Styrene-free polyester PLUS mortar anchor, for use in non-cracked concrete and masonry

MO-PS+

Assessed ETA Option 7 (non-cracked concrete).

PRODUCT INFORMATION

DESCRIPTION
Styrene-free polyester PLUS chemical anchor.

OFFICIAL DOCUMENTATION
- ETA 13/0751 option 7, M8 to M24 for non-cracked concrete (100 years).
- ETA 17/0096 for installation in masonry.
- Declaration features DoP MO-PS+.
- Certificate EVCP 1020-CPR-090-041428 for use in concrete.
- Certificate EVCP 1020-CPR-090-037484 for use in masonry.

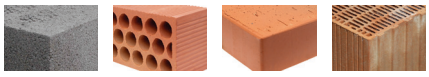
VALID FOR

Stud

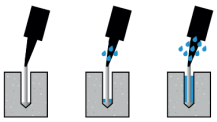
DIMENSIONS
Stud M8 - M24

RANGE OF CACULATION LOADS
From 9.5 to 66,0 kN (non-cracked).

BASE MATERIAL
Concrete quality C20/25 to C50/60 non-cracked.


Concrete | Hollow brick | Solid brick | Thermal clay

ASSESSMENTS
- ETA 13/0752 Option 7: non-cracked concrete.
- ETA 17/0096 Masonry.

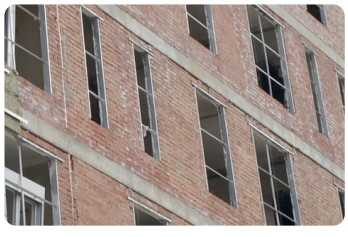
DRILL HOLE CONDITION

Dry | Wet | Flooded

CHARACTERISTICS AND BENEFITS
- Easy installation.
- Use in non-cracked concrete, hollow and solid plasterboard.
- Used for medium-high loads.
- Temperature range -40°C to +80°C (maximum long-term temperature +50°C).
- Two versions, standard and stone colour.
- Variety of lengths and diameters: M8-M24-assessed studs, flexible assembly.
- For static or quasi-static loads.
- Version in zinc plated steel, stainless steel A2 and A4.
- Styrene-free polyester resin for all types of materials
- Available in INDEXcal.

MATERIALS
Standard stud:
Carbon steel 5.8, 8.8.

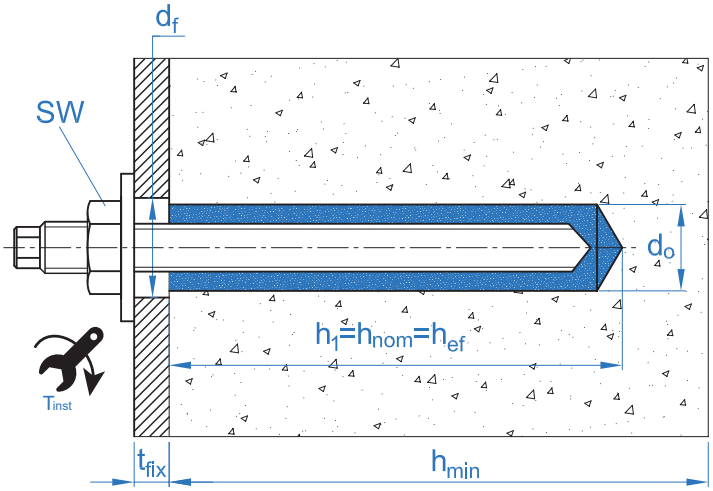
Stainless standard stud:
Stainless steel A2-70 and A4-70.

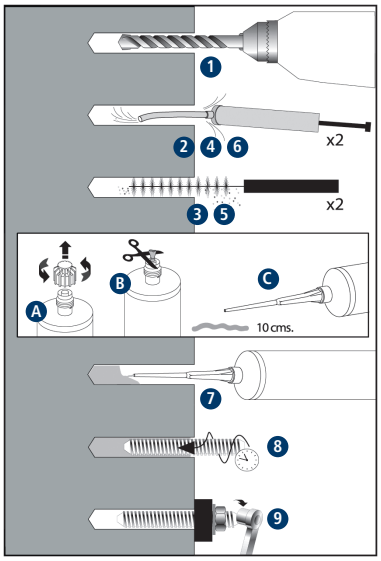
APPLICATIONS
- For indoor and outdoor use.
- Fixing of building substructures.
- Rehabilitation of facades. For fixing air-conditioning supports, boilers, awnings, signs, balconies, shelving units, railings, etc.
- Large metric sizes, retaining walls.
- Structural applications.



CONCRETE INSTALLATION PARAMETERS

METRIC			M8	M10	M12	M16	M20	M24
d_0	nominal diameter	[mm]	10	12	14	18	22	26
d_f	diameter in anchor plate ≤	[mm]	9	12	14	18	22	26
T_{inst}	tightening torque ≤	[Nm]	10	20	40	80	150	200
Circular cleaning brush			Ø14		Ø20		Ø29	
$h_{ef,min}$ = 8d								
h_1	depth of the drill hole	[mm]	64	80	96	128	160	192
$s_{cr,N}$	critical distance between anchors	[mm]	192	240	288	384	480	576
$c_{cr,N}$	critical distance from the edge	[mm]	96	120	144	192	240	288
c_{min}	minimum distance from the edge	[mm]	35	40	50	65	80	96
s_{min}	minimum distance between anchors	[mm]	35	40	50	65	80	96
h_{min}	minimum concrete thickness	[mm]	100	110	126	158	204	244
Standard stud								
h_1	depth of the drill hole	[mm]	80	90	110	128	170	210
$s_{cr,N}$	critical distance between anchors	[mm]	240	270	330	384	510	630
$c_{cr,N}$	critical distance from the edge	[mm]	120	135	165	192	255	315
c_{min}	minimum distance from the edge	[mm]	43	45	56	65	85	105
s_{min}	minimum distance between anchors	[mm]	43	45	56	65	85	105
h_{min}	minimum concrete thickness	[mm]	110	120	140	158	214	262
$h_{ef,max}$ = 12d								
h_1	depth of the drill hole	[mm]	96	120	144	192	240	288
$s_{cr,N}$	critical distance between anchors	[mm]	288	360	432	576	720	864
$c_{cr,N}$	critical distance from the edge	[mm]	144	180	216	288	360	432
c_{min}	minimum distance from the edge	[mm]	50	60	70	95	120	145
s_{min}	minimum distance between anchors	[mm]	50	60	70	95	120	145
h_{min}	minimum concrete thickness	[mm]	126	150	174	222	284	340
Zinc-plated stud code 5.8 / 8.8 			EQAC08110 EQ8808110	EQAC10130 EQ8810130	EQAC12160 EQ8812160	EQAC16190 EQ8816190	EQAC20260 EQ8820260	EQAC24300 EQ8824300
Stainless steel stud code A2 / A4 			EQA208110 EQA408110	EQA210130 EQA410130	EQA212160 EQA412160	EQA216190 EQA416190	EQA220260 EQA420260	EQA224300 EQA424300



INSTALLATION ACCESSORIES			INSTALLATION PROCEDURE
CODE	PRODUCT	MATERIAL	CONCRETE
MOPISSI	APPLICATION GUNS	Gun for 300 ml cartridges	
MOPISTO		Guns for 410 ml cartridges, professional use	
MOPISNEU		Pneumatic gun for 410 ml coaxial cartridges, professional use	
EQ-AC **EQ-8.8** **EQ-A2** **EQ-A4**	STUD	Studs threaded steel, class 5.8 ISO 898-1 Studs threaded steel, class 8.8 ISO 898-1 Studs stainless steel A2-70 Studs stainless steel A4-70	
MORCEPKIT	CLEANING BRUSHES	Kit with 3 cleaning brushes measuring ø14, ø20 and ø29 mm	
MOBOMBA	CLEANING PUMP	Pump for cleaning leftover dust and fragments in the drill hole	
MORCANU	MIXING TUBE	Plastic. Static labyrinth mixture	

MINIMUM CURING TIME			
TYPE	BASE MATERIAL TEMPERATURE [ºC]	HANDLING TIME [min]	CURING TIME [min]
MO-PS+ / MO-PSP+	min +5	18	145
	+5 to +10	10	145
	+10 to +20	6	85
	+20 to +25	5	50
	+25 to +30	4	40
	+30	4	35

Resistance in concrete C20/25 for an insulated anchor, without effects of distance from the edge or spacing between anchors, with a standard stud EQ-AC, EQ-8.8, EQ-A2 or EQ-A4.

Characteristic tensile strength N_{Rk}								
Metric			M8	M10	M12	M16	M20	M24
N_{Rk}	Non-cracked concrete	[kN]	17,1	22,6	37,3	57,9	85,5	118,8
Calculated tensile strength N_{Rd}								
Metric			M8	M10	M12	M16	M20	M24
N_{Rd}	Non-cracked concrete	[kN]	9,5	12,6	20,7	32,2	47,5	66,0
Maximum recommended tensile load N_{rec}								
Metric			M8	M10	M12	M16	M20	M24
N_{rec}	Non-cracked concrete	[kN]	6,8	9,0	14,8	23,0	33,9	47,1
Characteristic resistance to shear stress V_{Rk}								
Metric			M8	M10	M12	M16	M20	M24
V_{Rk}	Zinc-plated stud 5.8	[kN]	*9,0*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*
	Zinc-plated stud 8.8	[kN]	*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*
	Stainless steel stud (A2/A4)	[kN]	*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124,0*
Calculated resistance to shearing V_{Rd}								
Metric			M8	M10	M12	M16	M20	M24
V_{Rd}	Zinc-plated stud 5.8	[kN]	*7,2*	*12,0*	*16,8*	*31,2*	*48,8*	*70,4*
	Zinc-plated stud 8.8	[kN]	*12,0*	*18,4*	*27,2*	*50,4*	*78,4*	*112,8*
	Stainless steel stud (A2/A4)	[kN]	*8,3*	*12,8*	*19,2*	*35,3*	*55,1*	*79,5*
Maximum recommended load to shear stress V_{rec}								
Metric			M8	M10	M12	M16	M20	M24
V_{rec}	Zinc-plated stud 5.8	[kN]	*5,1*	*8,6*	*12,0*	*22,3*	*34,9*	*50,3*
	Zinc-plated stud 8.8	[kN]	*8,6*	*13,1*	*19,4*	*36,0*	*56,0*	*80,6*
	Stainless steel stud (A2/A4)	[kN]	*6,0*	*9,2*	*13,7*	*25,2*	*39,4*	*56,8*
Effective depth of studs EQ-AC / EQ-A2 / EQ-A4								
Metric			M8	M10	M12	M16	M20	M24
Effective depth		[mm]	80	90	110	128	170	210

The values underlined and in italics indicate steel failure

Simplified calculation method. European Technical Assessment ETA 13/0751

Simplified version of the calculation method according to Eurocode 2 EN 1992-4. Resistance is calculated according to the data shown in assessment ETA 13/0751.

- Influence of concrete resistance.
- Influence of the distance from the edge of the concrete.
- Influence of the spacing between anchors.
- Influence of rebars.
- Influence of the base material thickness.
- Influence of the load application angle.
- Influence of the effective depth.
- Valid for a group of two anchors.
- Valid for dry or wet drill holes.

The calculation method is based on the following simplification:
No different loads act on individual anchors, without eccentricity.

INDEXcal
For a more precise calculation and taking into account more constructive arrangements we recommend the use of our INDEXcal calculation program. It can be downloaded free from our website **www.indexfix.com**

TENSILE LOADS

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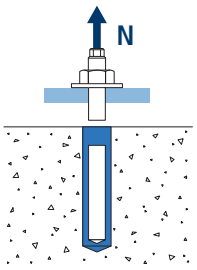
- Calculated steel resistance: $N_{Rd,s}$
- Calculated extraction resistance: $N_{Rd,p} = N^{o}_{Rd,p} \cdot \Psi_{c} \cdot \Psi_{hef,p}$
- Calculated concrete cone resistance: $N_{Rd,c} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N} \cdot \Psi_{hef,N}$
- Calculated concrete cracking resistance: $N_{Rd,sp} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp} \cdot \Psi_{hef,N}$

Calculated steel resistance

$N_{Rd,s}$

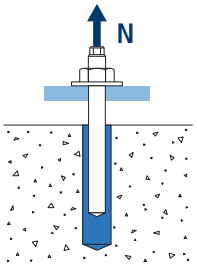
	Metric		M8	M10	M12	M16	M20	M24
$N^{o}_{Rd,s}$	Steel class 5.8	[kN]	12.0	19.3	28.0	52.7	82.0	118.0
	Steel class 8.8	[kN]	19.3	30.7	44.7	84.0	130.7	188.0
	Steel class 10.9	[kN]	27.8	43.6	63.2	118.0	184.2	265.4
	Stainless steel Class A2-70, A4-70	[kN]	13.9	21.9	31.6	58.8	92.0	132.1



Calculated extraction resistance

$N_{Rd,p} = N^{o}_{Rd,p} \cdot \Psi_{c} \cdot \Psi_{hef,p}$

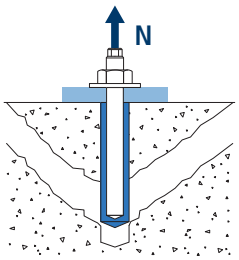
	Metric		M8	M10	M12	M16	M20	M24
$N^{o}_{Rd,p}$	Non-cracked concrete	[kN]	9.5	12.6	20.7	32.2	47.5	66.0



Calculated concrete cone resistance

$N_{Rd,c} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N} \cdot \Psi_{hef,N}$

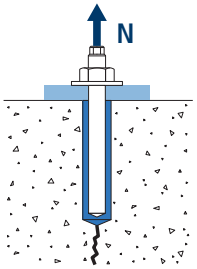
	Metric		M8	M10	M12	M16	M20	M24
$N^{o}_{Rd,c}$	Non-cracked concrete	[kN]	19,6	23,3	31,5	39,6	60,6	83,2



Calculated concrete cracking resistance

$N_{Rd,sp} = N^{o}_{Rd,c} \cdot \Psi_{b} \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp} \cdot \Psi_{hef,N}$

	Metric		M8	M10	M12	M16	M20	M24
$N^{o}_{Rd,sp}$	Non-cracked concrete	[kN]	19,6	23,3	31,5	39,6	60,6	83,2



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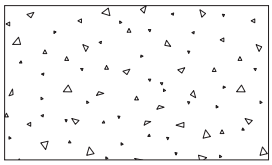
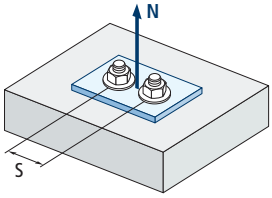
Influence coefficients



Influence of concrete resistance for extraction Ψ_c					
Concrete type		C20/25	C30/37	C40/50	C50/60
Ψ_c	Non-cracked concrete	1.00	1.12	1.19	1.30

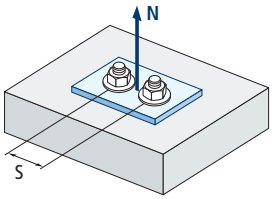
$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

Influence of concrete resistance for concrete cone and concrete cracking Ψ_b					
Concrete type		C20/25	C30/37	C40/50	C50/60
Ψ_b		1.00	1.22	1.41	1.55



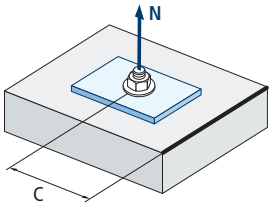
Influence of spacing between anchors (concrete cone) $\Psi_{s,N}$										
$s/s_{cr,N}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$\Psi_{s,N}$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00

$$\Psi_{s,N} = 0.5\left(1+\frac{s}{S_{cr,N}}\right) \leq 1$$



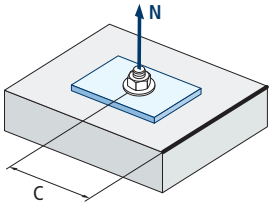
Influence of spacing between anchors (cracking) $\Psi_{s,N}$										
$s/s_{cr,sp}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$\Psi_{s,sp}$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00

$$\Psi_{s,sp} = 0.5\left(1+\frac{s}{S_{cr,sp}}\right) \leq 1$$



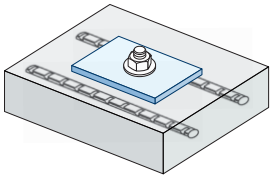
Influence of the distance from the edge of the concrete (concrete cone) $\Psi_{c,N}$												
$c/C_{cr,N}$	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.6
$\Psi_{c,N}$	0.40	0.46	0.51	0.45	0.49	0.55	0.61	0.67	0.75	0.83	0.91	1.00

$$\Psi_{c,N} = 0.35 + \frac{0.5 \cdot c}{C_{cr,N}} + \frac{0.15 \cdot c^2}{C_{cr,N}^{\ 2}} \leq 1$$



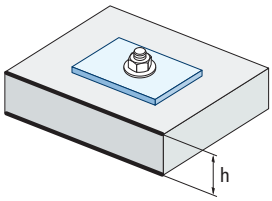
Influence of the distance from the edge of the concrete (cracking) $\Psi_{c,sp}$												
$c/C_{cr,sp}$	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.6
$\Psi_{c,sp}$	0.40	0.46	0.51	0.45	0.49	0.55	0.61	0.67	0.75	0.83	0.91	1.00

$$\Psi_{c,sp} = 0.35 + \frac{0.5 \cdot c}{C_{cr,sp}} + \frac{0.15 \cdot c^2}{C_{cr,sp}^{\ 2}} \leq 1$$



Influence of the rebars $\Psi_{re,N}$					
h_{ef} (mm)	64	70	80	90	100
$\Psi_{re,N}$	0.82	0.85	0.90	0.95	1.00

$$\Psi_{re,N} = 0.5 + \frac{h_{ef}}{200} \leq 1$$



• Influence of the base material thickness $\Psi_{h,sp}$											
$\Psi_{h,sp}$	h/h_{ef}	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.68
	fh	1.00	1.07	1.13	1.19	1.25	1.31	1.37	1.42	1.48	1.50

$$\Psi_{h,sp} = \left(\frac{h}{2 \cdot h_{ef}}\right)^{2/3} \leq 1.5$$

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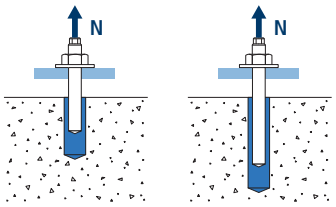
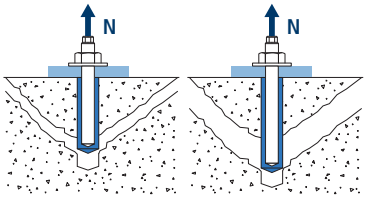
• Influence of the effective depth for the extraction combination $\Psi_{hef,p}$						
Metric h_{ef}	M8	M10	M12	M16	M20	M24
64	0.80	Value not permitted				
80	1.00	0.89				
90	1.13	1.00	0.82			
96	1.20	1.07	0.87			
110		1.22	1.00			
120		1.33	1.09			
128			1.16	1.00		
144			1.31	1.13		
160				1.25	0.94	
170				1.33	1.00	
192	Value not permitted			1.50	1.13	0.91
210					1.24	1.00
240					1.41	1.14
288						1.37



$$\Psi_{hef,p} = \frac{h_{ef}}{h_{stand}}$$

• Influence of the effective depth for the concrete cone $\Psi_{hef,N}$						
Metric h_{ef}	M8	M10	M12	M16	M20	M24
64	0.72	Value not permitted				
80	1.00	0.84				
90	1.19	1.00				
96	1.31	1.10	0.82			
110	1.61	1.35	1.00			
120	1.84	1.54	1.14	0.91		
128	2.02	1.70	1.26	1.00	0.65	
144		2.02	1.50	1.19	0.78	
160		2.37	1.75	1.40	0.91	0.67
170		2.60	1.92	1.53	1.00	0.73
192			2.31	1.84	1.20	0.87
210			2.64	2.10	1.37	1.00
240	Value not permitted		3.22	2.57	1.68	1.22
288				3.38	2.21	1.61



$$\Psi_{hef,N} = \left(\frac{h_{ef}}{h_{stand}}\right)^{1.5}$$

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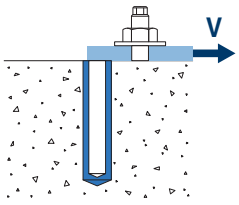
SHEARING LOADS

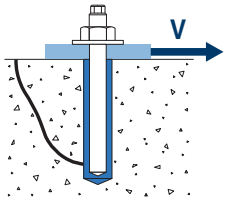
- Calculated steel resistance without lever arm: $V_{Rd,s}$
- Calculated spalling resistance: $V_{Rd,cp} = k \cdot N^{o}_{Rd,c}$
- Calculated concrete edge resistance: $V_{Rd,c} = V^{o}_{Rd,c} \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{\alpha,V} \cdot \Psi_{h,V}$



Calculated steel resistance to shearing

$V_{Rd,s}$

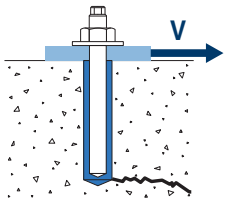
	Metric		M8	M10	M12	M16	M20	M24
$V^{o}_{Rd,s}$	Steel class 5.8	[kN]	7.2	12	16.8	31.2	48.8	70.4
	Steel class 8.8	[kN]	12	18.4	27.2	50.4	78.4	112.8
	Steel class 10.9	[kN]	12	19.3	28	52.7	82	118
	Stainless steel Class A2-70, A4-70	[kN]	8.3	12.8	19.2	35.3	55.1	79.5



Calculated spalling resistance

$V_{Rd,cp} = k \cdot N^{o}_{Rd,c}$

Metric	M8	M10	M12	M16	M20	M24
k	2					

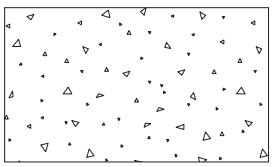


Calculated concrete edge resistance

$V_{Rd,c} = V^{o}_{Rd,c} \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{\alpha,V} \cdot \Psi_{h,V}$

Metric			M8	M10	M12	M16	M20	M24
$V^{o}_{Rd,c}$	Non-cracked concrete	[kN]	5.7	8.6	11.8	19.0	28.3	36.4

Influence coefficients



$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

Influence of concrete resistance for concrete cone and concrete cracking Ψ_b

Concrete type	C20/25	C30/37	C40/50	C50/60
Ψ_b	1.00	1.22	1.41	1.55

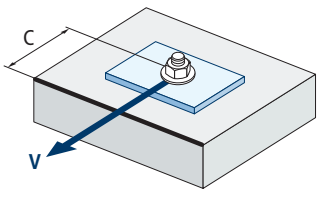
Influence of the distance from the edge and spacing between anchors $\Psi_{se,V}$

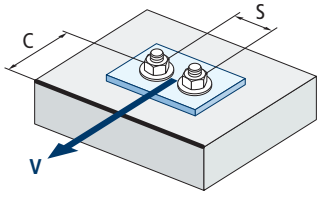
For one anchor

c/h_{ef}	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.50	5.00
Insulated	0.35	0.65	1.00	1.40	1.84	2.32	2.83	3.38	3.95	4.56	5.20	5.86	6.55	7.26	8.00	9.55	11.18

For two anchors

s/c	c/h_{ef}	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.50	5.00
	1.0	0.24	0.43	0.67	0.93	1.22	1.54	1.89	2.25	2.64	3.04	3.46	3.91	4.37	4.84	5.33	6.36	7.45
	1.5	0.27	0.49	0.75	1.05	1.38	1.74	2.12	2.53	2.96	3.42	3.90	4.39	4.91	5.45	6.00	7.16	8.39
	2.0	0.29	0.54	0.83	1.16	1.53	1.93	2.36	2.81	3.29	3.80	4.33	4.88	5.46	6.05	6.67	7.95	9.32
	2.5	0.32	0.60	0.92	1.28	1.68	2.12	2.59	3.09	3.62	4.18	4.76	5.37	6.00	6.66	7.33	8.75	10.25
	≥ 3.0	0.35	0.65	1.00	1.40	1.84	2.32	2.83	3.38	3.95	4.56	5.20	5.86	6.55	7.26	8.00	9.55	11.18





$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1.5}$$

$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1.5} \cdot \left(1 + \frac{s}{3 \cdot c}\right) \cdot 0.5 \leq \left(\frac{c}{h_{ef}}\right)^{1.5}$$

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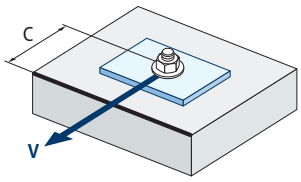
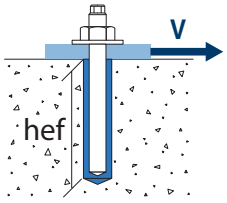
Influence of the distance from the edge of the concrete $\Psi_{c,V}$								
c/d	4	5	7	10	15	20	25	30
$\Psi_{c,V}$	0.76	0.72	0.68	0.63	0.58	0.55	0.53	0.51

$$\Psi_{c,V} = \left(\frac{d}{c}\right)^{0.20}$$

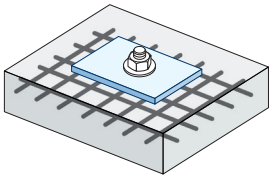


Influence of the effective depth $\Psi_{hef,V}$					
h_{ef}/d	8	9	10	11	12
$\Psi_{hef,V}$	1.65	2.04	2.47	2.93	3.42

$$\Psi_{hef,V} = 0.04 \cdot \left(\frac{h_{ef}}{d}\right)^{1.79}$$

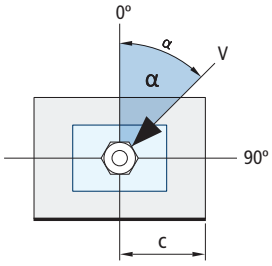


Influence of the rebars $\Psi_{re,v}$				
		Without perimeter rebar	Perimeter rebar ≥Ø12mm	Perimeter rebar with abutments at≤100mm
$\Psi_{re,v}$	Non-cracked concrete	1	1	1



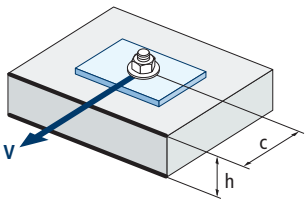
Influence of the load application angle $\Psi_{\alpha,v}$										
Angle, α(°)	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$\Psi_{\alpha,v}$	1.00	1.01	1.05	1.13	1.24	1.40	1.64	1.97	2.32	2.50

$$\Psi_{\alpha,V} = \sqrt{\frac{1}{(\cos\alpha_v)^2 + \left(\frac{\sin\alpha_v}{2.5}\right)^2}} \geq 1$$



Influence of the base material thickness $\Psi_{h,V}$										
h/c	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	≥ 1.5
$\Psi_{h,v}$	0.32	0.45	0.55	0.63	0.71	0.77	0.84	0.89	0.95	1.00

$$\Psi_{h,V} = \left(\frac{h}{1.5 \cdot c}\right)^{0.5} \geq 1.0$$



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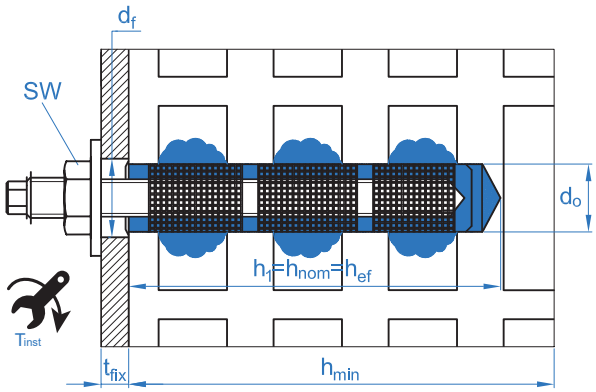
FIXING IN BRICKS

INSTALLATION PARAMETERS										
BASE MATERIAL		Bricks no. 1 - 12								
ANCHOR TYPE		Threaded rod without sleeve[1]			Threaded rod with sleeve			Internal threaded socket with sleeve		
SIZE		M8	M10	M12	M8	M10	M12	M8	M10	M12
Plastic sleeve length	[mm]	-	-	-	85	85	85	85	85	85
Plastic sleeve diameter	[mm]	-	-	-	15/16	15/16	20	15/16	20	20
Internal threaded socket	[mm]	-	-	-	-	-	-	12 x 80	14 x 80	16 x 80
Volume per hole/sleeve	[ml]	15	15	27	15	15	27	15	15	27
d_0: drill bit diameter	[mm]	15	15	20	15/16	15/16	20	15/16	20	20
h_1: drill hole depth ≥	[mm]	90	90	90	90	90	90	90	90	90
h_{ef}: effective depth ≥	[mm]	85	85	85	85	85	85	80	80	80
h_{min}: base material thickness ≥	[mm]	120	120	120	120	120	120	120	120	120
d_f: Diameter of clearance hole in the fixture ≤	[mm]	9	12	14	9	12	14	9	12	14
T_{ins}: torque ≤ [Nm]	[Nm]	2	2	2	2	2	2	2	2	2

[1] Valid only for solid bricks

INSTALLATION PARAMETERS							
BASE MATERIAL		Brick no. 13		Bricks no. 14 - 16			
ANCHOR TYPE		Threaded rod with sleeve		Threaded rod without sleeve			
SIZE		M6	M8	M6	M8	M10	M12
Plastic sleeve length	[mm]	80	80	-	-	-	-
Plastic sleeve diameter	[mm]	12	12	-	-	-	-
Internal threaded socket	[mm]	-	-	-	-	-	-
Volume per hole/sleeve	[ml]	10	10	10	15	15	27
d_0: drill bit diameter	[mm]	12	12	8	10	12	14
h_1: drill hole depth ≥	[mm]	85	85	80	80	80	95
h_{ef}: effective depth ≥	[mm]	80	80	75	75	75	90
h_{min}: base material thickness ≥	[mm]	115	115	110	110	110	125
d_f: Diameter of clearance hole in the fixture ≤	[mm]	9	9	7	9	12	14
T_{ins}: torque ≤ [Nm]	[Nm]	2	2	2	2	2	2



In order to make fixations in hollow bricks a nylon sleeve should be used to prevent the resin from falling through the inner holes. In some cases, to perform installations in bricks where a stud is required to be threaded, a metal sleeve with an internal thread can be used for fixing. In this case, the metal sleeve with internal thread must be inside a plastic.

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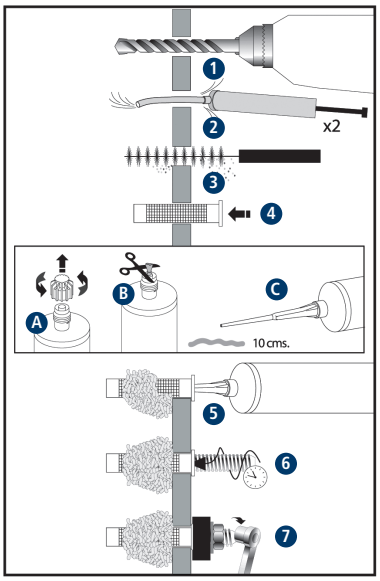
EDGE DISTANCES AND SPACING BETWEEN ANCHORS

BASE MATERIAL	SOLID OR HOLLOW BRICK									SOLID OR HOLLOW BRICK										AERATED CONCRETE					
ANCHOR TYPE	Threaded rod with or without sleeve									Internal threaded socket with sleeve										Threaded rod without sleeve					
SIZE	(M6)[2] M8			M10			M12			M8			M10			M12				M6 / M8 / M10			M12		
Critical/ Minimum spacing and edge distance	$C_{cr} = C_{min}$	$S_{cr\,II} = S_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = s_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = s_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = S_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = s_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = s_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = S_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$	$C_{cr} = C_{min}$	$S_{cr\,II} = s_{min\,II}$	$S_{min\,\perp} = C_{min\,\perp}$
Brick no. 1	100	235	115	100	235	115	120	235	115	100	235	115	120	235	115	120	235	115	-	-	-	-	-	-
Brick no. 2	100	240	113	100	240	113	120	240	113	100	240	113	120	240	113	120	240	113	-	-	-	-	-	-
Brick no. 3	100	237	237	100	237	237	120	250	237	-	-	-	120	250	237	120	250	237	-	-	-	-	-	-
Brick no. 4	128	255	255	128	255	255	128	255	255	128	255	255	128	255	255	128	255	255	-	-	-	-	-	-
Brick no. 5	128	255	255	128	255	255	128	255	255	128	255	255	128	255	255	128	255	255	-	-	-	-	-	-
Brick no. 6	100	250	240	100	250	240	120	250	240	100	250	240	120	250	240	120	250	240	-	-	-	-	-	-
Brick no. 7	100	250	248	100	250	248	-	-	-	100	250	248	120	250	248	120	250	248	-	-	-	-	-	-
Brick no. 8	100	250	248	100	250	248	120	250	248	-	-	-	120	250	248	120	250	248	-	-	-	-	-	-
Brick no. 9	100	370	238	100	370	238	120	370	238	100	370	238	120	370	238	120	370	238	-	-	-	-	-	-
Brick no. 10	100	245	110	100	245	110	120	245	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brick no. 11	100	373	238	100	373	238	120	373	238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brick no. 12	100	400	200	-	-	-	120	400	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brick no. 13	100	245	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brick no. 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	225	225	135	270	270
Brick no. 15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	225	225	135	270	270
Brick no. 16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113	225	225	135	270	270

[2] Valid only for installation in brick no.13

MO-PS+

INSTALLATION ACCESSORIES			INSTALLATION PROCEDURE
CODE	PRODUCT	MATERIAL	BRICK
MOPISSI	APPLICATION GUNS	Gun for 300 ml cartridges	
MOPISTO		Guns for 410 ml cartridges, professional use	
MOPISNEU		Pneumatic gun for 410 ml coaxial cartridges, professional use	
MO-ES	STUD	Threaded stud	
MORCEPKIT	CLEANING BRUSHES	Kit with 3 cleaning brushes measuring ø14, ø20 and ø29 mm	
MOBOMBA	CLEANING PUMP	Pump for cleaning leftover dust and fragments in the drill hole	
MORCANU	MIXING TUBE	Plastic. Static labyrinth mixture	
MO-TN	NYLON SLEEVE	Plastic white or grey	
MO-TR	THREADED METAL SLEEVE	Threaded metal sleeve M8, M10, M12, zinc-plated	
MO-TM	METAL SLEEVE	Metal sleeve ø12, ø16 and ø22 mm	

MINIMUM CURING TIME			
TYPE	BASE MATERIAL TEMPERATURE [°C]	HANDLING TIME [min]	CURING TIME [min]
MO-PS+ / MO-PSP+	min +5	18	145
	+5 to +10	10	145
	+10 to +20	6	85
	+20 to +25	5	50
	+25 to +30	4	40
	+30	4	35

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Characteristic resistances in masonry for an isolated anchor (without considering anchor-to-anchor or anchor-to-edge distance effects) and class 5.8 studs or A4-70 stainless steel are shown in tables below.

Use categories in respect of installation and use:

- Category d/d - Installation and use in structures subject to dry, internal conditions.
- Category w/d - Installation in dry or wet substrate and use in structures subject to dry, internal conditions.
- Category w/w - Installation and use in structures subject to dry or wet environmental conditions.

CHARACTERISTIC RESISTANCES (F_{RK})

ANCHOR TYPE	THREADED ROD WITH OR WITHOUT SLEEVE, TENSION AND SHEAR [kN]												INTERNAL THREADED SOCKET WITH SLEEVE, TENSION AND SHEAR [kN]					
USE CONDITIONS	d/d				w/d				w/w				d/d, w/d			w/w		
BASE MATERIAL	M6	M8	M10	M12	M6	M8	M10	M12	M6	M8	M10	M12	M8	M10	M12	M8	M10	M12
Brick no. 1	-	2,50	2,00	2,00	-	2,50	2,00	2,00	-	2,00	1,20	1,50	1,50	2,50	2,50	1,20	2,00	2,50
Brick no. 2	-	0,75	1,20	0,50	-	0,75	1,20	0,50	-	0,60	0,90	0,50	-	0,75	0,40	-	0,60	0,30
Brick no. 3	-	0,75	1,20	0,50	-	0,75	1,20	0,50	-	0,75	0,90	0,50	0,60	0,75	0,90	0,50	0,60	0,75
Brick no. 4	-	1,50	1,50	3,00	-	1,50	1,50	3,00	-	1,50	1,50	3,00	2,00	3,00	4,00	2,00	3,00	4,00
Brick no. 5	-	0,75	0,90	1,50	-	0,75	0,90	1,50	-	0,75	0,90	1,20	2,00	1,50	0,90	1,50	1,50	0,90
Brick no. 6	-	1,20	1,20	0,90	-	1,20	1,20	0,90	-	0,90	0,90	0,75	0,90	1,50	0,60	0,75	1,20	0,50
Brick no. 7	-	0,60	0,30	-	-	0,60	0,30	-	-	0,60	0,30	-	0,50	0,30	0,75	0,50	0,30	0,60
Brick no. 8	-	0,60	1,50	1,20	-	0,60	1,50	1,20	-	0,50	1,20	0,90	-	0,40	0,60	-	0,30	0,50
Brick no. 9	-	2,50	1,50	2,50	-	2,50	1,50	2,50	-	2,00	1,50	2,00	0,60	1,20	0,90	0,50	0,90	0,90
Brick no. 10	-	0,75	0,50	0,75	-	0,75	0,50	0,75	-	0,75	0,50	0,60	-	-	-	-	-	-
Brick no. 11	-	1,50	1,50	1,50	-	1,50	1,50	1,50	-	1,50	1,20	1,50	-	-	-	-	-	-
Brick no. 12	-	0,75	-	0,60	-	0,75	-	0,60	-	0,75	-	0,50	-	-	-	-	-	-
Brick no. 13	1,2	1,20	-	-	1,2	1,20	-	-	0,90	0,90	-	-	-	-	-	-	-	-
Brick no. 14	0,75	0,75	0,75	0,90	0,60	0,60	0,60	0,75	0,60	0,60	0,60	0,75	-	-	-	-	-	-
Brick no. 15	0,9	1,50	2,00	2,50	0,75	1,20	1,50	2,00	0,75	1,20	1,50	1,75	-	-	-	-	-	-
Brick no. 16	1,2	2,50	3,00	3,50	0,90	2,00	2,50	3,00	0,90	2,00	2,00	2,50	-	-	-	-	-	-

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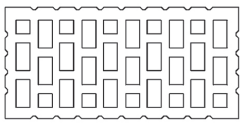
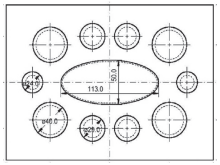
BRICK TYPES

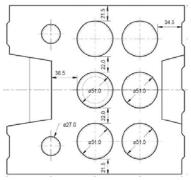
Brick no. 1
Hollow clay brick HLz 12-1, 0-2DF according to EN 771-1
Length / width / height:
235 mm / 112 mm / 115 mm
fb ≥ 12 N/mm2 / ρ ≥ 1,0 kg/dm³



Brick no. 2
Hollow sillico calcareous brick KSL 12-1, 4-3DF according to EN 771-2
Length / width / height:
240 mm / 175 mm / 113 mm
fb ≥ 12 N/mm2 / ρ ≥ 1,4 kg/dm³



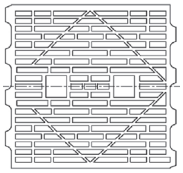
Brick no. 3
Hollow sillico calcareous brick KSL 12-1, 4-2DF according to EN 771-2
Length / width / height:
250 mm / 240 mm / 237 mm
fb ≥ 12 N/mm2 / ρ ≥ 1,4 kg/dm³



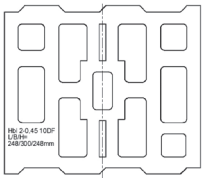
Brick no. 4
Solid clay brick Mz 12-2, 0-NF according to EN 771-1.
Length / width / height:
240 mm / 116 mm / 71 mm
fb ≥ 12 N/mm2 / ρ ≥ 2,0 kg/dm³

Brick no. 5
Solid sillico calcareous brick KS 12-2, 0-NF according to EN 771-2.
Length / width / height:
240 mm / 115 mm / 70 mm
fb ≥ 12 N/mm2 / ρ ≥ 2,0 kg/dm ³

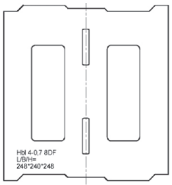
Brick no. 6
Hollow baked clay brick HLzW 6-0,7-8DF according to EN 771-1
Length / width / height:
250 mm / 240 mm / 240 mm
fb ≥ 6 N/mm2 / ρ ≥ 0,8 kg/dm³



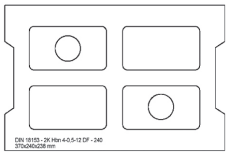
Brick no. 7
Hollow lightweight concrete block Hbl 2-0,45-10DF according to EN 771-3
Length / width / height:
250 mm / 300 mm / 248 mm
fb ≥ 2,0 N/mm2 / ρ ≥ 0,45 kg/dm³



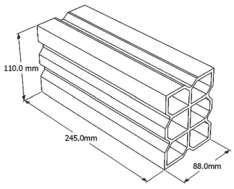
Brick no. 8
Hollow lightweight concrete block Hbl 4-0, 7-8DF according to EN 771-3
Length / width / height:
250 mm / 240 mm / 248 mm
fb ≥ 4,0 N/mm2 / ρ ≥ 0,7 kg/dm³



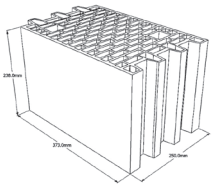
Brick no. 9
Concrete block Hbn 4-12DF according to EN 771-3
Length / width / height:
370 mm / 240 mm / 238 mm
fb b ≥ 4 N/mm2 / ρ ≥ 1,2 kg/dm³



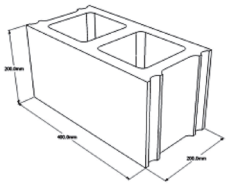
Brick no. 10
Hollow clay brick Hueco Doble according to EN 771-1
Length / width / height:
245 mm / 110 mm / 88 mm
fb ≥ 2,5 N/mm2 / ρ ≥ 0,74 kg/dm³



Brick no. 11
Hollow clay brick Porotherm 25 P+W KL15 according to EN 771-1
Length / width / height:
373 mm / 250 mm / 238 mm
fb b ≥ 12 N/mm2 / ρ ≥ 0,9 kg/dm³



Brick no. 12
Concrete hollow block, Bloque hormigon according to EN 771-3
Length / width / height:
400 mm / 200 mm / 200 mm
fb ≥ 2,5 N/mm2 / ρ ≥ 1,7 kg/dm³



Brick no. 13
Perforated clay brick PERFORADO 10 according EN 771-1
Length / width / height:
245 mm / 110 mm / 100 mm
fb b ≥ 15 N/mm2 / ρ ≥ 2,05 kg/dm³

Brick no. 14
Autoclaved aerated concrete AAC2 according to EN 771-4.
Length / width / height:
599 mm / 375 mm / 249 mm
fb ≥ 2,0 N/mm2 / ρ ≥ 0,35 kg/dm³

Brick no. 15
Autoclaved aerated concrete AAC4 according to EN 771-4.
Length / width / height:
599 mm / 375 mm / 249 mm
fb ≥ 4,0 N/mm2 / ρ ≥ 0,5 kg/dm³

Brick no. 16
Autoclaved aerated concrete AAC6 according to EN 771-4.
Length / width / height:
499 mm / 240 mm / 250 mm
fb ≥ 6,0 N/mm2 / ρ ≥ 0,65 kg/dm³

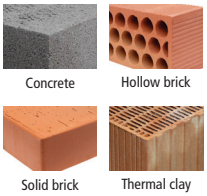
RANGE

STYRENE-FREE POLYESTER PLUS

MO-PS+

CE ETA 13/0752 STRUCTURAL FIXINGS IN UNCRACKED CONCRETE
CE ETA 17/0096 FIXINGS IN MASONRY
ÉMISSIONS DANS L'AIR INTÉRIEUR A+
LEED TESTED

CODE	DIMENSION	
MOPS300	300 ml	12
MOPS410	410 ml	12
MOPSP300	300 ml	12
MOPSPP410	410 ml	12



Accessories for chemical anchor cartridges

MO-PIS Application guns

CODE	MODEL
MOPISTO	Manual
MOPISPR	Professional 410 ml
MOPISSI	Silicone 300 ml
MOPISNEU	Pneumatic

MO-TN Plastic sleeve

CODE	DIMENSION
MOTN12050	12 x 50
MOTN15085	15 x 85
MOTN15130	15 x 130
MOTN20085	20 x 85

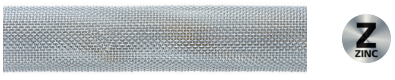
MO-AC Mixing tubes and miscellaneous

CODE	MODEL
MOBOMBA	Blower pump
MORCANU	Tube 170 - 300 - 410 ml
MORCEPKIT	Kit 3 brushes

MO-ES Threaded stud

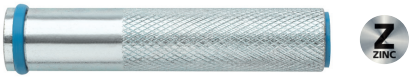
CODE	DIMENSION
MOES06070	M6 x 70
MOES08110	M8 x 110
MOES10115	M10 x 115
MOES12110	M12 x 110

MO-TM Metal sleeve



CODE	DIMENSION
MOTM12100	12 x 1000
MOTM16100	16 x 1000
MOTM22100	22 x 1000

MO-TR Threaded sleeve



CODE	DIMENSION
MOTRO08	M8/12 x 80
MOTRO10	M10/14 x 80
MOTRO12	M12/16 x 80

MO-PS+

Accessories for chemical anchor cartridges

Stud for chemical anchor with nut and washer

EQ-AC Zinc-plated 5.8

CODE	DIMENSION
EQAC08110	M8 x 110
EQAC10130	M10 x 130
EQAC10190	M10 x 190
EQAC12160	M12 x 160
EQAC12220	M12 x 220
EQAC16190	M16 x 190
EQAC16250	M16 x 250
EQAC20260	M20 x 260
EQAC20350	M20 x 350
EQAC24300	M24 x 300
EQAC24380	M24 x 380
EQAC30330	M30 x 330

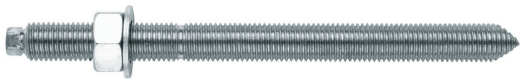
EQ-A2 Stainless steel A2

CODE	DIMENSION
EQA208110	M8 x 110
EQA210130	M10 x 130
EQA212160	M12 x 160
EQA216190	M16 x 190
EQA220260	M20 x 260
EQA224300	M24 x 300
EQA230330	M30 x 330

EQ-8.8 Zinc-plated 8.8

CODE	DIMENSION
EQ8808110	M8 x 11040
EQ8810130	M10 x 130
EQ8812160	M12 x 160
EQ8816190	M16 x 190
EQ8820260	M20 x 260
EQ8824300	M24 x 300

EQ-A4 Stainless steel A4



CODE	DIMENSION
EQA408110	M8 x 110
EQA410130	M10 x 130
EQA412160	M12 x 160
EQA416190	M16 x 190
EQA420260	M20 x 260
EQA424300	M24 x 300
EQA430330	M30 x 330