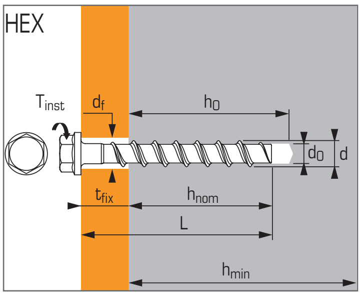
TAPCON 4

zinc coated steel version **1/4**

Concrete screw anchor for use in cracked and non-cracked concrete

European Technical Assessment

ETA Option 1- 15/0368



Technical data

Versions	Anchor size	Minimum embedment depth				Maximum embedment depth				Thread Ø	Drilling Ø	Total anchor length	Tighten torque	Code
		Embed. depth min.	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base material	Embed. depth max.	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base material					
		(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) d	(mm) d_0	(mm) L	(Nm) T_{inst}	
Zinc coated versions														
HEX	8X60		15				-					60		155840
	8X75		30				10					75		155841
	8X100	45	55	55	110	65	35	75	110	9,8	8	100	*	155842
	8X130		85				65					130		155843
	8X150		105				85					150		155844
	10X60		10				-					60		155845
	10X75		25				-					75		155846
	10X100	50	50	60	110	95	5	85	110	11,9	10	100	*	155847
	10X130		80				35					130		155848
	10X150		100				55					150		155849
	14X80		20				-					80		155850
	14X100	60	40	70	150	115	-	125	150	16,2	13	100	*	155851
	14X130		70				15					130		155852
	14X150		90				35					150		155853

* stop turning the impact torque machine when the head of the TAPCON 4 is in contact with the part to be fixed

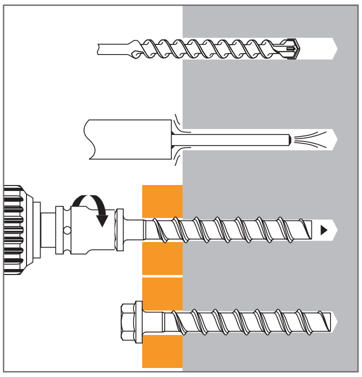
APPLICATION

- Channel, cable tray
- Brackets
- Trunking
- Push-pull bars
- Formwork / shuttering

MATERIAL

Zinc coated steel versions:
Min. tensile strength: 700 N/mm²
Mechanical galvanised acc. to EN ISO 12863
Size 8 and 10 : 45 µm
Size 14 : 20 µm

INSTALLATION



Anchor mechanical properties

Anchor size		Ø8	Ø10	Ø14
As (mm²)	Stressed cross-section	39,6	65,0	134,0
W_{el} (mm³)	Elastic section modulus	35,1	74,0	220,0
$M^0_{rk,s}$ (Nm)	Characteristic bending moment	46,8	93,2	261,0
M (Nm)	Recommended bending moment	24,4	46,6	130,5

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 (3/4 to 4/4).

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	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rk}	6,0	6,0	9,0
$h_{nom,max}$	**65**	**95**	**115**
N_{Rk}	12,0	16,0	35,0
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rk}	3,0	4,0	5,0
$h_{nom,max}$	**65**	**95**	**115**
N_{Rk}	7,5	9,0	20,0

SHEAR

Anchor size	Ø8	Ø10	Ø14
Cracked & non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
V_{Rk}	17,0	26,9	53,5
$h_{nom,max}$	**65**	**95**	**115**
V_{Rk}	17,0	26,9	53,5

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	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rd}	3,3	3,3	5,0
$h_{nom,max}$	**65**	**95**	**115**
N_{Rd}	6,7	8,9	19,4
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rd}	1,7	2,2	2,8
$h_{nom,max}$	**65**	**95**	**115**
N_{Rd}	4,2	5,0	11,1

$\gamma_{Mc} = 1,8$

SHEAR

Anchor size	Ø8	Ø10	Ø14
Cracked & non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
V_{Rd}	11,3	17,9	35,7
$h_{nom,max}$	**65**	**95**	**115**
V_{Rd}	11,3	17,9	35,7

$\gamma_{Ms} = 1,5$

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	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rec}	2,4	2,4	3,6
$h_{nom,max}$	**65**	**95**	**115**
N_{Rec}	4,8	6,3	13,9
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
N_{Rec}	1,2	1,6	2,0
$h_{nom,max}$	**65**	**95**	**115**
N_{Rec}	3,0	3,6	7,9

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

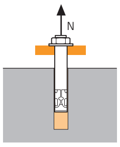
SHEAR

Anchor size	Ø8	Ø10	Ø14
Cracked & non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
V_{rec}	8,1	12,8	25,6
$h_{nom,max}$	**65**	**95**	**115**
V_{rec}	8,1	12,8	25,6

$\gamma_F = 1,4$; $\gamma_{Ms} = 1,5$

SPIT CC Method

TENSILE in kN



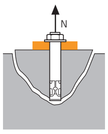
Pull-out resistance

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

$N^0_{Rd,p}$ — Design pull-out resistance

Anchor size	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$N^0_{Rd,p}$	3,3	3,3	5,0
$h_{nom,max}$	**65**	**95**	**115**
$N^0_{Rd,p}$	6,7	8,9	19,4
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$N^0_{Rd,p}$	1,7	2,2	2,8
$h_{nom,max}$	**65**	**95**	**115**
$N^0_{Rd,p}$	4,2	5,0	11,1

$\gamma_{Mc} = 1,8$



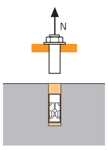
Concrete cone resistance

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

$N^0_{Rd,c}$ — Design cone resistance

Anchor size	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$N^0_{Rd,c}$	4,5	5,2	6,9
$h_{nom,max}$	**65**	**95**	**115**
$N^0_{Rd,c}$	8,8	10,8	21,8
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$N^0_{Rd,c}$	3,1	3,6	4,8
$h_{nom,max}$	**65**	**95**	**115**
$N^0_{Rd,c}$	6,2	7,6	15,3

$\gamma_{Mc} = 1,8$



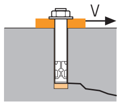
Steel resistance

$N_{Rd,s}$ — Steel design tensile resistance

Anchor size	Ø8	Ø10	Ø14
$N_{Rd,s}$	30,3	48,0	95,7

$\gamma_{Ms} = 1,4$

SHEAR in kN



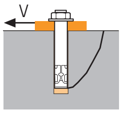
Concrete edge resistance

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

$V^0_{Rd,c}$ — Design concrete edge resistance at minimum edge distance (C_{min})

Anchor size	Ø8	Ø10	Ø14
$h_{nom,min}$	**45**	**50**	**60**
C_{min}	60	70	90
S_{min}	60	70	90
$V^0_{Rd,c,non\text{-}cracked}$	4,8	6,2	9,5
$V^0_{Rd,c,cracked}$	3,4	4,4	6,8
$h_{nom,max}$	**65**	**95**	**115**
C_{min}	60	70	90
S_{min}	60	70	90
$V^0_{Rd,c,non\text{-}cracked}$	5,2	6,7	11,0
$V^0_{Rd,c,cracked}$	3,7	4,8	7,8

$\gamma_{Mc} = 1,5$



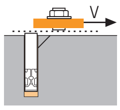
Pryout failure

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

$V^0_{Rd,cp}$ — Design pryout resistance

Anchor size	Ø8	Ø10	Ø14
Non-cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$V^0_{Rd,cp}$	5,4	6,2	8,3
$h_{nom,max}$	**65**	**95**	**115**
$V^0_{Rd,cp}$	10,6	13,0	52,3
Cracked concrete (C20/25)			
$h_{nom,min}$	**45**	**50**	**60**
$V^0_{Rd,cp}$	3,8	4,4	5,8
$h_{nom,max}$	**65**	**95**	**115**
$V^0_{Rd,cp}$	7,4	9,1	36,6

$\gamma_{Mc} = 1,5$



Steel resistance

$V_{Rd,s}$ — Steel design shear resistance

Anchor size	Ø8	Ø10	Ø14
$h_{nom,min}$	**45**	**50**	**60**
$V_{Rd,s}$	11,3	17,9	35,7
$h_{nom,max}$	**65**	**95**	**115**
$V_{Rd,s}$	11,3	17,9	35,7

$\gamma_{Ms} = 1,5$

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

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

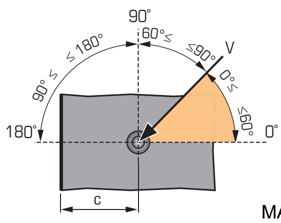
$$\beta_N + \beta_V \le 1,2$$

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

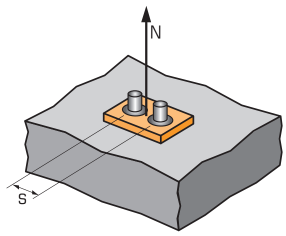
Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2



MAJ04/21

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.

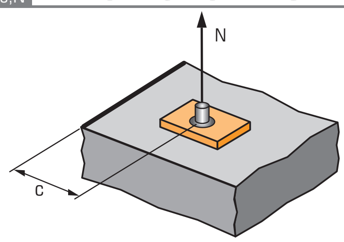
SPACING S — Reduction factor Ψ_s — Minimum anchor depth

Anchor size	Ø8	Ø10	Ø14
60	0.83		
65	0.86		
70	0.89	0.85	
75	0.92	0.88	
80	0.94	0.90	
85	0.97	0.93	
90	1.00	0.95	0.88
100		1.00	0.92
110			0.96
120			1.00

SPACING S — Reduction factor Ψ_s — Minimum anchor depth

Anchor size	Ø8	Ø10	Ø14
60	0.71		
70	0.75	0.72	
80	0.78	0.75	
90	0.82	0.78	0.67
110	0.89	0.84	0.71
125	0.94	0.89	0.74
140	1.00	0.93	0.77
170		1.00	0.83
180			0.85
210			0.91
230			0.95
260			1.00

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



$$\Psi_{c,N} = 0,27 + 0,48. \frac{c}{h_{ef}}$$

$c_{min} < c < c_{cr,N}$

$c_{cr,N} = 1,5.h_{ef}$

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

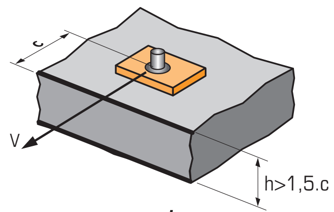
EDGE C — Reduction factor $\Psi_{c,N}$ — Minimum anchor depth

Anchor size	Ø8	Ø10	Ø14
60	1,00		
70		1,00	
80			
90			1,00

EDGE C — Reduction factor $\Psi_{c,N}$ — Minimum anchor depth

Anchor size	Ø8	Ø10	Ø14
60	0.88		
65	0.93		
70	0.98	0.89	
75	1.00	0.94	
80		0.98	
90		1.00	0.77
100			0.83
110			0.88
120			0.94
130			1.00

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

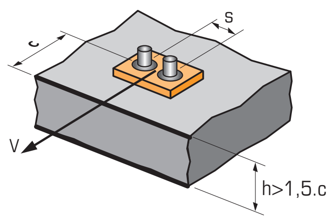


$$\Psi_{s-c,V} = \frac{c}{c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

Reduction factor $\Psi_{s-c,V}$ — Cracked & 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

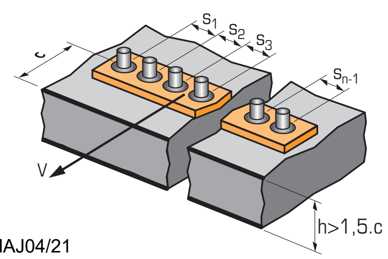


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

For 2 anchors fastening

Reduction factor $\Psi_{s-c,V}$ — Cracked & 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

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