[1)]	72250101	6 x 45	-	9	100	2,5

ETA-06/0259

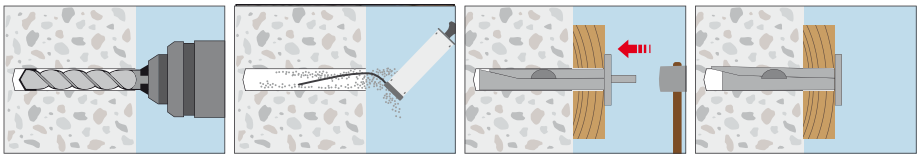
Extract from Permissible Service Conditions of ETA-06/0259 for use in concrete for redundant non-structural systems

Approved loads according to EN 1992-4 for single anchors without the influence of spacing and edge distances. The total safety factor (γ_M und γ_F) is included. The admissible loads per fixing point can be taken from the relevant national regulations of the EOTA member states and may be lower than the approved load of the anchor.

Loads and performance data			**TDN 6/5**	**TDN 6/35**	**TDN-O[1)]**
			concrete C20/25 to C50/60		
Approved loads, any direction	appr. F	[kN]	2,4	2,4	0,5
Loads under fire exposure (C20/25 to C50/60)					
Approved loads R 30	appr. F	[kN]	0,8	0,8	-
Approved loads R 60	appr. F	[kN]	0,7	0,7	-
Approved loads R 90	appr. F	[kN]	0,6	0,6	-
Approved loads R 120	appr. F	[kN]	0,4	0,4	-
Loads under fire exposure (C20/25 to C50/60)					
Approved loads R 30	h_{ef}	[mm]	32	32	33
Approved loads R 60	s_{min}	[mm]	200	200	200
Approved loads R 90	c_{min}	[mm]	150	150	150
Approved loads R 120	h_{min}	[mm]	80	80	100
Installation parameters					
Drill hole diameter	d_o	[mm]	6	6	6
Depth of drill hole	h_1	[mm]	40	40	45
Head diameter		[mm]	15	15	-

[1)]Not part of European Technical Assessment

Installation



Drywall Plug GKD

Description
The Drywall Plug GKD is a selfdrilling metal plug with twin cutting tip for fastening into drywall. Suitable for screws of Ø 4 to 4,5 mm and M4.

Applications
Fixing of switches, curtain rods, wall cupboards, lamps, cable ducts, skirting boards.

Range of loading: **0,10–0,15 kN**

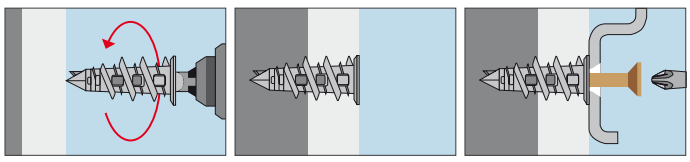
Drywall Plug GKD

- Self-drilling plug for drywall
- Perfect centering tip

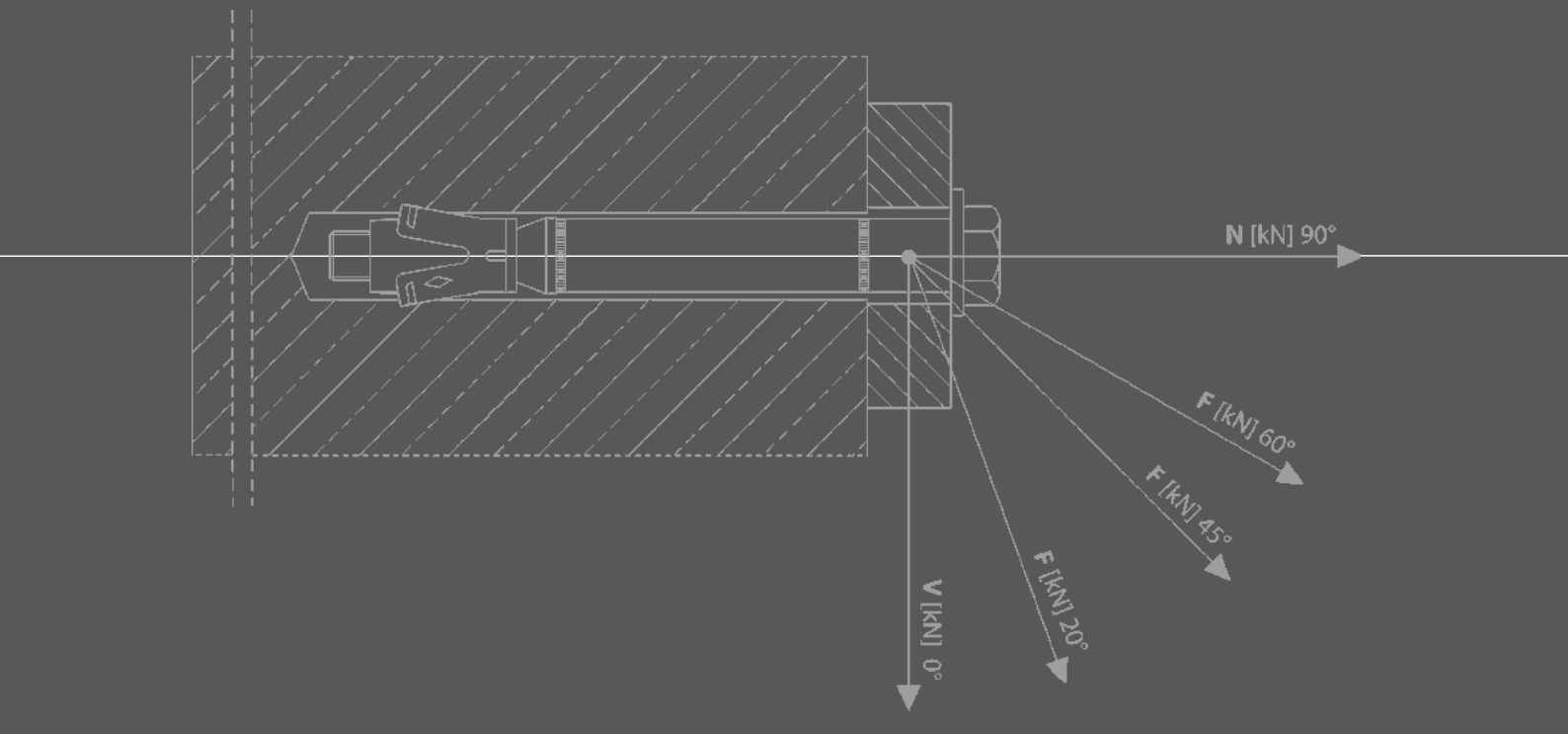
Description	Ref. No.	Anchor length mm	Suitable for screws mm	Package content pcs.	Weight per package kg	Content per master box pcs.
GKD 39	37305001	39	Ø 4,0 - 4,5	100	0,68	2400

Loads and performance data			GKD 39
Mean ultimate loads, drywall d=12,5mm	N_{um}	[kN]	0,45
Mean ultimate loads, aerated concrete LC 25/28	N_{um}	[kN]	0,40
Mean ultimate loads, gypsum panel	N_{um}	[kN]	1,00
Recommended loads, drywall d=12,5mm	rec. N	[kN]	0,10
Recommended loads, aerated concrete LC 25/28	rec. N	[kN]	0,10
Recommended loads, gypsum panel	rec. N	[kN]	0,15

Installation



Service



Mechanical Heavy Duty Anchors

Chemical Anchors

Light Duty Anchors

Service

MKT Anchor Design Software

- Easy and fast design of anchoring connections
- Clear input, detailed printout
- Dimensioning in concrete and brick work

MKT Anchor Design Software 4.55
Software for an easy and fast design of anchoring

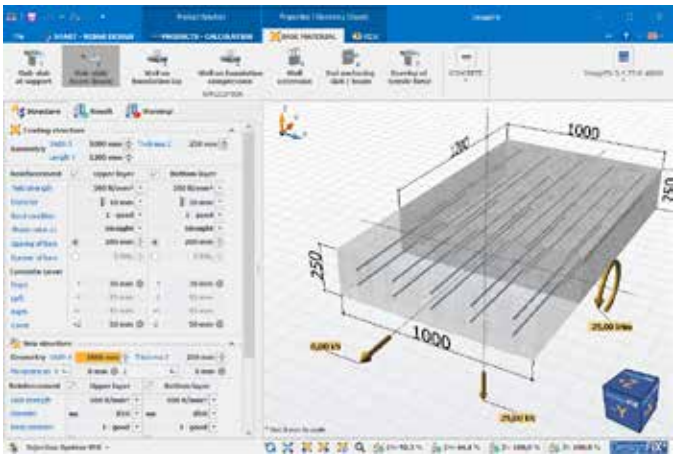
– Easy and clear input
– For anchor groups and fixings close to concrete edges
– Design according to the approvals of the MKT products and European Guidelines EN 1992-4, ETAG 001 Annex C, ETAG 029 Annex C, ETAG 001 part 6, Technical Reports TR 020, TR 029, TR 045 and TR 061
– Detailed display of results
– Detailed printout

new in version 4.55:

– Dimensioning of Wedge Anchor BZ3 A4 and BZ3 HCR with variable anchoring depths
– Dimensioning of Concrete Screw BSZ2 A4

MKT DesignFiX-rebar
Software for the design of post-installed rebar connections

– User interface with well-arranged 3-D input mask
– Design according to EN-1992-1-1 with characteristic values of the well proven and the new MKT Injection System
– Determination of steel stress and required lap length
– Free of charge (Registration required)



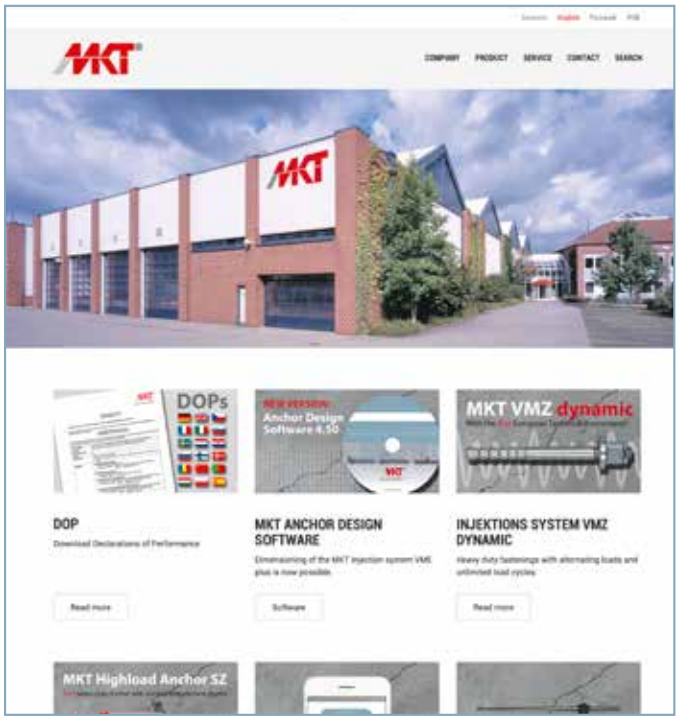
PC requirements:

• Windows 7 / Windows 8 / Windows 10

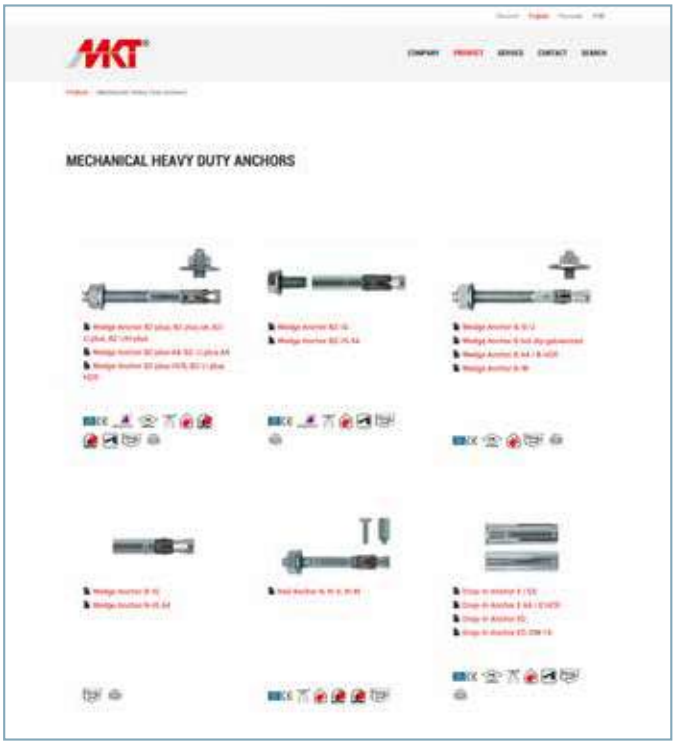
Please order our MKT software or use our free download service at **www.mkt.de.**

www.mkt.de

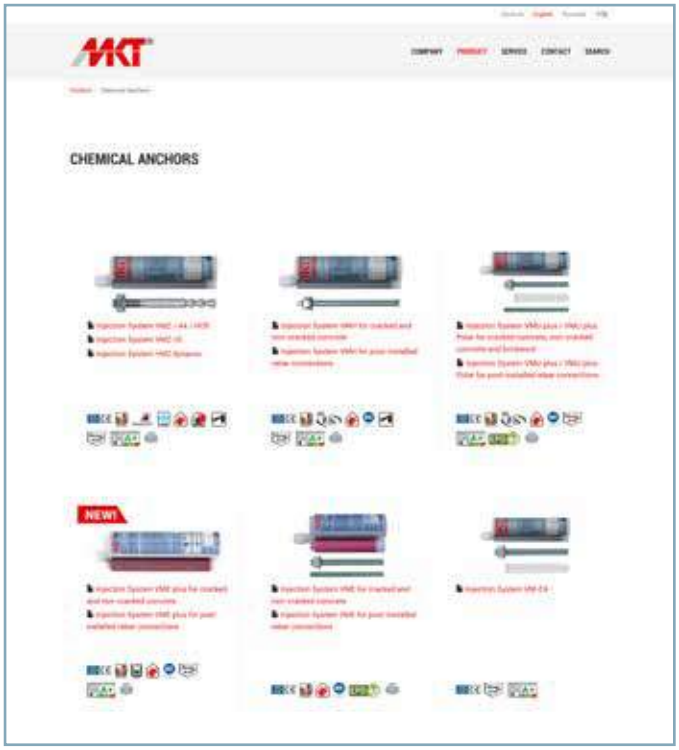
- Product information
- Download
- Support



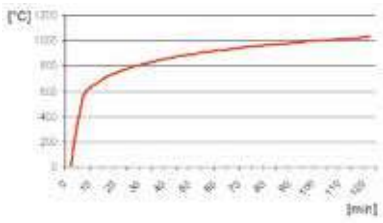
Product information
Contains detailed information and technical data for our product range.



Download
Software, approvals, certificates and data sheets can be downloaded from our website.



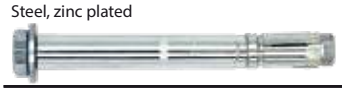
Fire Resistant Anchor Systems

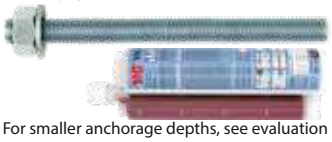


Tested according to standardized temperature curve ISO 834, DIN EN 1363-1: 1999-10, DIN EN 1363-1:2012, DIN 4102-2: 1977-09 in cracked concrete, exposed to open flames, without fire protection. Detailed information can be found in the European Technical Assessments, Fire Tests and Reports. They are available for download at www. mkt.de or can be sent on request.

Anchor system	Documents	Size	Maximum tension load in fire tests for the fire resistance classes			
			R 30 (30 min)	R 60 (60 min)	R 90 (90 min)	R 120 (120 min)
Wedge Anchor BZ3 Steel, zinc plated	ETA-19/0619	M8 $h_{ef,min}$	1,20	1,00	0,70	0,60
		M8 $h_{ef,std}$	1,20	1,00	0,70	0,60
		M8 $h_{ef,max}$	1,20	1,00	0,70	0,60
		M10 $h_{ef,min}$	1,74	1,74	1,30	1,00
		M10 $h_{ef,std}$	2,60	1,90	1,30	1,00
		M10 $h_{ef,max}$	2,60	1,90	1,30	1,00
		M12 $h_{ef,min}$	3,04	3,04	2,10	1,50
		M12 $h_{ef,std}$	4,60	3,30	2,10	1,50
		M12 $h_{ef,max}$	4,60	3,30	2,10	1,50
		M16 $h_{ef,min}$	5,86	5,60	3,50	2,50
		M16 $h_{ef,std}$	7,50	5,60	3,50	2,50
		M16 $h_{ef,max}$	7,50	5,60	3,50	2,50
Wedge Anchor BZ3 A4 Stainless steel A4/316, Stainless steel 1.4529	ETA-19/0619	M8 $h_{ef,min}$	1,25	1,25	1,25	1,00
		M8 $h_{ef,std}$	2,34	2,34	1,80	1,20
		M8 $h_{ef,max}$	2,38	2,38	1,80	1,20
		M10 $h_{ef,min}$	1,74	1,74	1,74	1,39
		M10 $h_{ef,std}$	4,25	4,25	3,10	2,10
		M10 $h_{ef,max}$	4,25	4,25	3,10	2,10
		M12 $h_{ef,min}$	3,04	3,04	3,04	2,43
		M12 $h_{ef,std}$	5,50	5,50	4,90	3,40
		M12 $h_{ef,max}$	5,50	5,50	4,90	3,40
		M16 $h_{ef,min}$	5,86	5,86	5,86	4,69
		M16 $h_{ef,std}$	8,75	8,75	8,10	5,60
		M16 $h_{ef,max}$	8,75	8,75	8,10	5,60
Wedge Anchor BZ3 dynamic Steel, zinc plated	ETA-20/0117	M10	2,60	1,90	1,30	1,00
		M12	4,60	3,30	2,10	1,50
		M16	7,50	5,60	3,50	2,50
Wedge Anchor BZ3 dynamic A4 Steel, zinc plated	ETA-20/0117	M10	4,25	4,25	3,10	2,10
		M12	5,50	5,50	4,90	3,40
		M16	8,75	8,75	8,10	5,60
Wedge Anchor BZ plus Steel, zinc plated	ETA-99/0010	M 8 $h_{ef,red}/h_{ef,std}$	1,25/1,25	1,10/1,10	0,80/0,80	0,60/0,70
		M 10 $h_{ef,red}/h_{ef,std}$	1,74/2,25	1,74/1,90	1,30/1,40	1,00/1,20
		M 12 $h_{ef,red}/h_{ef,std}$	3,04/4,00	3,00/3,00	1,90/2,40	1,30/2,20
		M 16 $h_{ef,red}/h_{ef,std}$	4,51/6,25	4,51/5,60	3,50/4,40	2,50/4,00
		M 20 $h_{ef,std}$	8,61	8,20	6,90	6,30
		M 24 $h_{ef,std}$	10,62	10,62	10,00	8,49
		M 27 $h_{ef,std}$	12,03	12,03	12,03	9,63
Wedge Anchor BZ plus A4 / HCR Stainless steel A4/316, Stainless steel 1.4529	ETA-99/0010	M 8 $h_{ef,red}/h_{ef,std}$	1,25/1,25	1,25/1,25	1,25/1,25	1,00/1,00
		M 10 $h_{ef,red}/h_{ef,std}$	1,74/2,25	1,74/2,25	1,74/2,25	1,39/1,80
		M 12 $h_{ef,red}/h_{ef,std}$	3,04/4,00	3,04/4,00	3,04/4,00	2,43/3,20
		M 16 $h_{ef,red}/h_{ef,std}$	4,51/6,25	4,51/6,25	4,51/6,25	3,61/5,00
		M 20 $h_{ef,std}$	8,61	8,61	8,61	6,89
		M 24 $h_{ef,std}$	10,00	10,00	10,00	8,00
Wedge Anchor BZ-IG Steel, zinc plated	ETA-99/0010	M 6	0,70	0,60	0,50	0,40
		M 8	1,40	1,20	0,90	0,80
		M 10	2,50	2,00	1,50	1,30
		M 12	3,70	2,90	2,20	1,80

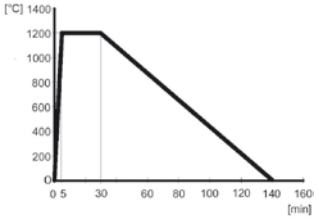
Anchor system	Documents	Size	Maximum tension load in fire tests for the fire resistance classes			
			R 30 (30 min)	R 60 (60 min)	R 90 (90 min)	R 120 (120 min)
Wedge Anchor BZ-IG A4 / HCR Stainless steel A4/316, Stainless steel 1.4529 	ETA-99/0010	M 6	1,25	1,25	1,00	0,50
		M 8	2,25	2,25	2,10	1,30
		M 10	3,00	3,00	3,00	2,40
		M 12	5,00	5,00	5,00	4,00
Wedge Anchor B, B-U Steel, zinc plated/hot dip galvanised 	Evaluation 21716	M 6 $h_{ef,red}/h_{ef,std}$	0,60/0,60	0,50/0,50	0,30/0,30	0,30/0,30
		M 8 $h_{ef,red}/h_{ef,std}$	0,80/0,80	0,70/0,70	0,60/0,60	0,50/0,50
		M 10 $h_{ef,red}/h_{ef,std}$	1,80/1,80	1,50/1,50	1,00/1,00	0,80/0,80
		M 12 $h_{ef,red}/h_{ef,std}$	3,20/3,40	2,80/2,80	1,70/1,70	1,20/1,20
		M 16 $h_{ef,red}/h_{ef,std}$	4,60/6,30	4,60/5,20	3,20/3,20	2,30/2,30
		M 20 $h_{ef,red}/h_{ef,std}$	6,20/9,00	6,20/8,20	5,00/5,00	3,60/3,60
Wedge Anchor B A4 / B HCR Stainless steel A4/Stainless steel 1.4529 	Evaluation 21716	M 6 $h_{ef,red}/h_{ef,std}$	0,90/1,80	0,90/1,40	0,90/0,90	0,70/0,70
		M 8 $h_{ef,red}/h_{ef,std}$	1,30/2,30	1,30/2,30	1,30/2,10	1,00/1,00
		M 10 $h_{ef,red}/h_{ef,std}$	2,10/2,90	2,10/2,90	2,10/2,90	1,60/2,20
		M 12 $h_{ef,red}/h_{ef,std}$	3,20/6,10	3,20/6,10	3,20/4,80	2,50/3,90
		M 16 $h_{ef,red}/h_{ef,std}$	4,60/6,40	4,60/6,40	4,60/6,40	3,70/5,20
		M 20 $h_{ef,red}/h_{ef,std}$	6,20/9,00	6,20/9,00	6,20/9,00	5,00/7,20
Nail Anchor N, N-K, N-M Steel, zinc plated/Stainless steel A4/Stainless steel HCR  With threaded rod ≥ 5.8	ETA-11/0240	N h_{ef} = 25	0,60	0,60	0,50	0,40
		N-K h_{ef} = 25	0,60	0,60	0,60	0,50
		N-M h_{ef} = 25	0,60	0,60	0,60	0,50
		N h_{ef} = 30	0,90	0,70	0,50	0,40
		N-K h_{ef} = 30	0,90	0,80	0,60	0,50
		N-M h_{ef} = 30	0,80	0,70	0,60	0,60
		N A4 h_{ef} = 25	0,60	0,60	0,50	0,40
		N-K A4 h_{ef} = 25	0,60	0,60	0,60	0,50
		N-M A4 h_{ef} = 25	0,60	0,60	0,60	0,50
		N A4, N-K A4 h_{ef} =30	0,90	0,90	0,90	0,70
		N-M A4 h_{ef} =30	0,80	0,70	0,60	0,60
Drop-in Anchor E/ES Steel, zinc plated / Stainless steel A4  with screw ≥ 5.6 or Stainless steel A4/316 [1] [1] Standard thread version or with screw 4.6/4.8 see evaluation	Evaluation 21725	M 6 x 30	0,90	0,70	0,40	0,30
		M 8 x 30	0,90	0,90	0,80	0,50
		M 8 x 40	1,80	1,30	0,80	0,50
		M 10 x 30	0,90	0,90	0,90	0,70
		M 10 x 40	1,80	1,80	1,20	0,80
		M 12 x 50	3,20	3,10	1,80	1,20
		M 12 x 80	4,30	3,10	1,80	1,20
		M 16 x 65	4,70	4,70	3,30	2,20
		M 16 x 80	6,40	5,70	3,30	2,20
		M 20 x 80	6,40	6,40	5,20	3,40
Drop-in Anchor E/ES For use in concrete for redundant non-structural systems according to EN 1992-4 Steel, zinc plated  with screw ≥ 5.6[1] [1]With threaded rod or with screw 4.6/4.8 see ETA-05/0116	ETA-05/0116	M 6 x 25	0,40	0,35	0,30	0,25
		M 6 x 30	0,80	0,80	0,40	0,30
		M 8 x 25	0,60	0,60	0,60	0,50
		M 8 x 30	0,90	0,90	0,90	0,50
		M 8 x 40	1,50	1,50	0,90	0,50
		M 10 x 25	0,60	0,60	0,60	0,50
		M 10 x 30	0,90	0,90	0,90	0,70
		M 10 x 40	1,50	1,50	1,50	1,00
		M 12 x 25	0,60	0,60	0,60	0,50
		M 12 x 50	1,50	1,50	1,50	1,20
		M 16 x 65	4,00	4,00	3,70	2,40
Drop-in Anchor E/ES A4 / HCR For use in concrete for redundant non-structural systems according to EN 1992-4 Stainless steel A4, stainless steel 1.4529 	ETA-05/0116	M 6 x 30	0,80	0,80	0,40	0,30
		M 8 x 30	0,90	0,90	0,90	0,50
		M 8 x 40	1,50	1,50	0,90	0,50
		M 10 x 40	1,50	1,50	1,50	1,00
		M 12 x 50	1,50	1,50	1,50	1,20
		M 16 x 65	4,00	4,00	3,70	2,40
Hollow Core Anchor Easy Steel, zinc plated/Web thickness $d_b \geq 30$ mm  (Web thickness $d_b \geq 40$ mm see approval)	Z-21.1-1785	M 6	0,70	0,60	0,40	0,20
		M 8	0,90	0,90	0,70	0,40
		M 10	1,20	1,20	1,20	1,00
		M 12	1,20	1,20	1,20	1,20

Anchor system	Documents	Size	Maximum tension load in fire tests for the fire resistance classes			
			R 30 (30 min)	R 60 (60 min)	R 90 (90 min)	R 120 (120 min)
Highload Anchor SZ Steel, zinc plated 	ETA-02/0030	M 6	1,00	0,80	0,60	0,40
		M 8	1,90	1,50	1,00	0,80
		M 10	4,00	3,20	2,10	1,50
		M 12	6,25	4,60	3,00	2,00
		M 16	9,00	8,60	5,00	3,10
		M 16L	11,00	8,60	5,00	3,10
		M20	12,50	12,50	7,70	4,90
		M24	16,25	16,25	12,60	9,20
Highload Anchor SZ A4 Stainless steel A4 	ETA-02/0030	M 8	2,25	2,25	2,25	1,80
		M 10	4,00	4,00	4,00	2,80
		M 12	6,25	6,25	6,25	4,10
		M16	9,00	9,00	9,00	7,20
Highload Anchor SLZ Steel, zinc plated 	ETA-09/0342	M 10	0,90	0,80	0,60	0,50
Concrete screw BSZ Steel, zinc plated/Steel, zinc flake coated 	ETA-16/0204	BSZ 6 h_{nom} 40	0,50	0,50	0,50	0,40
		BSZ 6 h_{nom} 55	0,90	0,80	0,60	0,40
		BSZ 8 h_{nom} 45	1,25	1,25	1,10	0,70
		BSZ 8 h_{nom} 55	2,25	1,70	1,10	0,70
		BSZ 8 h_{nom} 65	2,40	1,70	1,10	0,70
		BSZ 10 h_{nom} 55	2,25	2,25	2,25	1,70
		BSZ 10 h_{nom} 75	4,00	3,30	2,30	1,70
		BSZ 10 h_{nom} 85	4,40	3,30	2,30	1,70
		BSZ 12 h_{nom} 65	3,00	3,00	3,00	2,40
		BSZ 12 h_{nom} 85	4,72	4,72	4,20	3,40
		BSZ 12 h_{nom} 100	6,16	5,80	4,20	3,40
		BSZ 14 h_{nom} 75	3,80	3,80	3,80	3,04
		BSZ 14 h_{nom} 100	6,04	6,04	5,90	4,80
		BSZ 14 h_{nom} 115	7,60	7,60	5,90	4,80
Concrete screw BSZ For use in concrete for redundant non-structural systems according to EN 1992-4 Steel, zinc plated/Steel, zinc flake coated 	ETA-16/0439	BSZ 6 h_{nom} 35	0,65	0,65	0,60	0,40
		BSZ 6 h_{nom} 55	0,90	0,80	0,60	0,40
Concrete screw BSZ2 A4 Stainless steel A4 	ETA-22/0551	BSZ2 6 h_{nom} 45	0,4	0,4	0,4	0,3
		BSZ2 6 h_{nom} 55	0,8	0,8	0,6	0,4
		BSZ2 8 h_{nom} 45	0,8	0,8	0,8	0,6
		BSZ2 8 h_{nom} 55	1,4	1,4	1,1	0,7
		BSZ2 8 h_{nom} 65	2,0	1,7	1,1	0,7
		BSZ2 10 h_{nom} 55	1,5	1,5	1,5	1,2
		BSZ2 10 h_{nom} 75	3,3	3,3	2,3	1,7
		BSZ2 10 h_{nom} 85	4,3	3,3	2,3	1,7
Concrete screw BSZ2 A4 For use in concrete for redundant non-structural systems according to EN 1992-4 	ETA-22/0551	BSZ2 6 h_{nom} 35	0,5	0,5	0,5	0,4
Injection System VMZ Steel, zinc plated 	Evaluation GS6.1/18-033-2	≥ 50 M 8	1,69	0,07	---	---
		≥ 60 M 10	3,38	0,83	---	---
		≥ 80 M 12	5,80	3,11	1,14	---
		≥ 125 M 16	7,62	5,81	4,01	3,11
		≥ 170 M 20	13,02	9,75	6,48	4,84
		≥ 170 M 24	18,76	14,05	9,34	6,97
Injection System VMZ Stainless steel A4/316 and 1.4529 	Evaluation GS6.1/18-033-2	≥ 50 M 8	2,17 / 2,22	0,35 / 0,36	---	---
		≥ 60 M 10	4,46 / 4,56	1,31 / 1,35	0,22 / 0,23	---
		≥ 80 M 12	9,86	4,59 / 4,72	1,86 / 1,92	0,56 / 0,58
		≥ 125 M 16	16,67	11,79	6,92	4,48
		≥ 115 M 20	23,75	16,70	9,64	6,11
		≥ 170 M 24	34,23	24,06	13,89	8,79

Anchor system	Documents	Size	Maximum tension load in fire tests for the fire resistance classes			
			R 30 (30 min)	R 60 (60 min)	R 90 (90 min)	R 120 (120 min)
Injection System VMH Steel, zinc plated ≥ grade 5.8/Stainless steel A4/316 ≥ grade 70 and 1.4529 ≥ grade 70  For smaller anchorage depths, see evaluation	Evaluation 22210	M8 $h_{ef} \geq 80$	1,10	0,88	0,66	0,32
		M10 $h_{ef} \geq 90$	1,74	1,39	1,04	0,61
		M12 $h_{ef} \geq 100$	3,03	2,28	1,60	1,04
		M16 $h_{ef} \geq 110$	5,65	4,24	2,98	1,40
		M20 $h_{ef} \geq 130$	8,82	6,62	4,66	3,23
		M24 $h_{ef} \geq 140$	12,71	9,53	6,71	4,05
		M27 $h_{ef} \geq 150$	16,52	12,39	8,72	5,33
		M30 $h_{ef} \geq 160$	20,20	15,15	10,66	7,85
Injection System VMH Threaded Studs VMU-A Stainless steel A4 ≥ Fkl. 70, V-A Stainless steel A4 ≥ Fkl. 70  For smaller anchorage depths, see evaluation	Evaluation 22210	M8 $h_{ef} \geq 90$	2,45	1,94	1,46	0,71
		M10 $h_{ef} \geq 100$	3,89	3,07	2,32	1,22
		M12 $h_{ef} \geq 115$	8,43	6,15	3,79	2,50
		M16 $h_{ef} \geq 130$	15,70	11,46	7,07	4,11
		M20 $h_{ef} \geq 150$	24,50	17,89	11,03	7,60
		M24 $h_{ef} \geq 170$	35,30	25,77	15,89	10,94
		M27 $h_{ef} \geq 180$	45,90	33,51	20,66	14,23
		M30 $h_{ef} \geq 195$	56,10	40,95	25,25	17,39
Injection System VMU plus Steel, zinc plated ≥ grade 5.8/Stainless steel A4/316 ≥ grade 70 and 1.4529 ≥ grade 70  Only uncracked concrete	Evaluation EBB170019-3	M8 $h_{ef} \geq 80$	1,60	1,10	0,60	0,30
		M10 $h_{ef} \geq 90$	2,60	1,80	0,90	0,50
		M12 $h_{ef} \geq 110$	3,40	2,60	1,80	1,40
		M16 $h_{ef} \geq 125$	6,20	4,80	3,40	2,70
		M20 $h_{ef} \geq 170$	9,80	7,50	5,30	4,20
		M24 $h_{ef} \geq 210$	14,00	10,80	7,60	6,00
		M27 $h_{ef} \geq 250$	18,30	14,10	9,90	7,90
		M30 $h_{ef} \geq 280$	22,30	17,20	12,10	9,60
Injection System VME plus Steel, zinc plated ≥ Fkl. 5.8 / Stainless steel A4 ≥ Fkl. 70 / Stainless steel HCR ≥ Fkl. 70  For smaller anchorage depths, see evaluation	Evaluation 22209	M8 hef ≥ 90	1,10	0,88	0,66	0,19
		M10 hef ≥ 100	1,74	1,39	1,04	0,48
		M12 hef ≥110	3,03	2,28	1,60	0,88
		M16 hef ≥ 130	5,65	4,24	2,98	2,00
		M20 hef ≥ 150	8,82	6,62	4,66	3,43
		M24 hef ≥ 170	12,71	9,53	6,71	4,94
		M27 hef ≥ 180	16,52	12,39	8,72	6,43
		M30 hef ≥ 190	20,20	15,15	10,66	7,85
Injection System VME plus Threaded Studs VMU-A Stainless steel A4 ≥ Fkl. 70, V-A Stainless steel A4 ≥ Fkl. 70  For smaller anchorage depths, see evaluation	Evaluation 22209	M8 $h_{ef} \geq 110$	2,45	1,94	1,46	1,03
		M10 $h_{ef} \geq 125$	3,89	3,07	2,32	1,80
		M12 $h_{ef} \geq 140$	8,43	5,88	3,79	2,61
		M16 $h_{ef} \geq 180$	15,70	11,45	7,07	4,87
		M20 $h_{ef} \geq 190$	24,50	15,26	11,03	7,60
		M24 $h_{ef} \geq 250$	35,30	25,77	15,89	10,94
		M27 $h_{ef} \geq 275$	45,90	33,51	20,66	14,23
		M30 $h_{ef} \geq 250$	56,10	39,40	25,25	17,39
Chemical Anchor VZ Steel, zinc plated ≥ grade 5.8 	Evaluation 22043	M 8	0,73	0,55	0,40	0,33
		M 10	2,67	2,09	1,45	0,87
		M 12	3,88	2,78	1,77	1,26
		M 16	7,22	5,18	3,30	2,36
		M 20	11,27	8,09	5,15	3,68
		M24	16,24	11,65	7,41	5,30
Chemical Anchor VZ Stainless steel A4/316 ≥ grade 70 and 1.4529 ≥ grade 70 	Evaluation 22043	M 8	2,45	1,79	0,95	0,52
		M 10	3,89	2,68	1,47	0,87
		M 12	8,43	5,22	3,05	2,00
		M 16	15,70	7,90	4,80	3,24
		M 20	24,50	17,89	11,03	7,60
		M24	35,30	25,77	15,89	10,94
Chemical Anchor V Steel, zinc plated ≥ grade 5.8/Stainless steel A4/316 ≥ grade 70 and 1.4529 ≥ grade 70 	Evaluation 21726	M 8	1,70	1,20	0,70	0,50
		M 10	3,00	2,20	1,40	0,90
		M 12	4,70	3,50	2,20	1,60
		M 16	8,80	6,50	4,20	3,00
		M 20	13,80	10,10	6,50	4,70
		M 24	19,90	14,60	9,40	6,80

Fire Resistant Anchor Systems in tunnels

Tested according to ZTV tunnel temperature curve in cracked concrete, exposed to open flames, without fire protection.



Anchor system	IBMB test report	Size	Maximum tension load in fire tests according to ZTV tunnel temperature curve	
			Anchorage depth	Tensile load [kN]
Wedge Anchor BZ3 A4 Stainless steel A4 1.4401 	GS 2102/792/20	M8	35	0,40
		M10	40	0,55
		M12	50	0,90
		M16	65	3,40
Wedge Anchor BZ3 HCR Stainless steel HCR 1.4529 	GS 2102/792/20	M8	45	0,60
		M10	45	0,85
		M12	50	1,35
		M16	65	5,50
Wedge Anchor BZ plus HCR Stainless steel HCR 1.4529 	2104/017/22	M6	46	0,60
		M10	60	0,85
		M12	70	1,35
		M16	85	5,50
Nail Anchor N, N-K Stainless steel A4, Stainless steel 1.4529 	2011-B-0279	N6	30 mm	0,12
		N-K	30 mm	0,12
Injection System VMZ HCR Stainless steel 1.4529 	GS 6.1/20-004-3	60 M 10	60 mm	0,22
		75 M 10	75 mm	1,08
		75 M 12	75 mm	1,49
		70 M 12	70 mm	0,88
		80 M 12	80 mm	1,94
		95 M 12	95 mm	2,50
		100 M 12	100 mm	2,50
		110 M 12	110 mm	2,50
		125 M 12	125 mm	2,50
		90 M 16	90 mm	3,85
		105 M 16	105 mm	4,10
		125 M 16	125 mm	4,10
		145 M 16	145 mm	4,10
		160 M 16	160 mm	4,10
		115 M 20	115 mm	5,04
		170 M 20	170 mm	5,60
		190 M 20	190 mm	5,60
		170 M 24	170 mm	8,07
		200 M 24	200 mm	8,07
		225 M 24	225 mm	8,07

Anchor system	IBMB test report	Size	Maximum tension load in fire tests according to ZTV tunnel temperature curve	
			Anchorage depth	Tensile load [kN]
Injection System VMZ dynamic HCR Stainless steel 1.4529 	GS 6.1/20-004-3	M 12	100 mm	2,50
		M 16	125 mm	4,10
Injection System VMZ-IG HCR Stainless steel 1.4529, Nut, threaded rod or screw stainless steel HCR ≥ Fkl. 70 	GS 6.1/20-004-3	60 M 8	60 mm	0,22
		75 M 8	75 mm	0,32
		70 M 10	70 mm	0,75
		80 M 10	80 mm	0,75
		90 M 12	90 mm	1,23
		105 M 12	105 mm	1,23
		125 M 12	125 mm	1,23
		115 M 16	115 mm	1,51
		170 M 16	170 mm	1,68
		170 M 20	170 mm	2,42

Notes

Notes

Product Range 2022/23

30/2021 LP_E MKT 2.000 Printed in Germany

... a solid connection

MKT Metall-Kunststoff-Technik
GmbH & Co. KG
Auf dem Immel 2
67685 Weilerbach, Germany

Phone 06374 9116-0
Fax 06374 9116-60
info@mkt.de
www.mkt.de