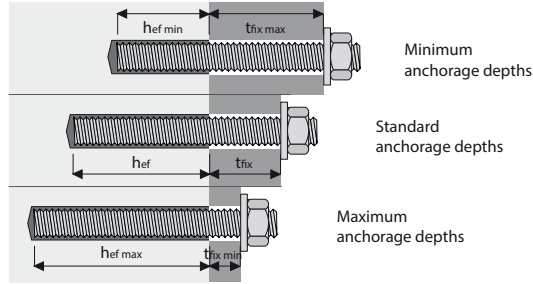


Threaded Studs, Perfo Sleeves and Tension Anchors for MKT Injection Systems

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.



$hef + t_{fix} =$ 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		
	Steel, zinc plated 5.8	Steel, hot dip galvanized 5.8	Stainless steel A4-70	Concrete ¹⁾ Usable length mm	Solid base material without Perfo Sleeve Drill hole Ø x depth mm	Maximum fixture thickness t _{fix} mm	Solid and hollow base material with VM-SH ²⁾							
							12x85	16x90	16x135	20x90			20x135	20x205
							Maximum fixture thickness t _{fix} 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 8.8



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

Threaded Stud V-A fvz



- For use in structures subject to dry internal conditions
- Steel 5.8, hot dip galvanized $\geq 50 \mu\text{m}$ (average plating thickness according to EN ISO 10684)

Threaded Stud V-A A4



- For use in structures subject to dry internal conditions or external atmospheric exposure
- Stainless steel A4-70

Threaded Stud V-A HCR



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

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⁾							
						Usable Length	Drill hole \varnothing x depth	Maximum fixture thickness t_{fx}	12x85	16x90	16x135	20x90	20x135	20x205	Maximum fixture thickness t_{fx}			pcs.	kg
mm	mm	mm	mm																
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 ³⁾	21829101	-	-	21829501 ⁴⁾	-	350	-	-	-	-	-	-	-	-	-	5	10,00		

¹⁾Drill hole \varnothing and drill depth depend on selected injection system and anchorage depth.

²⁾Drill hole \varnothing 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 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

Description	Ref. No.	Use in			Outer Ø x Length	Thread depth min / max	Package content	Weight per package		
		Steel, zinc plated 5.8	Stainless steel A4	Concrete					Solid base material without Perfo Sleeve	Solid and hollow base material with VM-SH ²⁾
				Drill hole Ø x depth mm					Drill hole Ø x depth mm	
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

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						
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.

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

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		
		Steel, zinc plated 5.8	Stainless steel A4	Concrete					Solid base material without Perfo Sleeve	Solid and hollow base material with VM-SH ²⁾
				Drill hole Ø x depth mm					Drill hole Ø x depth mm	
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 A4

Stainless steel A4-70



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

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 + tfix 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. tfix = 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_{fx} 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.