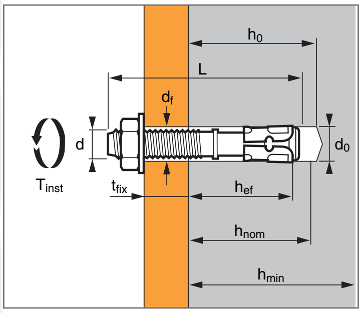
SPIT TIFIX

Zinc coated steel

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



Nut and washer non-assembled

Technical data

SPIT TIFIX	Letter marking	Anchor depth (mm) h_{ef}	Depth before expansion (mm) h_{nom}	Max thickness of part to be fixed (mm) t_{fix}	Drilling Depth (mm) h_0	Min thickness of base material (mm) h_{min}	Ø thread (mm) d	Ø drill bit (mm) d_0	Ø clearance (mm) d_f	Total anchor length (mm) L	Max. tightening torque (Nm) T_{inst}	Code
		Minimum anchor depth										
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

APPLICATION

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

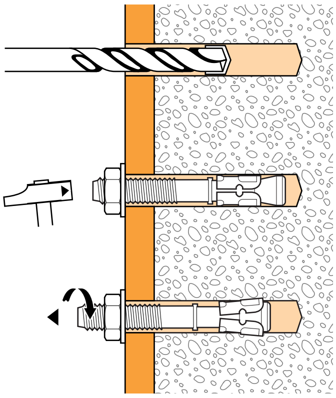
MATERIAL

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

Anchor mechanical properties

		M8	M10	M12	M16
Cross-section above cone					
f_{uk} (N/mm²)	Min. tensile strength	700	700	700	600
f_{yk}(N/mm²)	Yield strength	580	580	580	500
As (mm²)	Stressed cross-section	23,76	40,72	55,42	103,87
Threaded part					
f_{uk} (N/mm²)	Min. tensile strength	600	600	600	500
f_{yk}(N/mm²)	Yield strength	480	480	480	400
As (mm²)	Stressed cross-section	36,6	58	84,3	157
W_{el} (mm³)	Elastic section modulus	31,23	62,3	109,17	277,47
$M^0_{Rk,s}$ (Nm)	Characteristic bending moment	22	45	79	166
M (Nm)	Recommended bending moment	9,0	18,4	32,2	67,8

INSTALLATION



the right fixing

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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

$$N_{Rec} = \frac{N_{Rk}{}^{*}}{\gamma_{M}.\gamma_{F}}$$

*Derived from test results

$$V_{Rec} = \frac{V_{Rk}{}^{*}}{\gamma_{M}.\gamma_{F}}$$

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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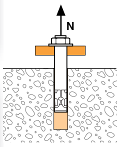
SPIT CC- Method

TENSILE in kN

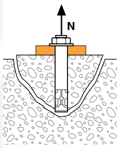


Pull-out resistance

$$N_{Rd,p} = N^{O}_{Rd,p} . f_b$$

$N^0_{Rd,p}$ Anchor size	Design pull-out resistance M8	M10	M12	M16
h_{ef}	*35*	*42*	*50*	*64*
$N^0_{Rd,p}$ (C20/25)	3,3	5,0	8,9	13,9

γ_{Mc} = 1,8

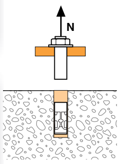


Concrete cone resistance

$$N_{Rd,c} = N^{O}_{Rd,c} . f_b . \Psi_s . \Psi_{c,N}$$

$N^0_{Rd,c}$ Anchor size	Design cone resistance M8	M10	M12	M16
h_{ef}	*35*	*42*	*50*	*64*
$N^0_{Rd,c}$ (C20/25)	5,8	7,6	9,9	14,3

γ_{Mc} = 1,8

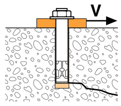


Steel resistance

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

γ_{Ms} = 1,5

SHEAR in kN

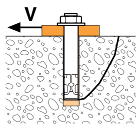


Concrete edge resistance

$$V_{Rd,c} = V^{O}_{Rd,c} . f_b . f_{\beta,V} . \Psi_{S-C,V}$$

$V^0_{Rd,c}$ Anchor size	Design concrete edge resistance at minimum edge distance (C_{min}) M8	M10	M12	M16
h_{ef}	*35*	*42*	*50*	*64*
C_{min}	55	75	100	100
S_{min}	45	65	100	100
$V^0_{Rd,c}$ (C20/25)	2,9	5,1	8,7	10,1

γ_{Mc} = 1,5

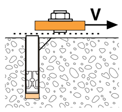


Pryout failure

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

$V^0_{Rd,cp}$ Anchor size	Design pryout resistance M8	M10	M12	M16
h_{ef}	*35*	*42*	*50*	*64*
$V^0_{Rd,cp}$ (C20/25)	7,0	9,1	11,9	34,4

γ_{Mcp} = 1,5



Steel resistance

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

γ_{Ms} = 1,25

$$N_{Rd} = \min(N_{Rd,p} \, ; \, N_{Rd,c} \, ; \, N_{Rd,s})$$
$$\beta_N = N_{Sd} / N_{Rd} \leq 1$$

$$V_{Rd} = \min(V_{Rd,c} \, ; \, V_{Rd,cp} \, ; \, V_{Rd,s})$$
$$\beta_V = V_{Sd} / V_{Rd} \leq 1$$

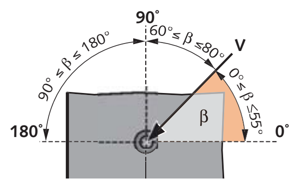
$$\beta_N + \beta_V \leq 1,2$$

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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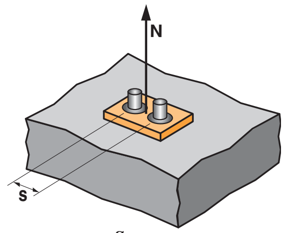
SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD

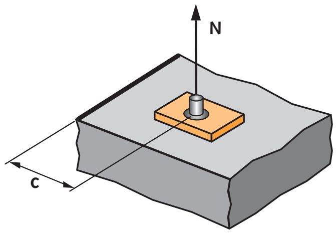


$$\Psi_S = 0,5 + \frac{s}{6.h_{ef}}$$

$S_{min} < S < S_{cr,N}$
$S_{cr,N} = 3.h_{ef}$
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

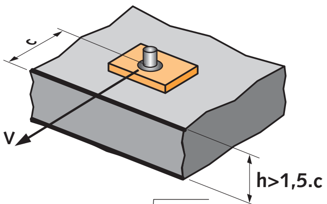


$$\Psi_{c,N} = 0,23 + 0,51.\frac{c}{h_{ef}}$$

$C_{min} < C < C_{cr,N}$
$C_{cr,N} = 1,5.h_{ef}$
$\Psi_{c,N}$ 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

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

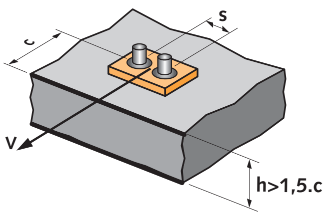


$$\Psi_{s-c,V} = \frac{c}{c_{min}}.\sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

Factor $\Psi_{s\text{-}c,V}$
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
$\Psi_{s\text{-}c,V}$	1,00	1,31	1,66	2,02	2,41	2,83	3,26	3,72	4,19	4,69	5,20	5,72

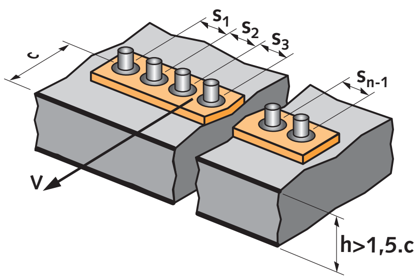


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}}.\sqrt{\frac{c}{c_{min}}}$$

For 2 anchors fastening

Factor $\Psi_{s\text{-}c,V}$
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	4,65



For 3 anchors fastening and more

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