Polyester PLUS mortar anchor, for use in non-cracked concrete and masonry

MO-P+

Assessed ETA Option 7 (non-cracked concrete).

PRODUCT INFORMATION

DESCRIPTION
Chemical anchor, polyester PLUS.

OFFICIAL DOCUMENTATION
- ETA 13/0752 option 7, M8 to M24 for non-cracked concrete.
- Declaration features DoP MO-P+.
- Certificate EVCP 1020-CPR-090-041426 for use in concrete.

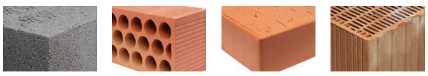
VALID FOR

Stud

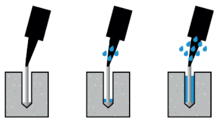
DIMENSIONS
Stud M8 - M24

RANGE OF CACULATION LOADS
From 10.6 to 61.6 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.

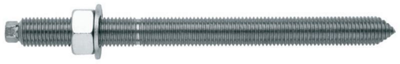
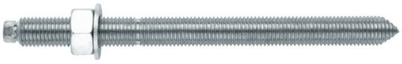
DRILL HOLE CONDITION

Dry | Wet | Flooded

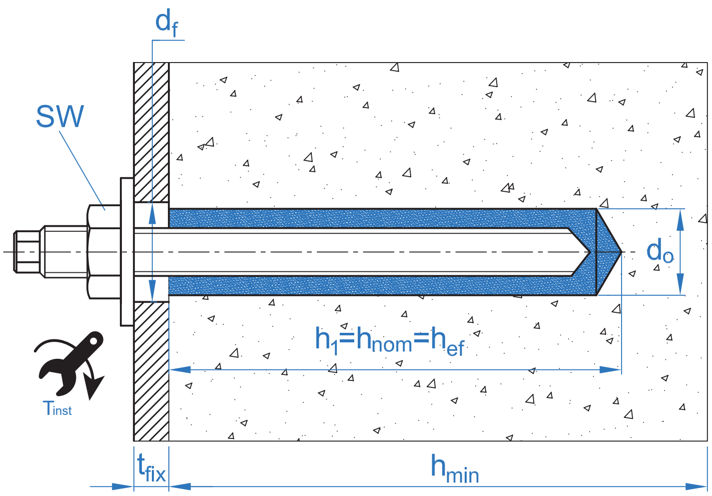
CHARACTERISTICS AND BENEFITS
- Easy installation.
- Use in non-cracked concrete, hollow and solid plasterboard.
- Used for medium-high loads.
- Temperature range -40°C to +80°C (maximum long-term temperature +50°C).
- Variety of lengths and diameters: M8-M24-assessed studs, flexible assembly.
- For static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

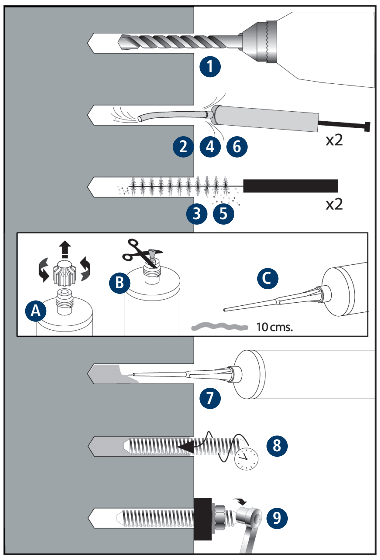
CONCRETE INSTALLATION PARAMETERS								
METRIC			M8	M10	M12	M16	M20	M24
d_0	nominal diameter	[mm]	10	12	14	18	22	26
d_f	diameter in anchor plate ≤	[mm]	9	12	14	18	22	26
T_{inst}	tightening torque ≤	[Nm]	10	20	40	80	150	200
Circular cleaning brush			Ø14		Ø20		Ø29	
$h_{ef,min}$ = 8d								
h_1	depth 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		
CODE	PRODUCT	MATERIAL
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

INSTALLATION PROCEDURE

CONCRETE



MINIMUM CURING TIME

TYPE	BASE MATERIAL TEMPERATURE [ºC]	HANDLING TIME [min]	CURING TIME [min]
MO-P+	min +5	18	120
	+5 to +10	12	120
	+10 to +20	6	80
	+20 to +25	4	40
	+25 to +30	3	30
	+30 to +35	2	20
	+35 to +40	1.5	15
	40	1.5	10

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]	19,1	25,4	35,2	51,5	80,1	110,8
Calculated tensile strength N_{Rd}								
	Metric		M8	M10	M12	M16	M20	M24
N_{Rd}	Non-cracked concrete	[kN]	10,6	14,1	19,6	28,6	44,5	61,6
Maximum recommended tensile load N_{rec}								
	Metric		M8	M10	M12	M16	M20	M24
N_{rec}	Non-cracked concrete	[kN]	7,6	10,1	14,0	20,4	31,8	44,0
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]	*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124,0*
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]	*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124,0*
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 13/0752

Simplified version of the calculation method according to Eurocode 2 EN 1992-4. Resistance is calculated according to the data shown in assessment ETA 13/0752.

- 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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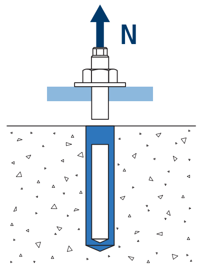
- Calculated steel resistance: $N_{Rd,s}$
- Calculated extraction resistance: $N_{Rd,p} = N^o_{Rd,p} \cdot \Psi_c \cdot \Psi_{hef,p}$
- Calculated concrete cone resistance: $N_{Rd,c} = N^o_{Rd,c} \cdot \Psi_b \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N} \cdot \Psi_{hef,N}$
- Calculated concrete 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

$N_{Rd,s}$

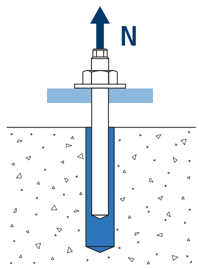
Metric			M8	M10	M12	M16	M20	M24
$N^o_{Rd,s}$	Steel class 5.8	[kN]	12	19.3	28	52.7	82	118
	Steel class 8.8	[kN]	19.3	30.7	44.7	84	130.7	188
	Steel class 10.9	[kN]	27.8	43.6	63.2	118	184.2	265.4
	Stainless steel Class A2-70, A4-70	[kN]	13.9	21.9	31.6	58.8	92	132.1



Calculated extraction resistance

$N_{Rd,p} = N^o_{Rd,p} \cdot \Psi_c \cdot \Psi_{hef,p}$

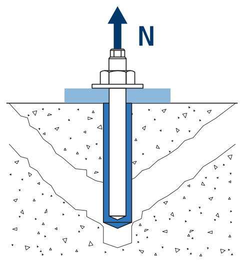
Metric			M8	M10	M12	M16	M20	M24
$N^o_{Rd,p}$	Non-cracked concrete	[kN]	10.6	14.1	19.6	28.6	44.5	61.6



Calculated concrete cone resistance

$N_{Rd,c} = N^o_{Rd,c} \cdot \Psi_b \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N} \cdot \Psi_{hef,N}$

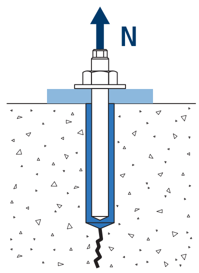
Metric			M8	M10	M12	M16	M20	M24
$N^o_{Rd,c}$	Non-cracked concrete	[kN]	19,6	23,3	31,5	39,6	60,6	83,2



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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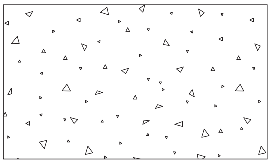
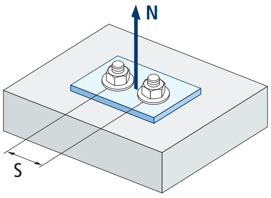
Influence coefficients



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

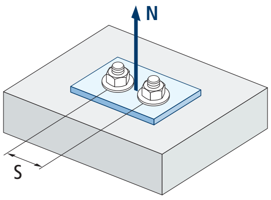
$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

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



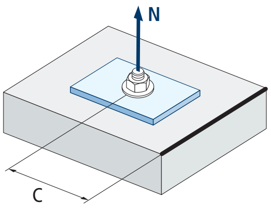
Influence of spacing between anchors (concrete cone) $\Psi_{s,N}$										
$s/s_{cr,N}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$\Psi_{s,N}$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00

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



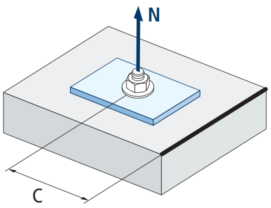
Influence of spacing between anchors (cracking) $\Psi_{s,N}$										
$s/s_{cr,sp}$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
$\Psi_{s,sp}$	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00

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



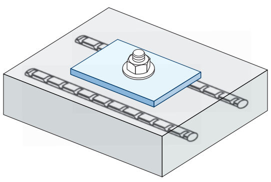
Influence of the distance from the edge of the concrete (concrete cone) $\Psi_{c,N}$												
$c/C_{cr,N}$	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.6
$\Psi_{c,N}$	0.40	0.46	0.51	0.45	0.49	0.55	0.61	0.67	0.75	0.83	0.91	1.00

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



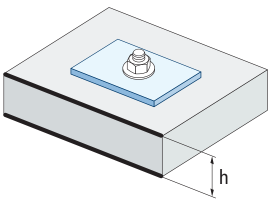
Influence of the distance from the edge of the concrete (cracking) $\Psi_{c,sp}$												
$c/C_{cr,sp}$	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.6
$\Psi_{c,sp}$	0.40	0.46	0.51	0.45	0.49	0.55	0.61	0.67	0.75	0.83	0.91	1.00

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



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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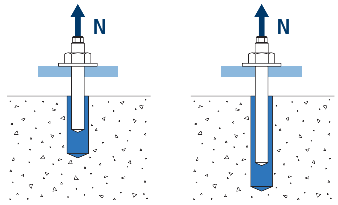
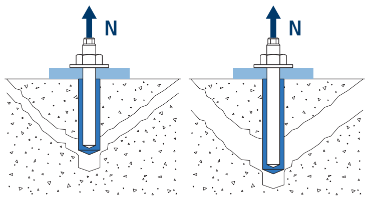
Influence of the effective depth for the extraction combination $\Psi_{hef,p}$						
Metric h_{ef}	M8	M10	M12	M16	M20	M24
64	0.80					
80	1.00	0.89				
90	1.13	1.00	0.82		**Value not permitted**	
96	1.20	1.07	0.87			
110		1.22	1.00			
120		1.33	1.09			
128			1.16	1.00		
144			1.31	1.13		
160				1.25	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					
80	1.00	0.84				
90	1.19	1.00			**Value not permitted**	
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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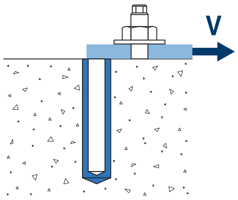
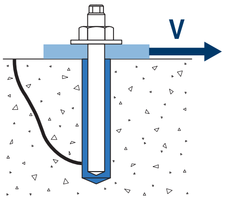
SHEARING LOADS

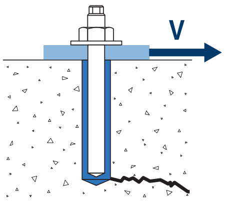
- Calculated steel resistance without lever arm: $V_{Rd,s}$
- Calculated spalling resistance: $V_{Rd,cp} = k \cdot N^o_{Rd,c}$
- Calculated concrete edge resistance: $V_{Rd,c} = V^o_{Rd,c} \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{\alpha,V} \cdot \Psi_{h,V}$



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

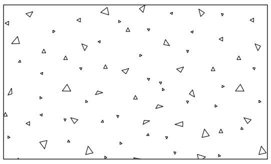


Calculated spalling resistance						
$V_{Rd,cp} = k \cdot N^o_{Rd,c}$						
Metric	M8	M10	M12	M16	M20	M24
k	2					



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

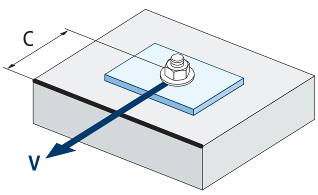
Influence of the distance from the edge and spacing between anchors $\Psi_{se,V}$

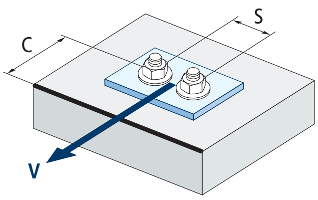
For one anchor

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





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

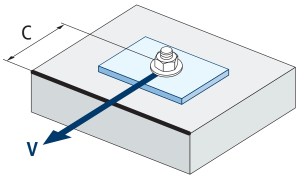
$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1.5} \cdot \left(1 + \frac{s}{3 \cdot c}\right) \cdot 0.5 \leq \left(\frac{c}{h_{ef}}\right)^{1.5}$$

MO-P+

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

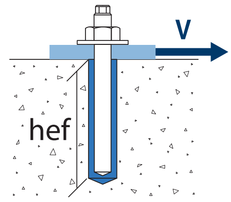
$$\Psi_{c,V} = \left(\frac{d}{c}\right)^{0.20}$$



Influence of the effective depth $\Psi_{hef,V}$

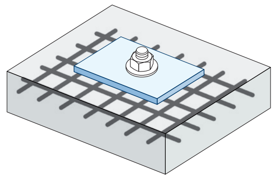
h_{ef}/d	8	9	10	11	12
$\Psi_{hef,V}$	1.65	2.04	2.47	2.93	3.42

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



Influence of the rebars $\Psi_{re,V}$

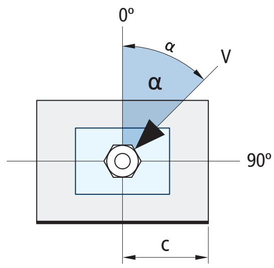
		Without perimeter rebar	Perimeter rebar ≥Ø12mm	Perimeter rebar with abutments at≤100mm
$\Psi_{re,V}$	Non-cracked concrete	1	1	1



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

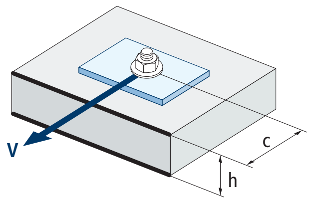
$$\Psi_{\alpha,V} = \sqrt{\frac{1}{(\cos\alpha_V)^2 + \left(\frac{\sin\alpha_V}{2.5}\right)^2}} \geq 1$$



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

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



MO-P+

FIXING IN BRICKS

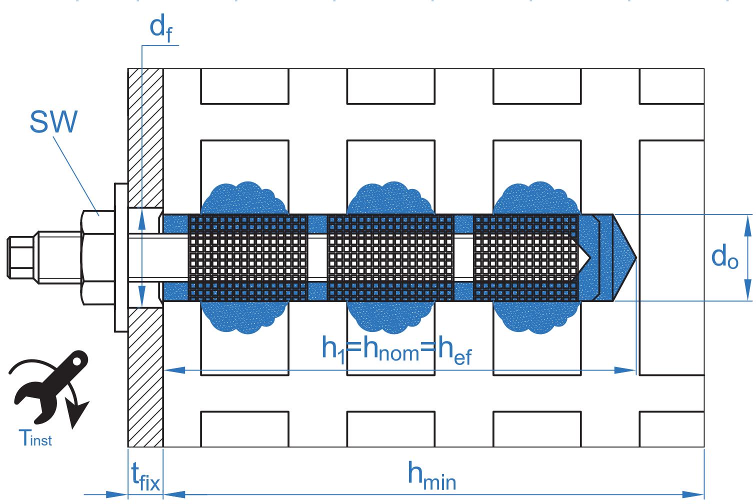
INSTALLATION PARAMETERS IN BRICKS. PLASTIC SLEEVE				
DIMENSION		M8	M10	M12
Plastic sleeve	ls	85		
	d_o	15	15	20
Mortar volume per sleeve	[ml]	15	15	27
h_1 drill hole depth ≥	[mm]	90	90	90
h_{nom} sleeve installation depth	[mm]	85	85	85
h_{ef} stud depth ≥	[mm]	80	80	80
t_{fix} thickness material to be fixed ≤	[mm]	22	25	18
h_{min} base material thickness ≥	[mm]	110	110	110
d_f diameter in metal sheet ≤	[mm]	9	12	14
T_{ins} tightening torque ≤	[Nm]	2	2	2
Circular brush		ø20		
Stud code		MOES08110	MOES10115	MOES12110
Sleeve code		MOTN15085	MOTN15085	MOTN20085

BASE MATERIAL		PLASTIC SLEEVE								
		M8			M10			M12		
Minimum distances and from the edge		$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$	$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$	$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$
Brick number 1	[mm]	100	235	115	100	235	115	120	235	115
Brick number 2	[mm]	100	240	113	100	240	113	120	240	113
Brick number 3	[mm]	100	237	237	100	237	237	120	250	237
Brick number 4	[mm]	128	255	255	128	255	255	128	255	255
Brick number 5	[mm]	128	255	255	128	255	255	128	255	255
Brick number 6	[mm]	100	250	240	100	250	240	120	250	240
Brick number 7	[mm]	100	250	248	100	250	248	-	-	-
Brick number 8	[mm]	100	250	248	100	250	248	120	250	248
Brick number 9	[mm]	100	370	238	100	370	238	120	370	238

MO-P+

INSTALLATION PARAMETERS IN BRICKS. METAL SLEEVE				
DIMENSION		M8	M10	M12
Plastic sleeve	ls		85	
	d_o	15	20	20
Mortar volume per sleeve	[ml]	15	15	20
h_1 drill hole depth ≥	[mm]	90	90	90
h_{nom} inst. depth plastic sleeve	[mm]	85	85	85
h_{ef} stud depth ≥	[mm]	80	80	80
t_{fix} thickness material to be fixed ≤	[mm]	22	25	18
h_{min} base material thickness ≥	[mm]	110	110	110
d_f diameter in metal sheet ≤	[mm]	9	12	14
T_{ins} tightening torque ≤	[Nm]	2	2	2
Circular brush			ø20	
Stud code 		MOES08110	MOES10115	MOES12110
Sleeve code		MOTN15085	MOTN15085	MOTN20085
Threaded sleeve code 		MOTRO08	MOTRO10	MOTRO12

BASE MATERIAL		PLASTIC SLEEVE								
		M8			M10			M12		
Minimum distances and from the edge		$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$	$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$	$c_{cr} = c_{min}$	$s_{cr\,II} = s_{min\,II}$	$s_{min\perp} = c_{min\perp}$
Brick number 1	[mm]	100	235	115	120	235	115	120	235	115
Brick number 2	[mm]	100	240	113	120	240	113	120	240	113
Brick number 3	[mm]	-	-	-	120	250	237	120	250	237
Brick number 4	[mm]	128	255	255	128	255	255	128	255	255
Brick number 5	[mm]	128	255	255	128	255	255	128	255	255
Brick number 6	[mm]	100	250	240	120	250	240	120	250	240
Brick number 7	[mm]	100	250	248	120	250	248	120	250	248
Brick number 8	[mm]	-	-	-	120	250	248	120	250	248
Brick number 9	[mm]	100	370	238	120	370	238	120	370	238



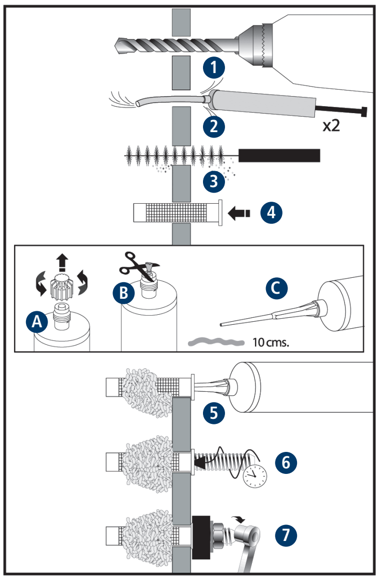
MO-P+

INSTALLATION ACCESSORIES

CODE	PRODUCT	MATERIAL
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

INSTALLATION PROCEDURE

BRICK



MINIMUM CURING TIME

TYPE	BASE MATERIAL TEMPERATURE [ºC]	HANDLING TIME [min]	CURING TIME [min]
MO-P+	min +5	12	180
	+5 to +10	8	100
	+10 to +20	4	70
	+20 to +25	3	40
	+25 to +30	2	40
	30	1	40

MO-P+

Characteristic resistances (F_{Rk})

Base material	Threaded studs Tensile and shear force [kN]			Threaded metal sleeve Tensile and shear force [kN]		
	M8	M10	M12	M8	M10	M12
Brick number 1	2.50	2.0	2.0	1.5	2.50	2.50
Brick number 2	0.75	1.2	0.5	0.6	0.75	0.90
Brick number 3	0.75	1.2	0.5	-	0.75	0.40
Brick number 4	1.50	1.5	3.0	2.0	3.00	4.00
Brick number 5	0.75	0.9	1.5	2.0	1.50	0.90
Brick number 6	1.20	1.2	0.9	0.9	1.50	0.60
Brick number 7	0.60	0.2	-	0.5	0.30	0.75
Brick number 8	0.60	1.5	1.2	-	0.40	0.60
Brick number 9	2.50	1.5	2.5	0.6	1.20	0.90

Calculated resistances (F_{Rd})

Base material	Threaded studs Tensile and shear force [kN]			Threaded metal sleeve Tensile and shear force [kN]		
	M8	M10	M12	M8	M10	M12
Brick number 1	1.00	0.80	0.80	0.60	1.00	1.00
Brick number 2	0.30	0.48	0.20	0.24	0.30	0.36
Brick number 3	0.30	0.48	0.20	-	0.30	0.16
Brick number 4	0.60	0.60	1.20	0.80	1.20	1.60
Brick number 5	0.30	0.36	0.60	0.80	0.60	0.36
Brick number 6	0.48	0.48	0.36	0.36	0.60	0.24
Brick number 7	0.24	0.08	-	0.20	0.12	0.30
Brick number 8	0.24	0.60	0.48	-	0.16	0.24
Brick number 9	1.00	0.60	1.00	0.24	0.48	0.36

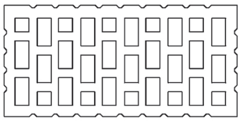
Recommended maximum loads (F_{recom}) (with andF= 1.4)

Base material	Threaded studs Tensile and shear force [kN]			Threaded metal sleeve Tensile and shear force [kN]		
	M8	M10	M12	M8	M10	M12
Brick number 1	0.71	0.57	0.57	0.43	0.71	0.71
Brick number 2	0.21	0.34	0.14	0.17	0.21	0.26
Brick number 3	0.21	0.34	0.14	-	0.21	0.11
Brick number 4	0.43	0.43	0.86	0.57	0.86	1.14
Brick number 5	0.21	0.26	0.43	0.57	0.43	0.26
Brick number 6	0.34	0.34	0.26	0.26	0.43	0.17
Brick number 7	0.17	0.06	-	0.14	0.09	0.21
Brick number 8	0.17	0.43	0.34	-	0.11	0.17
Brick number 9	0.71	0.43	0.71	0.17	0.34	0.26

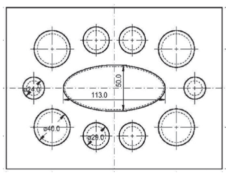
MO-P+

BRICK TYPES

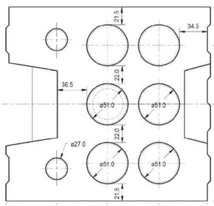
Brick no. 1
Hollow clay brick HLz
12-1,0-2DF according to EN 771-1
Length / width / height:
235 mm / 112 mm / 115 mm
fb ≥ 12 N/mm² / ρ ≥ 1.0 kg/dm³



Brick no. 2
Calcareous silico hollow 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



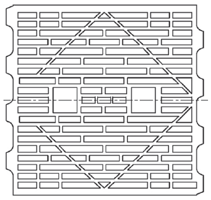
Brick no. 3
Silico-calcareous hollow brick KSL 12-1,
4-2DF in accordance with EN 771-2
Length / width / height:
250 mm / 240 mm / 237 mm
fb ≥ 12 N/mm² / ρ ≥ 1.4 kg/dm³



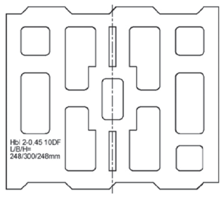
Brick no. 4
Fired clay solid brick Mz 12-2, 0-NF
according to EN 771-1
Length / width / height:
240 mm / 116 mm / 71 mm
fb ≥ 12 N/mm² / ρ ≥ 2.0 kg/dm³

Brick no. 5
Silico-calcareous solid 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/dm³

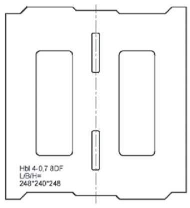
Brick no. 6
Fired clay hollow brick HLzW 6-0,7-8DF
according to EN 771-1
Length / width / height:
250 mm / 240 mm / 240 mm
fb ≥ 6 N/mm² / ρ ≥ 0.8 kg/dm³



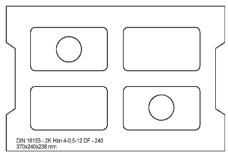
Brick no. 7
Lightweight concrete hollow block Hbl
2-0,45-10DF according to EN 771-3
Length / width / height:
250 mm / 300 mm / 248 mm
fb ≥ 2.0 N/mm² / ρ ≥ 0.45 kg/dm³



Brick no. 8
Lightweight concrete hollow 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



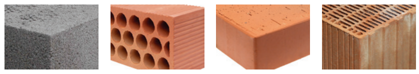
RANGE

MO-P+

POLYESTER PLUS

STRUCTURAL FIXINGS IN UNCRACKED CONCRETE ETA 13/0752 · ÉMISSIONS DANS L'AIR INTÉRIEUR A+ · LEED TESTED

CODE	DIMENSION	
NORMAL		
MOP300	300 ml	12
MOP410	410 ml	12



Concrete · Hollow brick · Solid brick · Thermal clay

Accessories for chemical anchor cartridges

MO-P+IS Application guns

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

MO-TN Plastic sleeve

Ny NYLON

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

MO-AC Mixing tubes and miscellaneous

MORCEPKIT
Kit 3 brushes (ø15, ø20, ø30)

MORCANU
MOBOMBA

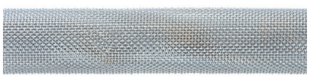
CODE	MODEL
MOBOMBA	Blower pump
MORCANU	Tube 170 - 300 - 410 ml
MORCEPKIT	Kit 3 brushes

MO-ES Threaded stud

Z ZINC

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

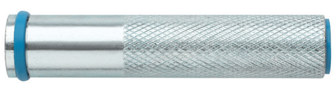
MO-TM Metal sleeve



Z ZINC

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

MO-TR Threaded sleeve



Z ZINC

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

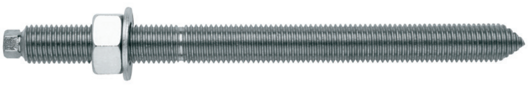
MO-P+

Accessories for chemical anchor cartridges

Stud for chemical anchor with nut and washer

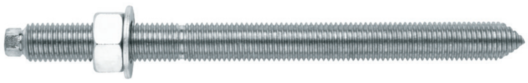
Hollow brick | Solid brick | Stone | Cellular concrete | Hollow concrete | Concrete | Reinforced concrete

EQ-AC Zinc-plated 5.8



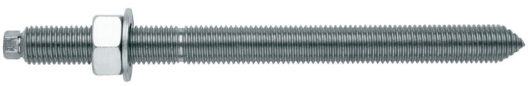
CODE	DIMENSION
EQAC08110	M8 x 110
EQAC10130	M10 x 130
EQAC10190	M10 x 190
EQAC12160	M12 x 160
EQAC12220	M12 x 220
EQAC16190	M16 x 190
EQAC16250	M16 x 250
EQAC20260	M20 x 260
EQAC20350	M20 x 350
EQAC24300	M24 x 300
EQAC24380	M24 x 380
EQAC30330	M30 x 330

EQ-A2 Stainless steel A2



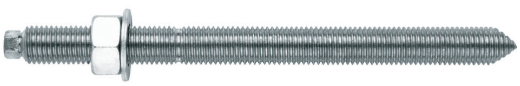
CODE	DIMENSION
EQA208110	M8 x 110
EQA210130	M10 x 130
EQA212160	M12 x 160
EQA216190	M16 x 190
EQA220260	M20 x 260
EQA224300	M24 x 300
EQA230330	M30 x 330

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