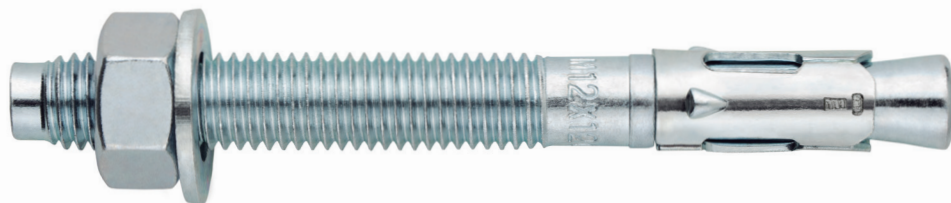




## Through-bolt expansion anchor with controlled torque, for use in non cracked concrete

**MTA**

Zinc-plated shaft. Zinc-plated clip.



### PRODUCT INFORMATION

#### DESCRIPTION

Metallic anchor, with male thread, expansion by controlled torque.

#### OFFICIAL DOCUMENTATION

• Not available.

#### SIZES

M6x45 to M24x260.

#### DESIGN LOAD RANGE

From 5,1 to 36,3 kN.



#### BASE MATERIAL

Concrete class from C20/25 to C50/60 non-cracked.



Stone



Concrete

#### ASSESSMENTS

• Not available.

#### CHARACTERISTICS AND BENEFITS

- Easy installation.
- Use in non-cracked concrete.
- Use for medium-heavy duty loads.
- Pre-installation or through the drill-hole of the fixture.
- Variety of lengths and diameters: flexibility in assembly.
- For static and quasi-static loads.
- Available at INDEXcal.



#### MATERIALS

**Shaft:** Cold-formed steel, zinc-plated  $\geq 5 \mu\text{m}$ .

**Washer:** DIN 125 or DIN 9021, zinc-plated  $\geq 5 \mu\text{m}$ .

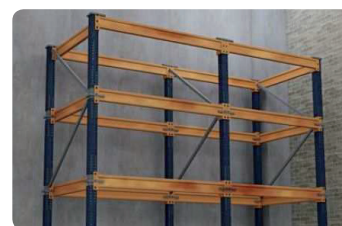
**Nut:** DIN 934, zinc-plated  $\geq 5 \mu\text{m}$ .

**Clip:** Cold-formed steel, zinc-plated  $\geq 40 \mu\text{m}$ .



#### APPLICATIONS

- Shelving.
- Pipe supports.
- Urban fitments.
- Fences.
- Common fixings.
- Railings.
- Balconies.



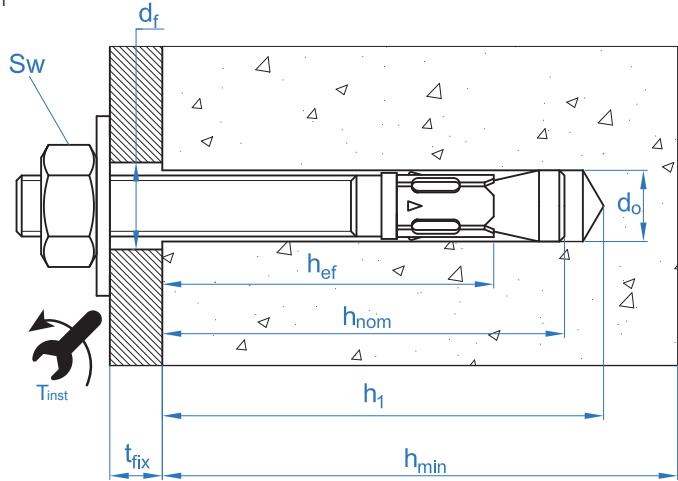
**MECHANICAL PROPERTIES**

			M6	M8	M10	M12	M14	M16	M20	M24
<b>Cone area section</b>										
$A_s$	(mm <sup>2</sup> )	Cone area section	14,5	25,5	46,5	68,0	100,2	122,6	216,3	299,57
$f_{u,s}$	(N/mm <sup>2</sup> )	Characteristic tension resistance	510	510	510	490	490	490	460	460
$f_{y,s}$	(N/mm <sup>2</sup> )	Yield strength	440	440	440	410	410	410	375	375
<b>Threaded area section</b>										
$A_s$	(mm <sup>2</sup> )	Cone area section	20,1	36,6	58,0	84,3	115,0	157,0	245,0	353
$f_{u,s}$	(N/mm <sup>2</sup> )	Characteristic tension resistance	510	510	510	490	490	490	490	490
$f_{y,s}$	(N/mm <sup>2</sup> )	Yield Strength	440	440	440	410	410	410	410	410

**INSTALLATION DATA**

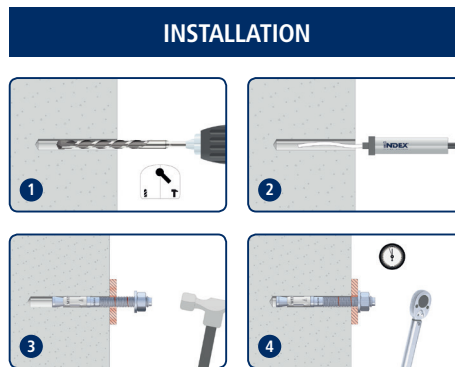
SIZE			M6	M8	M10	M12	M14	M16	M20	M24
Code			AM06XXX	AM08XXX	AM10XXX	AM12XXX	AM14XXX	AM16XXX	AM20XXX	AM24XXX
$d_0$	Nominal diameter of drill bit	[mm]	6	8	10	12	14	16	20	24
$T_{ins}$	Installation torque moment	[Nm]	7	20	35	60	90	120	240	250
$d_{f\leq}$	Diameter of clearance hole in the fixture	[mm]	7	9	12	14	16	18	22	26
$h_1$	Minimum drill hole depth	[mm]	55	65	75	85	100	110	135	155
$h_{nom}$	Installation depth	[mm]	49,5	59,5	66,5	77	91	103,5	125	143
$h_{ef}$	Effective embedment depth	[mm]	40	48	55	65	75	84	103	125
$h_{min}$	Minimum base material thickness	[mm]	100	100	110	130	150	168	206	250
$t_{fix}$	Maximum thickness of fixture	[mm]	L - 58	L - 70	L - 80	L - 92	L - 108	L - 122	L - 147	L-170
$s_{cr,N}$	Critical spacing	[mm]	120	144	165	195	225	252	309	375
$c_{cr,N}$	Critical edge distance	[mm]	60	72	83	98	113	126	155	187,5
$s_{cr,sp}$	Critical distance (splitting)	[mm]	160	192	220	260	300	280	360	560
$c_{cr,sp}$	Critical edge distance (splitting)	[mm]	80	96	110	130	150	140	180	280
$s_{min}$	Minimum spacing	[mm]	35	40	50	70	80	90	135	125
$c_{min}$	Minimum edge distance	[mm]	35	40	50	70	80	90	135	125
SW	Installation wrench		10	13	17	19	22	24	30	36

\*L = Total anchor length





Code	INSTALLATION PRODUCTS
	Hammer drill
BHDSXXXXX	Concrete Drill bits
MOBOMBA	Blow pump
MORCEPKIT	Cleaning Brush
DOMTAXX	Installation hammering tool
	Torque wrench
	Hexagonal socket



## Resistances in C20/25 concrete for an isolated anchor, without effects of edge distance or spacing

Characteristic Resistance $N_{Rk}$ and $V_{Rk}$																	
TENSION									SHEAR								
Size	M6	M8	M10	M12	M14	M16	M20	M24	Size	M6	M8	M10	M12	M14	M16	M20	M24
$N_{Rk}$ [kN]	7,4	13,0	19,0	26,4	32,8	38,8	52,7	50,0	$V_{Rk}$ [kN]	5,1	9,3	14,7	20,6	28,1	38,4	56,3	84,7

Design Resistance $N_{Rd}$ and $V_{Rd}$																	
TENSION									SHEAR								
Size	M6	M8	M10	M12	M14	M16	M20	M24	Size	M6	M8	M10	M12	M14	M16	M20	M24
$N_{Rd}$ [kN]	5,2	9,3	12,6	17,6	21,8	25,9	35,1	27,7	$V_{Rd}$ [kN]	4,0	7,4	11,7	16,4	22,4	30,7	45,0	67,7

Maximum Loads Recommended $N_{rec}$ and $V_{rec}$																	
TENSION									SHEAR								
Size	M6	M8	M10	M12	M14	M16	M20	M24	Size	M6	M8	M10	M12	M14	M16	M20	M24
$N_{rec}$ [kN]	3,7	6,6	9,0	12,6	15,6	18,5	25,1	19,8	$V_{rec}$ [kN]	2,9	5,3	8,4	11,7	16,0	21,9	32,1	48,4

## Simplified calculation method

Simplified version of the calculation method according to ETAG 001, annex C. Resistance has been calculated with data obtained from tests performed by INDEX.

- Influence of concrete strength.
- Influence of edge distance.
- Influence of spacing between anchors.
- Influence of reinforcements.
- Influence of base material thickness.
- Influence of load application angle.
- Valid for a group of two anchors.

The calculation method is based on the following simplification: **Different loads do not act on individual anchors, without eccentricity.**



### INDEXcal

For a more accurate calculation and to take more constructive provisions into account, we recommend using our calculation program INDEXcal. It may be easily downloaded from our website [www.indexfix.com](http://www.indexfix.com)

# MTA

## TENSION LOADS

- Steel design resistance:  $N_{Rd,s}$
- Pull-out design resistance:  $N_{Rd,p} = N_{Rd,p}^o \cdot \Psi_c$
- Concrete cone design resistance:  $N_{Rd,c} = N_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N}$
- Concrete splitting design resistance:  $N_{Rd,sp} = N_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp}$

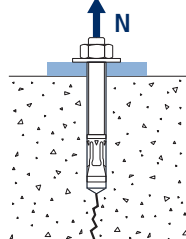
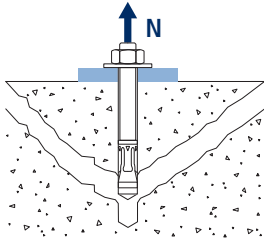
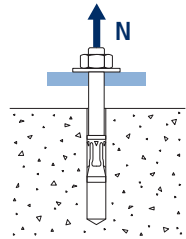
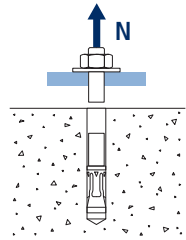
Steel Design resistance									
$N_{Rd,s}$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
$N_{Rd}^o$	[kN]	5,3	9,5	16,9	23,8	35,1	42,9	71,1	119,5

Pull-out design resistance									
$N_{Rd,p} = N_{Rd,p}^o \cdot \Psi_c$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
$N_{Rd,p}^o$	Non-cracked concrete [kN]	-*	-*	12,6	-*	-*	-*	-*	27,7

\* Pull-out failure is not decisive.

Concrete cone design resistance									
$N_{Rd,c} = N_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{s,N} \cdot \Psi_{c,N} \cdot \Psi_{re,N}$									
Concrete splitting design resistance*									
$N_{Rd,sp} = N_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{s,sp} \cdot \Psi_{c,sp} \cdot \Psi_{re,N} \cdot \Psi_{h,sp}$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
$N_{Rd,c}^o$	Non-cracked concrete [kN]	8,5	11,2	13,7	17,6	21,8	25,9	35,1	39,2

\*Concrete splitting design resistance must only be considered for non-cracked concrete.



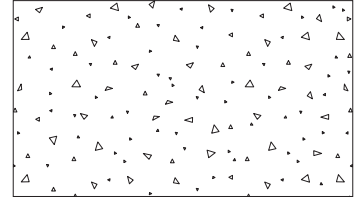


## MTA

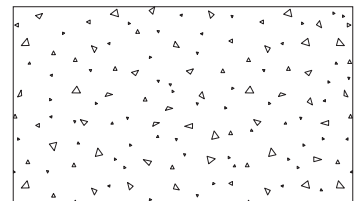
## Coefficients of influence

Influence of concrete strength resistance in pul-out failure  $\psi_c$ 

		M6	M8	M10	M12	M14	M16	M20	M24	
$\psi_c$	C 20/25					1,00				
	C 30/37					1,22				
	C 40/50					1,41				
	C 50/60					1,55				

Influence of concrete strength in concrete cone and splitting failure  $\psi_b$ 

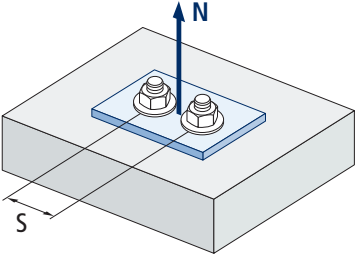
		M6	M8	M10	M12	M14	M16	M20	M24	
$\psi_b$	C 20/25					1,00				
	C 30/37					1,22				
	C 40/50					1,41				
	C 50/60					1,55				



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



**MTA**



$$\psi_{s,N} = 0,5 + \frac{s}{2 \cdot s_{cr,N}} \leq 1$$

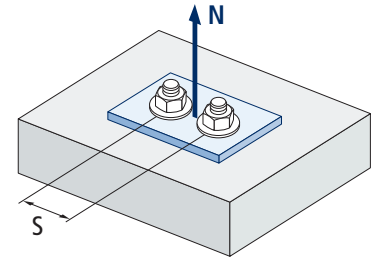
Influence of spacing (concrete cone) $\psi_{s,N}$								
s [mm]	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
35	0,65							
40	0,67	0,64						
50	0,71	0,67	0,65					
55	0,73	0,69	0,67					
60	0,75	0,71	0,68					
65	0,77	0,73	0,70					
70	0,79	0,74	0,71	0,68				
80	0,83	0,78	0,74	0,71				
85	0,85	0,80	0,76	0,72	0,69			
90	0,88	0,81	0,77	0,73	0,70			
100	0,92	0,85	0,80	0,76	0,72	0,70		
105	0,94	0,86	0,82	0,77	0,73	0,71		
110	0,96	0,88	0,83	0,78	0,74	0,72		
120	1,00	0,92	0,86	0,81	0,77	0,74		
125		0,93	0,88	0,82	0,78	0,75		0,67
126		0,94	0,88	0,82	0,78	0,75		0,67
128		0,94	0,89	0,83	0,78	0,75		0,67
130		0,95	0,89	0,83	0,79	0,76		0,67
135		0,97	0,91	0,85	0,80	0,77	0,72	0,68
144		1,00	0,94	0,87	0,82	0,79	0,73	0,69
150			0,95	0,88	0,83	0,80	0,74	0,70
165			1,00	0,92	0,87	0,83	0,77	0,72
170				0,94	0,88	0,84	0,78	0,73
180				0,96	0,90	0,86	0,79	0,74
195				1,00	0,93	0,89	0,82	0,76
200					0,94	0,90	0,82	0,77
210					0,97	0,92	0,84	0,78
220					0,99	0,94	0,86	0,79
225					1,00	0,95	0,86	0,80
252						1,00	0,91	0,84
255							0,91	0,84
260							0,92	0,85
300							0,99	0,90
309							1,00	0,91
310								0,91
375								1,00

Value without reduction = 1



Influence of spacing (concrete splitting) $\psi_{s,sp}$								
s [mm]	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
35	0,61							
40	0,63	0,60						
50	0,66	0,63	0,61					
55	0,67	0,64	0,63					
60	0,69	0,66	0,64					
65	0,70	0,67	0,65					
70	0,72	0,68	0,66	0,63				
80	0,75	0,71	0,68	0,65	0,63			
85	0,77	0,72	0,69	0,66	0,64			
90	0,78	0,73	0,70	0,67	0,65	0,66		
100	0,81	0,76	0,73	0,69	0,67	0,68		
110	0,84	0,79	0,75	0,71	0,68	0,70		
125	0,89	0,83	0,78	0,74	0,71	0,72		0,61
128	0,90	0,83	0,79	0,75	0,71	0,73		0,61
135	0,92	0,85	0,81	0,76	0,73	0,74	0,69	0,62
140	0,94	0,86	0,82	0,77	0,73	0,75	0,69	0,63
150	0,97	0,89	0,84	0,79	0,75	0,77	0,71	0,63
160	1,00	0,92	0,86	0,81	0,77	0,79	0,72	0,64
165		0,93	0,88	0,82	0,78	0,79	0,73	0,65
168		0,94	0,88	0,82	0,78	0,80	0,73	0,65
180		0,97	0,91	0,85	0,80	0,82	0,75	0,66
192		1,00	0,94	0,87	0,82	0,84	0,77	0,67
200			0,95	0,88	0,83	0,86	0,78	0,68
210			0,98	0,90	0,85	0,88	0,79	0,69
220			1,00	0,92	0,87	0,89	0,81	0,70
260				1,00	0,93	0,96	0,86	0,73
280					0,97	1,00	0,89	0,75
288					0,98		0,90	0,76
300					1,00		0,92	0,77
336							0,97	0,80
350							0,99	0,81
360							1,00	0,82
412								0,87
425								0,88
500								0,95
510								0,96
560								1,00

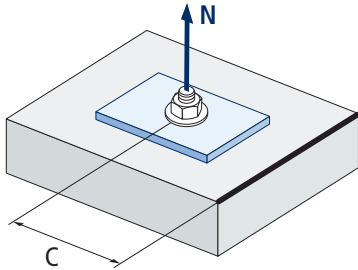
## MTA



$$\psi_{s,sp} = 0,5 + \frac{s}{2 \cdot s_{cr,sp}} \leq 1$$



**MTA**



$$\psi_{c,sp} = 0,35 + \frac{0,5 \cdot c}{c_{cr,sp}} + \frac{0,15 \cdot c^2}{c_{cr,sp}^2} \leq 1$$

Influence of concrete edge distance (splitting) $\psi_{c,sp}$								
c [mm]	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
35	0,60							
40	0,64	0,58						
50	0,72	0,65	0,61					
60	0,81	0,72	0,67					
65	0,86	0,76	0,70					
70	0,90	0,79	0,73	0,66				
75	0,95	0,83	0,76	0,69				
80	1,00	0,87	0,79	0,71	0,66			
83		0,89	0,81	0,73	0,67			
84		0,90	0,82	0,74	0,68			
85		0,91	0,83	0,74	0,68			
90		0,95	0,86	0,77	0,70	0,73		
96		1,00	0,90	0,80	0,73	0,76		
100			0,93	0,82	0,75	0,78		
105			0,96	0,85	0,77	0,81		
110			1,00	0,88	0,80	0,84		
125				0,97	0,87	0,92		0,60
128				0,99	0,89	0,93		0,61
130				1,00	0,90	0,94		0,61
135					0,92	0,97	0,81	0,63
140					0,95	1,00	0,83	0,64
144					0,97		0,85	0,65
150					1,00		0,87	0,66
168							0,95	0,70
175							0,98	0,72
180							1,00	0,73
206								0,80
213								0,82
250								0,92
255								0,93
280								1,00

Value without reduction = 1



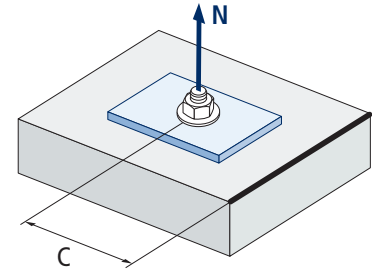


Influence of concrete edge distance (concrete cone) $\psi_{c,N}$								
c [mm]	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
35	0,69							
40	0,75	0,67						
50	0,87	0,77	0,71					
53	0,91	0,80	0,73					
60	1,00	0,87	0,79					
63		0,90	0,82					
65		0,92	0,83					
70		0,98	0,88	0,78				
72		1,00	0,90	0,80				
75			0,92	0,82				
80			0,97	0,86	0,78			
83			1,00	0,88	0,80			
85				0,90	0,81			
90				0,94	0,84	0,78		
98				1,00	0,90	0,83		
100					0,91	0,84		
105					0,94	0,87		
110					0,98	0,90		
113					1,00	0,92		
125						0,99		0,75
126						1,00		0,75
128								0,76
135							0,90	0,79
150							0,97	0,84
155							1,00	0,86
188								1,00

Invalid value

Value without reduction = 1

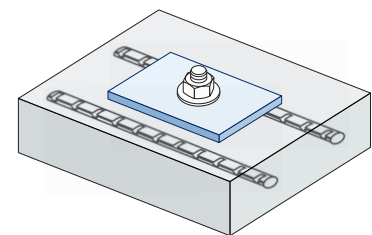
MTA



$$\psi_{c,N} = 0,35 + \frac{0,5 \cdot c}{C_{cr,N}} + \frac{0,15 \cdot c^2}{C_{cr,N}^2} \leq 1$$

Influence of reinforcements $\psi_{re,N}$								
$\psi_{re,N}$	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
	0,70	0,74	0,77	0,82	0,87	0,92	1,00	1,00

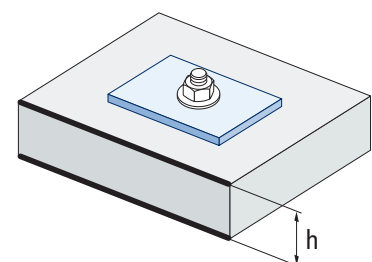
\*This factor only applies for a high density of reinforcements. If in the area of the anchor there are reinforcements with a distancing of  $\geq 150$  mm (any diameter) or with a diameter  $\leq 10$  mm and a distancing of  $\geq 100$  mm, a  $f_{re,N} = 1$  factor may be applied.



$$\psi_{re,N} = 0,5 + \frac{h_{ef}}{200} \leq 1$$

Influence of base material thickness $\psi_{h,sp}$											
$\psi_{h,sp}$	MTA										
	h/h <sub>ef</sub>	2,00	2,20	2,40	2,60	2,80	3,00	3,20	3,40	3,60	$\geq 3,68$
	$\psi_{h,sp}$	1,00	1,07	1,13	1,19	1,25	1,31	1,37	1,42	1,48	1,50

$$\psi_{h,sp} = \left( \frac{h}{2 \cdot h_{ef}} \right)^{2/3} \leq 1,5$$

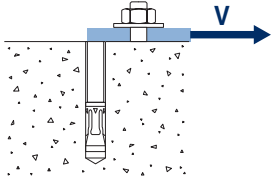


# MTA

## SHEAR LOADS

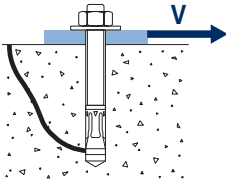
- Steel design resistance without lever arm:  $V_{Rd,s}$
- Pry-out design resistance:  $V_{Rd,cp} = k \cdot N_{Rd,c}^o$
- Concrete edge design resistance:  $V_{Rd,c} = V_{Rd,c}^o \cdot \psi_b \cdot \psi_{se,V} \cdot \psi_{c,V} \cdot \psi_{re,V} \cdot \psi_{\alpha,V} \cdot \psi_{h,V}$

Steel design resistance									
$V_{Rd,s}$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
$V_{Rd,s}$	[kN]	4,1	7,4	11,8	16,5	22,5	30,7	45,0	65,0

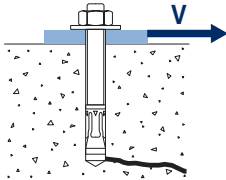


Pry-out design resistance*									
$V_{Rd,cp} = k \cdot N_{Rd,c}^o$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
k		1	1	1	2	2	2	2	2

\*  $N_{Rd,c}^o$  Concrete cone design resistance for tension loads



Concrete edge resistance									
$V_{Rd,c} = V_{Rd,c}^o \cdot \psi_b \cdot \psi_{se,V} \cdot \psi_{c,V} \cdot \psi_{re,V} \cdot \psi_{\alpha,V} \cdot \psi_{h,V}$									
Size		M6	M8	M10	M12	M14	M16	M20	M24
$V_{Rd,c}^o$	Non-cracked concrete [kN]	4,6	6,2	7,7	10,2	12,9	15,6	21,8	29,2



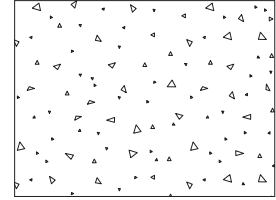


MTA

## Coefficients of influence

Influence of concrete strength in concrete edge failure  $\Psi_b$ 

		M6	M8	M10	M12	M14	M16	M20	M24
$\Psi_b$	C 20/25	1,00							
	C 30/37	1,22							
	C 40/50	1,41							
	C 50/60	1,55							



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

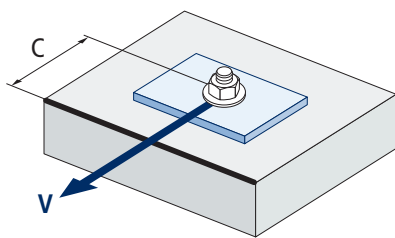
Influence of edge distance and spacing  $\Psi_{se,V}$ 

FOR ONE ANCHOR ONLY

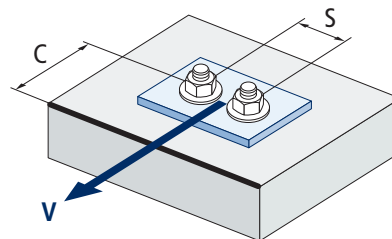
$c/h_{ef}$	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,25	2,50	2,75	3,00	3,25	3,50	3,75	4,00	4,50	5,00
Isolated	0,35	0,65	1,00	1,40	1,84	2,32	2,83	3,38	3,95	4,56	5,20	5,86	6,55	7,26	8,00	9,55	11,18

FOR TWO ANCHORS

$c/h_{ef}$	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	
$s/c$	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
	$\geq 3,0$	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



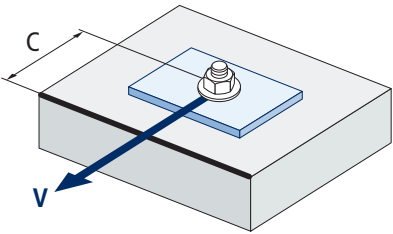
$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5}$$



$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5} \cdot \left(1 + \frac{s}{3 \cdot c}\right) \cdot 0,5 \leq \left(\frac{c}{h_{ef}}\right)^{1,5}$$



**MTA**

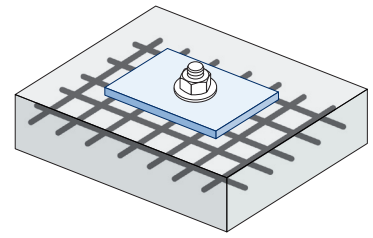


$$\psi_{c,v} = \left( \frac{d}{c} \right)^{0,20}$$

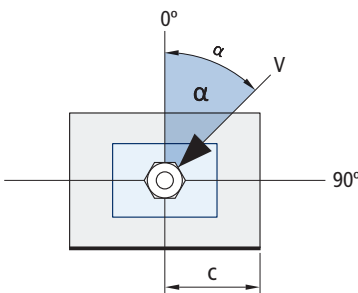
Influence of concrete edge distance $\psi_{c,v}$								
c [mm]	MTA							
	M6	M8	M10	M12	M14	M16	M20	M24
35	0,70							
40	0,68	0,72						
45	0,67	0,71						
50	0,65	0,69	0,72					
55	0,64	0,68	0,71					
60	0,63	0,67	0,70					
70	0,61	0,65	0,68	0,70				
80	0,60	0,63	0,66	0,68	0,71			
85	0,59	0,62	0,65	0,68	0,70			
90	0,58	0,62	0,64	0,67	0,69	0,71		
100	0,57	0,60	0,63	0,65	0,67	0,69		
105	0,56	0,60	0,62	0,65	0,67	0,69		
110	0,56	0,59	0,62	0,64	0,66	0,68		
120	0,55	0,58	0,61	0,63	0,65	0,67		
125	0,54	0,58	0,60	0,63	0,65	0,66		0,72
128	0,54	0,57	0,60	0,62	0,64	0,66		0,72
130	0,54	0,57	0,60	0,62	0,64	0,66		0,71
135	0,54	0,57	0,59	0,62	0,64	0,65	0,68	0,71
140	0,53	0,56	0,59	0,61	0,63	0,65	0,68	0,70
150	0,53	0,56	0,58	0,60	0,62	0,64	0,67	0,69
160	0,52	0,55	0,57	0,60	0,61	0,63	0,66	0,68
170	0,51	0,54	0,57	0,59	0,61	0,62	0,65	0,68
175	0,51	0,54	0,56	0,59	0,60	0,62	0,65	0,67
180	0,51	0,54	0,56	0,58	0,60	0,62	0,64	0,67
190	0,50	0,53	0,55	0,58	0,59	0,61	0,64	0,66
200	0,50	0,53	0,55	0,57	0,59	0,60	0,63	0,65
210	0,49	0,52	0,54	0,56	0,58	0,60	0,62	0,65
220	0,49	0,52	0,54	0,56	0,58	0,59	0,62	0,64
230	0,48	0,51	0,53	0,55	0,57	0,59	0,61	0,64
240	0,48	0,51	0,53	0,55	0,57	0,58	0,61	0,63
250	0,47	0,50	0,53	0,54	0,56	0,58	0,60	0,63
260	0,47	0,50	0,52	0,54	0,56	0,57	0,60	0,62
270	0,47	0,49	0,52	0,54	0,55	0,57	0,59	0,62
280	0,46	0,49	0,51	0,53	0,55	0,56	0,59	0,61
290	0,46	0,49	0,51	0,53	0,55	0,56	0,59	0,61
300	0,46	0,48	0,51	0,53	0,54	0,56	0,58	0,60



Influence of reinforcements $\Psi_{re,v}$			
	Without perimetral reinforcements	Perimetral reinforcements $\geq \text{Ø}12 \text{ mm}$	Perimetral reinforcements with brackets $\leq 100 \text{ mm}$
Non-cracked concrete	1	1	1

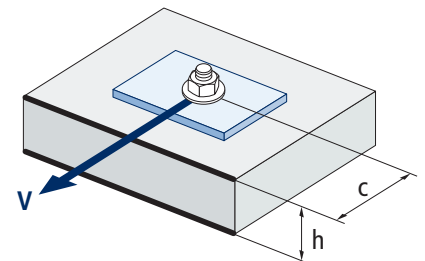


Influence of load application angle $\Psi_{\alpha,v}$										
Angle, $\alpha(^{\circ})$	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$\Psi_{\alpha,v}$	1,00	1,01	1,05	1,13	1,24	1,40	1,64	1,97	2,32	2,50



$$\Psi_{\alpha,v} = \sqrt{\frac{1}{(\cos \alpha_v)^2 + \left(\frac{\sin \alpha_v}{2,5}\right)^2}} \geq 1$$

Influence of base material thickness $\Psi_{h,v}$										
MTA										
h/c	0,15	0,30	0,45	0,60	0,75	0,90	1,05	1,20	1,35	$\geq 1,5$
$\Psi_{h,v}$	0,32	0,45	0,55	0,63	0,71	0,77	0,84	0,89	0,95	1,00



$$\Psi_{h,v} = \left(\frac{h}{1,5 \cdot c}\right)^{0,5} \geq 1,0$$



# MTA

## RANGE

Code	Size	Maximum thickness of fixture			Code	Size	Maximum thickness of fixture		
AM06045	M6 x 45 Ø6	1	200	1.200	AM08115	M8 x 115 Ø8	45	100	400
AM06055	M6 x 55 Ø6	11	200	1.200	AM08120	M8 x 120 Ø8	50	100	400
AM06060	M6 x 60 Ø6	2	200	1.200	AM08130	M8 x 130 Ø8	60	100	400
AM06065	M6 x 65 Ø6	7	200	1.200	AM08155	M8 x 155 Ø8	85	100	200
AM06070	M6 x 70 Ø6	12	200	1.200	AM10065	M10 x 65 Ø10	1	100	400
AM06080	M6 x 80 Ø6	22	200	1.200	AM10070	M10 x 70 Ø10	3	100	400
AM06085	M6 x 85 Ø6	27	200	1.200	AM10080	M10 x 80 Ø10	13	100	400
AM06090	M6 x 90 Ø6	32	200	1.200	AM10090	M10 x 90 Ø10	10	100	400
AM06100	M6 x 100 Ø6	42	200	800	AM10100	M10 x 100 Ø10	20	100	400
AM06110	M6 x 110 Ø6	52	200	800	AM10120	M10 x 120 Ø10	40	50	300
AM06120	M6 x 120 Ø6	62	100	600	AM10140	M10 x 140 Ø10	60	50	200
AM06130	M6 x 130 Ø6	72	100	600	AM10150	M10 x 150 Ø10	70	50	200
AM06140	M6 x 140 Ø6	82	100	600	AM10160	M10 x 160 Ø10	80	50	200
AM06150	M6 x 150 Ø6	92	100	600	AM10170	M10 x 170 Ø10	90	50	200
AM06160	M6 x 160 Ø6	102	100	400	AM10210	M10 x 210 Ø10	130	50	150
AM06170	M6 x 170 Ø6	112	100	400	AM10230	M10 x 230 Ø10	150	50	100
AM06180	M6 x 180 Ø6	122	100	300	AM12075	M12 x 75 Ø12	5	50	300
AM08050	M8 x 50 Ø8	4	100	800	AM12080	M12 x 80 Ø12	3	50	300
AM08060	M8 x 60 Ø8	3	100	800	AM12090	M12 x 90 Ø12	13	50	200
AM08065	M8 x 65 Ø8	8	100	600	AM12100	M12 x 100 Ø12	8	50	200
AM08075	M8 x 75 Ø8	5	100	600	AM12110	M12 x 110 Ø12	18	50	200
AM08090	M8 x 90 Ø8	20	100	600					