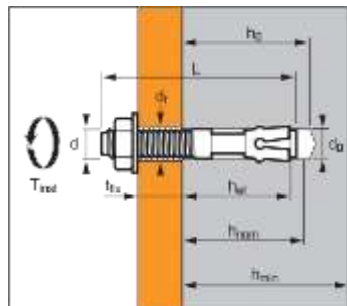




ETA Option 1
n° 04/0010



Pre-assembled anchor

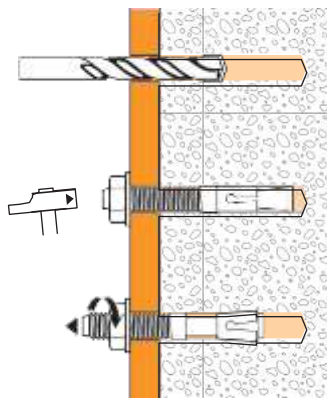
Applications

- Cadre din grinzi de otel sau lemn
- Lift guide rails
- Industrial doors and gates
- Brickwork support angles
- Storage systems

Material

- **Ancora M8-M16:**
Otel n°1.4404 (A4), 1.4578, NF EN 10088.3
- **Inel ex:** Steel n°1.4404 cold laminated, NF EN 10088.3
- **saiba:** Stainless Steel A4, NF EN 20898
- **Piulita hex.:** Stainless Steel A4-80, NF EN 20898-2

Installation



→ Ancora de expansiune cuplu controlat, cu corp si inel din otel inox A4, utilizabila in beton fisurat si beton nefisurat, agrementata cu ETA optiunea 1

Technical data

SPIT FIX Z A4	Letter marking	Adancime de ancorare minima					Adancime de ancorare maxima					Ø gaura (mm)	Ø drill burgh (mm)	Øperie curatar (mm)	Lung. totala ancora (mm)	Cuplu maxim strang (Nm)	Eurocode
		Adanc. Minima (mm)	Adancii inainte expand (mm)	Pachet de fixare maxim (mm)	Adanc. gaura (mm)	Grosime minima mat baza (mm)	Adanc. ancorar max (mm)	Adanc. inainte expand (mm)	Pachet de fixare maxim (mm)	Adanc. gaura (mm)	Grosime minima mat baza (mm)						
M6x55/15*	-	25,6	35	15	41	100	35	45	5	51	100	6	6	8	55	10	054270
M8x55/5	-			5					-						55		050441
M8x70/20-7	C	35	42	20	52	100	48	55	7	65	100	8	8	9	70	20	054610
M8x90/40-27	E			40					27						90		055343
M8x130/80-67	H			80					67						130		050367
M10x65/5	-			5					-						65		050466
M10x75/15	C	42	50	15	62	100	58	66	-	78	100	10	10	12	75	35	054630
M10x95/35-20	E			35					20						95		054640
M10x120/60-45	G			60					45						120		050442
M12x80/5	-			5					-						80		055344
M12x100/25-6	E	50	60	25	75	100	70	80	6	95	140	12	12	14	100	50	055345
M12x115/40-21	G			40					21						115		055346
M12x140/65-46	I			65					46						140		054680
M16x125/30-8	G			30					8						125		050443
M16x150/55-33	I	64	70	55	95	128	86	100	33	117	172	16	16	18	150	100	054700
M16x170/75-53	K			75					53						170		050444

* Aceasta dim. de ancora nu este conforma cu ETA

Proprietatile ancorei mecanice

	M6	M8	M10	M12	M16	
Secțiune transversală deasupra con ancora						
f_{uk} (N/mm ²)	Min. rezistență la rupere	900	900	900	900	880
f_{yk} (N/mm ²)	Limita de curgere	780	780	780	780	750
A_s (mm ²)	Secțiunea transversal minima	24,6	41,9	58,1	81,7	107,5
Parte filetata						
f_{uk} (N/mm ²)	Min. rezistență la rupere	620	620	620	620	580
f_{yk} (N/mm ²)	Yield strength	420	420	420	420	330
A_s (mm ²)	Secțiunea transversal minima	20,1	36,6	58	84,3	157
W_{el} (mm ³)	Secțiunea modul de elasticitate	12,71	31,23	62,3	109,17	277,47
$M^0_{Rk,s}$ (Nm)	Momentul la încovoiere caracteristic	9,45	23	46	81	193
M (Nm)	Momentul la încovoiere recomandat	3,7	9,4	18,8	33,1	78,8



Sarcinile specificate în această pagină sunt derivate din rezultatele testelor interne. Pentru rezultate derivate din Metodologia CC, vă rugăm să consultați pagina următoare. Datele oferite în paginile "Metoda CC" trebuie să se aplice.

Incarcari max ($V_{Ru,m}$, V_{Rk}) / incarcari caracteristice (N_{Rk} , V_{Rk}) în kN

Incarcarile maxime sunt derivate din rezultatele testelor în condiții de funcționare admisibile, iar incarcari caracteristice sunt determinate statistic

TRACTIUNE

Anchor size	M6	M8	M10	M12	M16
Beton nefisurat					
$h_{ef,min}$	25,6	35	42	50	64
$N_{Ru,m}$	6,0	12,5	13,3	20,1	33,1
N_{Rk}	4,5	8,0	9,9	13,6	24,1
$h_{ef,max}$	35	48	58	70	86
$N_{Ru,m}$	9,4	22,0	23,0	26,3	53,6
N_{Rk}	7,0	17,2	19,2	25,1	44,1
Beton fisurat					
$h_{ef,min}$	-	35	42	50	64
$N_{Ru,m}$	-	12,5	13,1	18,6	29,6
N_{Rk}	-	7,5	9,1	14,2	24,8
$h_{ef,max}$	-	48	58	70	86
$N_{Ru,m}$	-	15,9	20,3	29,2	54,2
N_{Rk}	-	14,7	18,8	27,0	49,5

FORFECARE

Anchor size	M6	M8	M10	M12	M16
Beton fisurat si nefisurat					
$V_{Ru,m}$	7,4	18,2	29,2	43,2	69,1
V_{Rk}	6,2	17,3	25	36,1	51,3

Încărcări proiectare (N_{Rd} , V_{Rd}) fara influenta distantei fata de alta ancora sau margine in kN

$$N_{Rd} = \frac{N_{Rk}^*}{\gamma_{Mc}}$$

*Derived from test results

$$V_{Rd} = \frac{V_{Rk}^*}{\gamma_{Ms}}$$

TRACTIUNE

Anchor size	M6	M8	M10	M12	M16
Non cracked concrete					
$h_{ef,min}$	25,6	35	42	50	64
N_{Rd}	2,5	5,3	6,6	9,1	16,1
$h_{ef,max}$	35	48	58	70	86
N_{Rd}	3,8	11,5	12,8	14,3	29,4
Cracked concrete					
$h_{ef,min}$	-	35	42	50	64
N_{Rd}	-	5,0	6,1	9,5	16,5
$h_{ef,max}$	-	48	58	70	86
N_{Rd}	-	9,8	12,5	18,0	33,0

$\gamma_{Mc} = 1,5$

FORFECARE

Anchor size	M6	M8	M10	M12	M16
Cracked and non-cracked concrete					
V_{Rd}	4,1	11,5	16,7	24,1	28,5

$\gamma_{Ms} = 1,5$ for M8 to M12 and $\gamma_{Ms} = 1,8$ for M16

Incarcari recomandate (N_{rec} , V_{rec}) pt o ancora fara influenta dist fata de alta ancora sau margine in kN

$$N_{Rec} = \frac{N_{Rk}^*}{\gamma_M \gamma_F}$$

*Derived from test results

$$V_{Rec} = \frac{V_{Rk}^*}{\gamma_M \gamma_F}$$

TRACTIUNE

Anchor size	M6	M8	M10	M12	M16
Non cracked concrete					
$h_{ef,min}$	25,6	35	42	50	64
N_{Rec}	1,7	3,8	4,7	6,5	11,5
$h_{ef,max}$	35	48	58	70	86
N_{Rec}	2,7	8,2	9,1	10,2	21,0
Cracked concrete					
$h_{ef,min}$	-	35	42	50	64
N_{Rec}	-	3,6	4,3	6,8	11,8
$h_{ef,max}$	-	48	58	70	86
N_{Rec}	-	7,0	9,0	12,8	23,6

$\gamma_E = 1,4$; $\gamma_{Mc} = 1,5$

FORFECARE

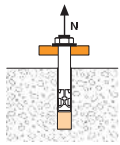
Anchor size	M6	M8	M10	M12	M16
Cracked and non-cracked concrete					
V_{Rec}	2,9	8,2	11,9	17,2	20,4

$\gamma_{Ms} = 1,5$ for M8 to M12 and $\gamma_{Ms} = 1,8$ for M16



SPIT CC - Method (Valorile extrase din Agrementul European ETA)

Incarcari la TRACTIUNE in kN

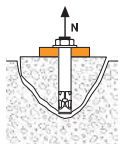


→ Rezistența la smulgere

$$N_{Rd,p} = N_{Rd,p}^o \cdot f_b$$

$N_{Rd,p}^o$ Anchor size	Design pull-out resistance			
	M8	M10	M12	M16
$h_{ef,min}$	35	42	50	64
$h_{ef,max}$	48	58	70	86
Non cracked concrete (C20/25)				
$N_{Rd,p}$ ($h_{ef,min}$)	6,0	6,0	8,0	13,3
$N_{Rd,p}$ ($h_{ef,max}$)	8,0	10,7	10,7	20,0
Cracked concrete (C20/25)				
$N_{Rd,p}$ ($h_{ef,min}$)	2,0	4,0	5,0	8,0
$N_{Rd,p}$ ($h_{ef,max}$)	2,7	5,0	6,0	10,7

$$\gamma_{Mc} = 1,5$$

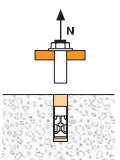


→ Rezistența con din beton

$$N_{Rd,c} = N_{Rd,c}^o \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$N_{Rd,c}^o$ Anchor size	Design cone resistance			
	M8	M10	M12	M16
$h_{ef,min}$	35	42	50	64
$h_{ef,max}$	48	58	70	86
Non cracked concrete (C20/25)				
$N_{Rd,c}$ ($h_{ef,min}$)	7,0	9,1	11,9	17,2
$N_{Rd,c}$ ($h_{ef,max}$)	11,2	14,8	19,7	26,8
Cracked concrete (C20/25)				
$N_{Rd,c}$ ($h_{ef,min}$)	5,0	6,5	8,5	12,3
$N_{Rd,c}$ ($h_{ef,max}$)	8,0	10,6	14,1	19,1

$$\gamma_{Mc} = 1,5$$



→ Rezist. la rupere

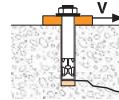
$N_{Rd,s}$ Anchor size	Design steel tensile resistance			
	M8	M10	M12	M16
$N_{Rd,s}$	8,5	14,4	20,0	29,7

$$\gamma_{Ms} = 1,8 \text{ for M8 to M12 and } \gamma_{Ms} = 2,1 \text{ for M16}$$

$$N_{Rd} = \min(N_{Rd,p}; N_{Rd,c}; N_{Rd,s})$$

$$\beta_N = N_{Sd} / N_{Rd} \leq 1$$

FORFECARE in kN



→ Rezistența betonului in margine

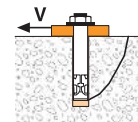
$$V_{Rd,c} = V_{Rd,c}^o \cdot f_b \cdot f_{\beta,V} \cdot \Psi_{S-C,V}$$

$V_{Rd,c}^o$ rezistență de proiectare in beton de margine, la distanța minimă de margine in mm (C_{min})

Anchor size	M8	M10	M12	M16
Adancime minima de ancorare mm				
h_{ef}	35	42	50	64
C_{min}	60	65	100	100
S_{min}	60	75	170	150
$V_{Rd,c}$ (C20/25)	3,3	4,1	8,7	10,1

Anchor size	M8	M10	M12	M16
Adancime maxima de ancorare mm				
h_{ef}	48	58	70	86
C_{min}	60	65	90	105
S_{min}	50	55	75	90
$V_{Rd,c}$ (C20/25)	3,7	4,4	8,2	11,8

$$\gamma_{Mc} = 1,5$$



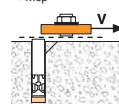
→ Pryout failure

$$V_{Rd,cp} = V_{Rd,cp}^o \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$V_{Rd,cp}^o$ Anchor size	Design pryout resistance			
	M8	M10	M12	M16
Non cracked concrete				
$h_{ef,min}$	35	42	50	64
$V_{Rd,cp}$ (C20/25)	7,0	9,1	11,9	34,4
$h_{ef,max}$	48	58	70	86
$V_{Rd,cp}$ (C20/25)	11,2	14,8	39,4	53,6

Anchor size	M8	M10	M12	M16
Cracked concrete				
$h_{ef,min}$	35	42	50	64
$V_{Rd,cp}$ (C20/25)	5,0	6,5	8,5	24,6
$h_{ef,max}$	48	58	70	86
$V_{Rd,cp}$ (C20/25)	8,0	10,6	28,1	38,3

$$\gamma_{Mcp} = 1,5$$



→ forfecare otel

$V_{Rd,s}$ Anchor size	Design steel shear resistance			
	M8	M10	M12	M16
$V_{Rd,s}$	7,5	12,0	17,4	25,3

$$\gamma_{Ms} = 1,5 \text{ for M8 to M12 and } \gamma_{Ms} = 1,8 \text{ for M16}$$

$$V_{Rd} = \min(V_{Rd,c}; V_{Rd,cp}; V_{Rd,s})$$

$$\beta_V = V_{Sd} / V_{Rd} \leq 1$$

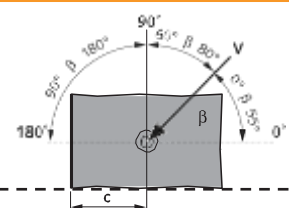
$$\beta_N + \beta_V \leq 1.2$$

f_B Influenta calitate beton

Concrete class	f_B	Concrete class	f_B
C25/30	1,1	C40/50	1,41
C30/37	1,22	C45/55	1,48
C35/45	1,34	C50/60	1,55

$f_{\beta,V}$ Influenta directiei incarcarii pt forfecare

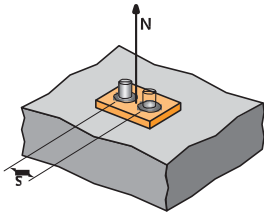
Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1.1
70	1.2
80	1.5
90 to 180	2





SPIT CC - Method (Valorile extrase din Agrementul European ETA)

Ψ Influența dist între ancore pt rezistență conului de beton în sarcină de tracțiune



$$\Psi_S = 0,5 + \frac{S}{6 \cdot h_{ef}}$$

$$S_{min} < S < S_{cr,N}$$

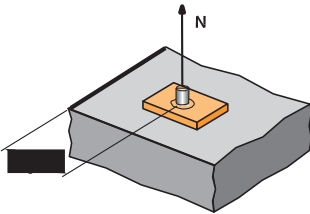
$$S_{cr,N} = 3 \cdot h_{ef}$$

Ψ_S must be used for each spacing influenced the anchors group.

Spatiu S mm	Factor Ψ _S			
	Adacime min de ancorare			
	M8	M10	M12	M16
60	0,78			
75	0,86	0,80		
100	0,98	0,90	0,83	0,76
105	1,00	0,92	0,85	0,77
110		0,94	0,87	0,79
125		1,00	0,92	0,83
150			1,00	0,89
170				0,94
192				1,00

Spatiu S mm	Factor Ψ _S			
	Adancime max de ancorare			
	M8	M10	M12	M16
50	0,67			
55	0,69	0,66		
75	0,76	0,72	0,68	
90	0,81	0,76	0,71	0,67
110	0,88	0,82	0,76	0,71
130	0,95	0,87	0,81	0,75
145	1,00	0,92	0,85	0,78
155		0,95	0,87	0,80
175		1,00	0,92	0,84
205			0,99	0,90
210			1,00	0,91
258				1,00

Ψ Influenta marginii pt rezistenta con beton in sarcina de tractiun



$$\Psi_{c,N} = 0,5 + 0,33 \cdot \frac{C}{h_{ef}}$$

$$C_{min} < C < C_{cr,N}$$

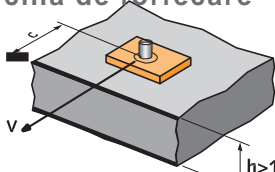
$$C_{cr,N} = 1,5 \cdot h_{ef}$$

Ψ_{c,N} must be used for each distance influenced the anchors group.

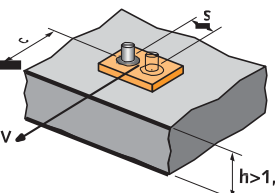
EDgE C	Factor Ψ _{c,N}			
	Minimum anchorage depth			
	M8	M10	M12	M16
60	1,00			
65		1,00		
100			1,00	
100				1,00

EDgE C	Factor Ψ _{c,N}			
	Maximum anchorage depth			
	M8	M10	M12	M16
60	0,91			
65	0,95	0,91		
72	1,00	0,96		
80		1,00		
90			0,94	
105			1,00	0,90
130				1,00

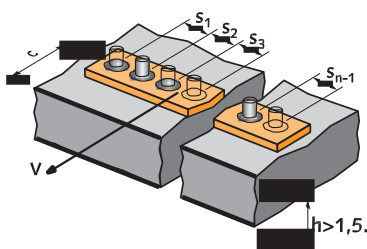
Ψ Influenta dist între ancore si fata de margine pentru rezistenta coltului din beton in sarcina de forfecare



$$\Psi_{s-c,V} = \frac{C}{C_{min}} \cdot \frac{C}{C_{min}}$$



$$\Psi_{s-c,V} = \frac{3 \cdot c + s}{6 \cdot C_{min}} \cdot \frac{C}{C_{min}}$$



▶ Pentru o singura ancore

C / C _{min}	Factor Ψ _{s-c,V}												
	Non-cracked concrete												
	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,2	
Ψ _{s-c,V}	1,00	1,31	1,66	2,02	2,41	2,83	3,26	3,72	4,19	4,69	5,20	5,72	

▶ For 2 ancore

S / C _{min}	Factor Ψ _{s-c,V}												
	Non-cracked concrete												
C / C _{min}	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,2	
1,0	0,67	0,84	1,03	1,22	1,43	1,65	1,88	2,12	2,36	2,62	2,89	3,16	
1,5	0,75	0,93	1,12	1,33	1,54	1,77	2,00	2,25	2,50	2,76	3,03	3,31	
2,0	0,83	1,02	1,22	1,43	1,65	1,89	2,12	2,38	2,63	2,90	3,18	3,46	
2,5	0,92	1,11	1,32	1,54	1,77	2,00	2,25	2,50	2,77	3,04	3,32	3,61	
3,0	1,00	1,20	1,42	1,64	1,88	2,12	2,37	2,63	2,90	3,18	3,46	3,76	
3,5		1,30	1,52	1,75	1,99	2,24	2,50	2,76	3,04	3,32	3,61	3,91	
4,0			1,62	1,86	2,10	2,36	2,62	2,89	3,17	3,46	3,75	4,05	
4,5				1,96	2,21	2,47	2,74	3,02	3,31	3,60	3,90	4,20	
5,0					2,33	2,59	2,87	3,15	3,44	3,74	4,04	4,35	
5,5						2,71	2,99	3,28	3,71	4,02	4,33	4,65	
6,0							2,83	3,11	3,41	3,71	4,02	4,33	4,65

▶ For 3 ancore sau mai multe

$$\Psi_{s-c,V} = \frac{3 \cdot c + s_1 + s_2 + s_3 + \dots + s_{n-1}}{3 n c} \cdot \sqrt{\frac{C}{c}}$$