

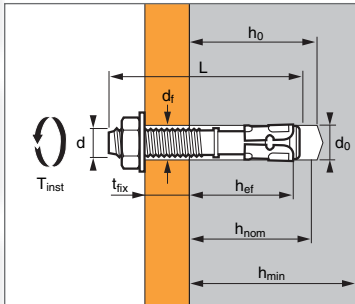
SPIT TIFIX

Zinc coated steel



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➤ Torque controlled expansion anchor, made of zinc coated steel for use in non cracked concrete



Nut and washer non-assembled

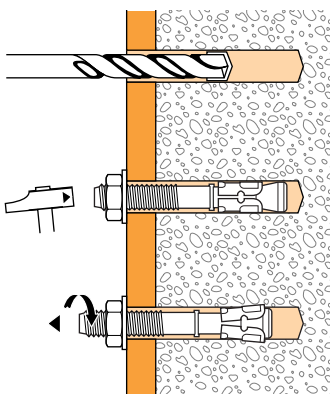
APPLICATION

- Steel and timber framework and beams
- Lift guide rails
- Industrial doors and gates
- Brickwork support angles
- Storage systems

MATERIAL

- Bolt M8-M20: Cold formed NFA 35-053 / Zinc electroplates (5 μ m)
- Sleeve: Cold formed, NFA 36-231
- Washer: Steel, DIN 513
- Hexagonal nut: Steel strength grade 6 or 8, NF EN 20898-2

INSTALLATION



Technical data

SPIT TIFIX	Letter marking	Minimum anchor depth					Ø thread	Ø drill bit	Ø clearance	Total anchor length (mm)	Max. tightening torque (Nm)	Code
		Anchor depth (mm)	Depth before expansion (mm)	Max thickness of part to be fixed (mm)	Drilling Depth (mm)	Min thickness of base material (mm)						
		h_{ef}	h_{nom}	t_{fix}	h_0	h_{min}	d	d_0	d_f	L	T_{inst}	
M8x55	-			5						55		055361
M8x70	C	35	42	20	52	100	8	8	9	70	15	055362
M8x90	E			40						90		055363
M8x130	H			80						130		055364
M10x75	C			15						75		055365
M10x95	E	42	50	36	62	100	10	10	12	96	30	055366
M10x120	G			60						120		055367
M10x140	I			80						140		055368
M12x80	-			5						80		055369
M12x100	E			25						100		055370
M12x140	I	50	60	65	75	100	12	12	14	140	50	055371
M12x160	J			85						160		055372
M12x180	L			105						180		055373
M12x220	O			145						220		055374
M16x100	-			5						100		055375
M16x125	G	64	78	30	95	128	16	16	18	125	100	055376
M16x170	K			75						170		055377

Anchor mechanical properties

	M8	M10	M12	M16
Cross-section above cone				
f_{uk} (N/mm ²) Min. tensile strength	700	700	700	600
f_{yk} (N/mm ²) Yield strength	580	580	580	500
A_s (mm ²) Stressed cross-section	23,76	40,72	55,42	103,87
Threaded part				
f_{uk} (N/mm ²) Min. tensile strength	600	600	600	500
f_{yk} (N/mm ²) Yield strength	480	480	480	400
A_s (mm ²) Stressed cross-section	36,6	58	84,3	157
W_{el} (mm ³) Elastic section modulus	31,23	62,3	109,17	277,47
$M^{0Rk,s}$ (Nm) Characteristic bending moment	22	45	79	166
M (Nm) Recommended bending moment	9,0	18,4	32,2	67,8

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The loads specified on this page allow judging the product's performances, but cannot be used for the designing. The data given in the pages "CC method" have to be applied.

Ultimate ($N_{Ru,m}$, $V_{Ru,m}$) / characteristic loads (N_{Rk} , V_{Rk}) in kN

Mean Ultimate loads are derived from test results in admissible service conditions, and characteristic loads are statistically determined.

TENSILE

Anchor size	M8	M10	M12	M16
h_{ef}	35	42	50	64
$N_{Ru,m}$	9,6	14,5	26,2	40,6
N_{Rk}	6,7	9,5	21,9	36,0

SHEAR

Anchor size	M8	M10	M12	M16
$V_{Ru,m}$	10,8	18,2	30,8	44,7
V_{Rk}	5,3	15,6	25,6	30,4

Mechanical anchors

Design Loads (N_{Rd} , V_{Rd}) for one anchor without edge or spacing influence in kN

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

*Derived from test results

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

TENSILE

Anchor size	M8	M10	M12	M16
h_{ef}	35	42	50	64
N_{Rd}	3,7	5,3	12,2	20,0

$\gamma_{Mc} = 1,8$

SHEAR

Anchor size	M8	M10	M12	M16
V_{Rd}	4,2	12,5	20,5	24,3

$\gamma_{Ms} = 1,25$

Recommended loads (N_{rec} , V_{rec}) for one anchor without edge or spacing influence in kN

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

*Derived from test results

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

TENSILE

Anchor size	M8	M10	M12	M16
h_{ef}	35	42	50	64
N_{Rec}	2,7	3,8	8,7	14,3

$\gamma_F = 1,4$; $\gamma_{Mc} = 1,8$

SHEAR

Anchor size	M8	M10	M12	M16
V_{Rec}	3,0	8,9	14,6	17,4

$\gamma_{Ms} = 1,25$

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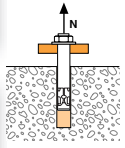
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SPIT CC- Method

TENSILE in kN

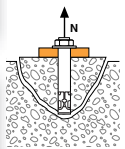


- Pull-out resistance

$$N_{Rd,p} = N_{Rd,p}^0 \cdot f_b$$

$N_{Rd,p}^0$ Anchor size	Design pull-out resistance			
h_{ef}	M8	M10	M12	M16
$N_{Rd,p}^0$ (C20/25)	3,3	5,0	8,9	13,9

$$\gamma_{Mc} = 1,8$$

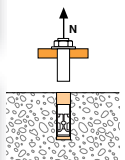


- Concrete cone resistance

$$N_{Rd,c} = N_{Rd,c}^0 \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$N_{Rd,c}^0$ Anchor size	Design cone resistance			
h_{ef}	M8	M10	M12	M16
$N_{Rd,c}^0$ (C20/25)	5,8	7,6	9,9	14,3

$$\gamma_{Mc} = 1,8$$



- Steel resistance

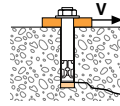
$N_{Rd,s}$ Anchor size	Steel design tensile resistance			
$N_{Rd,s}$	M8	M10	M12	M16
$N_{Rd,s}$	9,3	16	22	34

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

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

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

SHEAR in kN

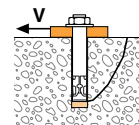


- Concrete edge resistance

$$V_{Rd,c} = V_{Rd,c}^0 \cdot f_b \cdot f_{\beta,V} \cdot \Psi_{S-C,V}$$

$V_{Rd,c}^0$ Anchor size	Design concrete edge resistance at minimum edge distance (C_{min})			
h_{ef}	M8	M10	M12	M16
$V_{Rd,c}^0$ (C20/25)	2,9	5,1	8,7	10,1

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

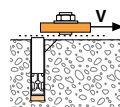


- Pryout failure

$$V_{Rd,cp} = V_{Rd,cp}^0 \cdot f_b \cdot \Psi_s \cdot \Psi_{c,N}$$

$V_{Rd,cp}^0$ Anchor size	Design pryout resistance			
h_{ef}	M8	M10	M12	M16
$V_{Rd,cp}^0$ (C20/25)	7,0	9,1	11,9	34,4

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



- Steel resistance

$V_{Rd,s}$ Anchor size	Steel design shear resistance			
$V_{Rd,s}$	M8	M10	M12	M16
$V_{Rd,s}$	3,8	11,2	18,2	18,9

$$\gamma_{Ms} = 1,25$$

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

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

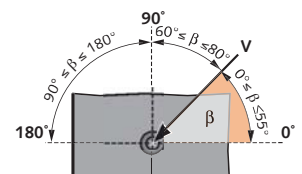
$$\beta_N + \beta_V \leq 1,2$$

f_B INFLUENCE OF CONCRETE

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

$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2



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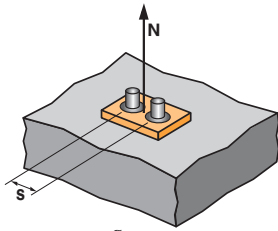
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SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_s = 0,5 + \frac{s}{6 \cdot h_{ef}}$$

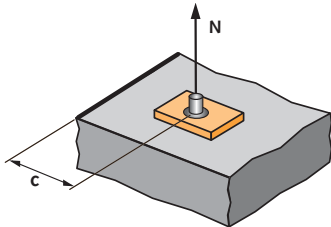
$S_{min} < S < S_{cr,N}$

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

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

SPACING S	Reduction factor Ψ_s			
	M8	M10	M12	M16
45	0,71			
65	0,81	0,76		
100	0,98	0,90	0,83	0,76
110	1,00	0,94	0,87	0,79
125		1,00	0,92	0,83
150			1,00	0,89
180				0,97
192				1,00

$\Psi_{c,N}$ INFLUENCE OF EDGE FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_{c,N} = 0,23 + 0,51 \cdot \frac{c}{h_{ef}}$$

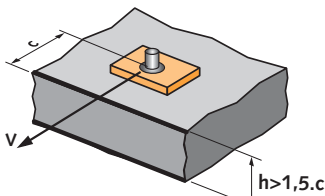
$C_{min} < C < C_{cr,N}$

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

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

EDGE C	Reduction factor $\Psi_{c,N}$			
	M8	M10	M12	M16
55	1,00			
75		1,00		
100			1,00	
100				1,00

$\Psi_{s-c,V}$ INFLUENCE OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD

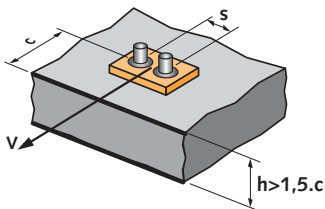


$$\Psi_{s-c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

Factor $\Psi_{s-c,V}$
Non-cracked concrete

$\frac{C}{C_{min}}$	1,0	1,2	1,4	1,6	1,8	2,0	2,2	2,4	2,6	2,8	3,0	3,2
$\Psi_{s-c,V}$	1,00	1,31	1,66	2,02	2,41	2,83	3,26	3,72	4,19	4,69	5,20	5,72



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

For 2 anchors fastening

Factor $\Psi_{s-c,V}$
Non-cracked concrete

$\frac{s}{C_{min}}$	$\frac{C}{C_{min}}$												
	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	

For 3 anchors fastening and more

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

