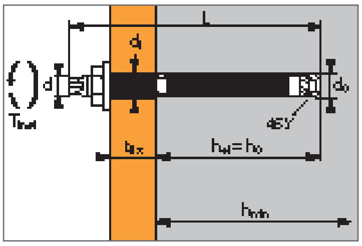
SPIT EPCON C8

Standard embedment (Galvanized and SS)



ETA Option 1
n° 10/0309

APPLICATION

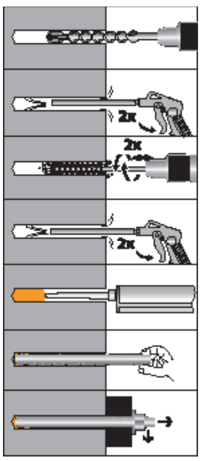
- Steel profiles
- Fixing machinery (resistant to vibration)
- Storage tanks, pipes
- Signs
- Guard rails
- Electrical insulated fixings
- Drinking water installations

MATERIAL

- **Threaded Zinc rod M8-M16:** cold formed steel NF A35-053
- **Threaded Zinc rod M20-M30:** 11 SMnPb37 - NFA 35-561
- **Threaded SS rod M8 - M24:** A4-70 acc. ISO 3506-1
- **Threaded SS rod M30:** A4-50 acc. ISO 3506-1
- **Zinc coating 5 µm min.** NF E25-009

INSTALLATION

Premium cleaning*



***Premium cleaning:**

2 x blowing with compressed air

2 x brushing with fitted on a drilling machine

2 x blowing with compressed air

Epoxy resin - High performance

Technical data

SPIT EPCON C8 resin with Zinc coated steel MAXIMA rod	Max. Anchor depth (mm)	Max. thick of part to be fixed (mm)	Min thick of base material (mm)	Ø Thread (mm)	drilling depth (mm)	Ø Drill bit (mm)	Ø Clearance (mm)	Total length (mm)	Tighening torque (Nm)	Code*
	h_{ef}	t_{fix}	h_{min}	d	h_0	d_0	d_f	L	T_{inst}	
EPCON C8 M8	80	15	110	8	80	10	9	110	10	050950
EPCON C8 M10	90	20	120	10	90	12	12	130	20	050960
EPCON C8 M12	110	25	140	12	110	14	14	160	30	050970
EPCON C8 M16	125	35	160	16	125	18	18	190	60	050980
EPCON C8 M20	170	65	220	20	170	25	22	260	120	655220
EPCON C8 M24	210	63	265	24	210	28	26	300	200	655240
EPCON C8 M30	280	70	350	30	280	35	33	380	400	050940
EPCON C8 Epoxy Resin, dual component cartridge					- vol. 450 ml					050883
EPCON C8 Epoxy Resin, dual component cartridge					- vol. 900 ml					055829

* These are zinc coated Maxima studs, for standard studs or SS studs see catalogue.

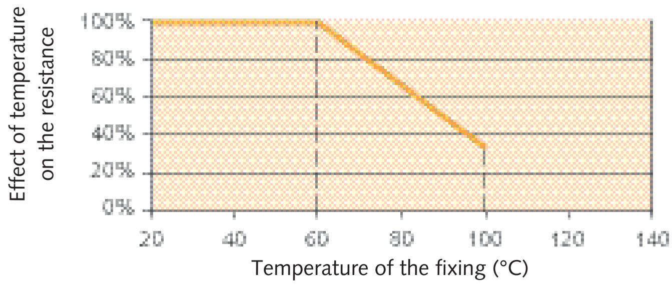
Anchor mechanical properties

Threaded (Maxima rod)		M8	M10	M12	M16	M20	M24	M30
f_{uk} (N/mm²)	Min. tensile strength Zinc	600	600	600	600	520	520	520
f_{yk} (N/mm²)	Yield strength Zinc	420	420	420	420	420	420	420
f_{uk} (N/mm²)	Min. tensile strength SS	700	700	700	700	700	700	500
f_{yk} (N/mm²)	Min. Yield strength SS	350	350	350	350	350	350	200
A_s (mm²)	Stressed cross-section	36.6	58	84.3	157	227	326.9	522.8
$M^0_{Rk,s}$ (Nm)	Characteristic bending moment Zinc	22	45	78	200	301	520	1052
$M^0_{Rk,s}$ (Nm)	Characteristic bending moment SS	22	45	80	207	405	700	1011
M (Nm)	Recommended bending moment Zinc	9.0	18.4	31.8	81.6	122.9	212.2	429.4
M (Nm)	Recommended bending moment SS	9.0	18.4	32.7	84.5	165.3	285.7	412.7

Setting time

Ambient temperature (°C)	SPIT EPCON C8 resin	
	Max. time for installation (min.)	Curing time (h)
40°C	5	6
30°C to 39°C	5	8
25°C to 29°C	8	12
20°C to 24°C	11	16
10°C to 19°C	14	23
5°C to 9°C	20	30

For temperatures below 0 ° C refer SPIT



Chemical resistance of the SPIT EPCON C8 anchor

Chemical substances	Concentration (%)	Resistance
Sulfuric acid	10	(o)
Hydrochlor ic acid	10	(o)
Nitric acid	10	(o)
Acetic acid	10	(o)
Ammonium hydroxide or ammoniac	10	(o)
Sodium Hypochlorite	5	(o)
Sodium hydroxide (or Caustic soda)	50	(o)

Substances chimiques	Concentration (%)	Résistance
Acetone		(-)
Toluène		(o)
Ethanol		(o)
Methyl-ethyl-ketone (MEK)		(-)
Methanol		(-)
Demineralized water		(+)
Sea water	100	(+)
Engine Petrol	100	(+)
Motor oil	100	(+)

SPIT EPCON C8

Standard embedment (Galvanized and SS)

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.

Number of sealings per cartridge

Anchor size	8	10	12	16	20	24	30
Ø Drilling (mm)	10	12	14	18	25	28	35
Drilling depth (mm)	80	90	110	125	170	210	280
Nb. of sealings for one cartridge							
EPCON C8 450 ml	165	120	83	56	12	11	5
EPCON C8 900 ml	331	241	167	112	25	22	10

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	M20	M24	M30
h_{ef} (mm)	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked concrete							
$N_{Ru,m}$	39,4	55,3	81,2	115,0	183,5	257,7	403,8
N_{Rk}	32,1	45,2	66,2	93,8	149,8	211,4	330,5
Cracked concrete							
$N_{Ru,m}$	27,0	37,7	55,1	82,5	139,4	205,4	340,4
N_{Rk}	20,8	29,1	42,3	63,6	107,3	157,9	261,3

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
$V_{Ru,m}$	15,92	22,75	32,8	56,2	73,6	115,0	177,7
V_{Rk}	10,98	18,9	25,3	46,8	59,02	95,8	135,9

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

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

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

*Derived from test results

TENSILE

Anchor size	M8	M10	M12	M16	M20	M24	M30
h_{ef} (mm)	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked concrete							
N_{Rd}	17,8	25,1	36,8	52,1	83,2	117,4	183,6
Cracked concrete							
N_{Rd}	11,6	16,1	23,5	35,3	59,6	87,7	145,1

γ_{Mc} = 1.8

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
V_{Rd}	7,7	13,2	17,7	32,7	39,3	63,9	90,6

γ_{Ms} = 1.43 for M8 to M16 and γ_{Ms} = 1.5 for M20 to M30

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

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

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

* derived from test results

TENSILE

Anchor size	M8	M10	M12	M16	M20	M24	M30
h_{ef} (mm)	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked concrete							
N_{Rec}	12,7	17,9	26,3	37,2	59,4	83,9	131,2
Cracked concrete							
N_{Rec}	8,3	11,5	16,8	25,2	42,6	62,7	103,7

γ_F = 1.4 ; γ_{Mc} = 1.8

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
V_{Rec}	5,5	9,4	12,6	23,4	28,1	45,6	64,7

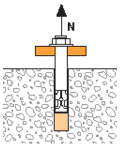
γ_F = 1.4 ; γ_{Ms} = 1.43 for M8 to M16 and γ_{Ms} = 1.5 for M20 to M30

SPIT EPCON C8

Standard embedment (Galvanized and SS)

SPIT CC- Method

TENSILE in kN

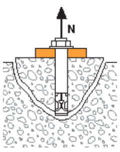


Pull - out resistance for dry and wet concrete (1)

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

$N^0_{Rd,p}$ Anchor size				Design pull - out resistance			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked	17,9	25,1	36,9	52,4	83,1	114,4	190,6
Cracked	10,6	14,9	20,7	29,7	50,4	74,8	102,6

$\gamma_{Mc} = 1.8$

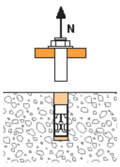


Concrete cone resistance for dry and wet concrete (1)

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

$N^0_{Rd,c}$				Design cone resistance			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked	20,0	23,9	32,3	39,1	62,1	85,2	131,2
Cracked	14,3	17,1	23,1	28,0	44,3	60,9	93,7

$\gamma_{Mc} = 1.8$

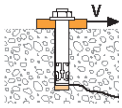


Steel resistance

$N_{Rd,s}$				Steel design tensile resistance			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
SPIT MAXIMA SS rod	12,3	19,8	28,9	54,5	85,0	122,5	91,3
SPIT MAXIMA Zinc rod	12,9	20,5	29,8	55,6	79,2	114,1	182,6
Std. rod grade 5.8*	12,0	19,3	28,0	52,0	81,3	118,0	186,7
Std. rod grade 8.8*	19,3	30,7	44,7	84,0	130,7	188,0	299,3
Std. rod grade 10.9*	26,4	41,4	60,0	112,1	175,0	252,1	400,7

MAXIMA rod: $\gamma_{Ms} = 1.71$ for M8-M16 and $\gamma_{Ms} = 1.49$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.5$ and 10.9 = $\gamma_{Ms} = 1.5$
MAXIMA SS rod : $\gamma_{Ms} = 1.87$ for M8-M24 and $\gamma_{Ms} = 2.86$ for M30

SHEAR in kN

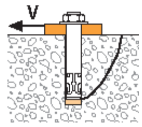


Concrete edge resistance

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

$V^0_{Rd,c}$				Design concrete edge resistance at minimun edge distance (C_{min})			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
h_{ef} (mm)	*80*	*90*	*110*	*125*	*170*	*210*	*280*
C_{min} (mm)	40	50	60	80	100	120	150
S_{min} (mm)	40	50	60	80	100	120	150
Non-cracked	2,5	3,8	5,5	9,4	15,4	21,9	34,6
Cracked	1,8	2,7	3,9	6,7	11	15,6	24,7

$\gamma_{Mc} = 1.5$

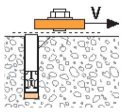


Pryout failure

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

$V^0_{Rd,cp}$				Design pryout resistance			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
h_{ef} (mm)	*80*	*90*	*110*	*125*	*170*	*210*	*280*
Non-cracked	35,7	47,8	64,6	78,3	124,1	170,4	262,4
Cracked	21,2	29,8	41,5	55,9	88,7	121,7	187,4

$\gamma_{Mcp} = 1.5$



Steel resistance

$V_{Rd,s}$				Steel design tensile resistance			
Anchor size	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
SPIT MAXIMA SS rod	7,3	11,9	17,3	32,7	51,3	73,1	55,0
SPIT MAXIMA Zinc rod	7,7	12,2	17,7	32,9	39,3	56,7	90,7
Std. rod grade 5.8*	7,36	11,6	16,9	31,2	48,8	70,4	112,0
Std. rod grade 8.8*	11,68	18,6	27,0	50,4	78,4	112,8	179,2
Std. rod grade 10.9*	12,2	19,3	28,1	52,0	81,3	117,3	186,7

MAXIMA SS rod : $\gamma_{Ms} = 1.56$ for M8-M24 and $\gamma_{Ms} = 2.38$ for M30
MAXIMA rod: $\gamma_{Ms} = 1.43$ for M8-M16 and $\gamma_{Ms} = 1.5$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.25$
Std. rod grade 10.9: $\gamma_{Ms} = 1.5$

(1) The concrete in the area of the anchorage is water saturated.

* Special grade available on request

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

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

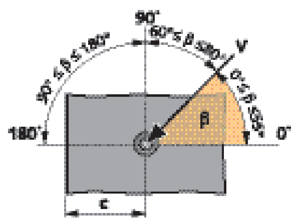
$$\beta_N + \beta_V \leq 1.2$$

f_B INFLUENCE OF CONCRETE

Concrete class	f_B
C25/30	1.02
C30/40	1.08
C40/60	1.10
C50/60	1.12

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

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

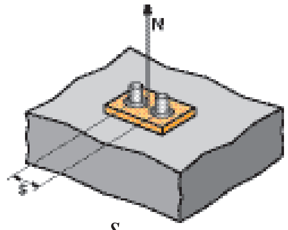


SPIT EPCON C8

Standard embedment (Galvanized and SS)

SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



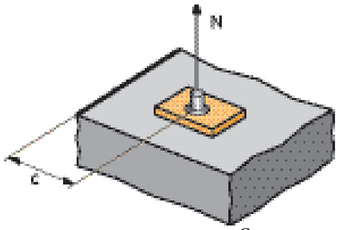
$$\Psi_S = 0,5 + \frac{s}{6.h_{ef}}$$

$S_{min} \le S \le S_{cr,N}$
$S_{cr,N} = 3.h_{ef}$
Ψ_S Must be used for each spacing influenced the anchors group.

SPACING S	Reduction factor Ψ_s Non-cracked concrete M8	M10	M12	M16
40	0,58			
50	0,60	0,59		
60	0,63	0,61	0,59	0,58
80	0,67	0,65	0,62	0,61
100	0,71	0,69	0,65	0,63
150	0,81	0,78	0,73	0,70
200	0,92	0,87	0,80	0,77
250	1,00	0,96	0,88	0,83
300		1,00	0,95	0,90
330			1,00	0,94
375				1,00

SPACING S	Reduction factor Ψ_s Non-cracked concrete M20	M24	M30
100	0,60		
120	0,62	0,60	
150	0,65	0,62	0,59
180	0,68	0,64	0,61
200	0,70	0,66	0,62
250	0,75	0,70	0,65
350	0,84	0,78	0,71
450	0,94	0,86	0,77
510	1,00	0,90	0,80
630		1,00	0,88
750		1,00	0,95
840			1,00

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



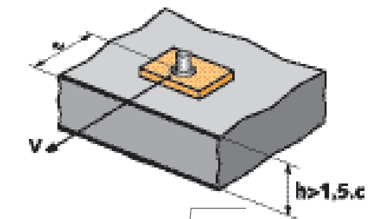
$$\Psi_{c,N} = 0,25 + 0,5 . \frac{c}{h_{ef}}$$

$C_{min} \le C \le C_{cr,N}$
$C_{cr,N} = 1,5.h_{ef}$
$\Psi_{c,N}$ Must be used for each spacing influenced the anchors group.

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete M8	M10	M12	M16
40	0,50			
50	0,56	0,53		
60	0,63	0,58	0,52	
80	0,75	0,69	0,61	0,57
120	1,00	0,92	0,80	0,73
135		1,00	0,86	0,79
165			1,00	0,91
190				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete M20	M24	M30
100	0,54		
120	0,60	0,54	
150	0,69	0,61	0,52
180	0,78	0,68	0,57
200	0,84	0,73	0,61
255	1,00	0,86	0,71
315		1,00	0,81
420			1,00

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

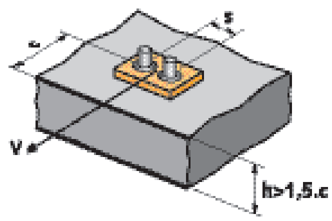


$$\Psi_{s-c,V} = \frac{c}{c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

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

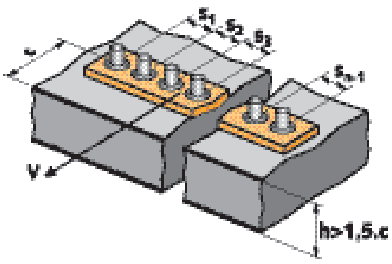


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

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

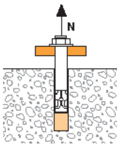
$$\Psi_{s-c,V} = \frac{3.c + s_1 + s_2 + s_3 + \ldots + s_{n-1}}{3.n.c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

SPIT EPCON C8

Embedment 12xØ (Galvanized and SS)

SPIT CC- Method

TENSILE in kN

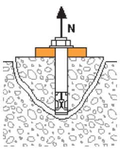


Pull - out resistance for dry and wet concrete (1)

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

$N^0_{Rd,p}$ Anchor size	Design pull - out resistance M8	M10	M12	M16	M20	M24	M30
h_{ef}	*95*	*120*	*144*	*192*	*220*	*280*	*330*
Non-cracked	21,2	33,5	48,3	80,4	107,5	152,5	224,6
Cracked	12,6	19,9	27,1	45,6	65,3	99,7	121,0

$\gamma_{Mc} = 1.8$

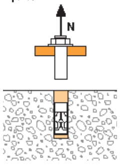


Concrete cone resistance for dry and wet concrete (1)

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

$N^0_{Rd,c}$ Anchor size	Design cone resistance M8	M10	M12	M16	M20	M24	M30
h_{ef}	*95*	*120*	*144*	*192*	*220*	*280*	*330*
Non-cracked	25,9	36,8	48,4	74,5	91,4	131,2	167,9
Cracked	18,5	26,3	34,6	53,2	65,3	93,7	119,9

$\gamma_{Mc} = 1.8$

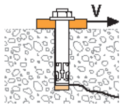


Steel resistance

$N_{Rd,s}$ Anchor size	Steel design tensile resistance M8	M10	M12	M16	M20	M24	M30
SPIT MAXIMA SS rod	12,3	19,8	28,9	54,5	85,0	122,5	91,3
SPIT MAXIMA Zinc rod	12,9	20,5	29,8	55,6	79,2	114,1	182,6
Std. rod grade 5.8*	12,0	19,3	28,0	52,0	81,3	118,0	186,7
Std. rod grade 8.8*	19,3	30,7	44,7	84,0	130,7	188,0	299,3
Std. rod grade 10.9*	26,4	41,4	60,0	112,1	175,0	252,1	400,7

MAXIMA rod: $\gamma_{Ms} = 1.71$ for M8-M16 and $\gamma_{Ms} = 1.49$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.5$ and 10.9 = $\gamma_{Ms} = 1.5$
MAXIMA SS rod: $\gamma_{Ms} = 1.87$ for M8-M24 and $\gamma_{Ms} = 2.86$ for M30

SHEAR in kN

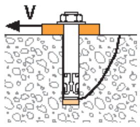


Concrete edge resistance

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

$V^0_{Rd,c}$ Anchor size	Design concrete edge resistance at minimun edge distance (C_{min}) M8	M10	M12	M16	M20	M24	M30
h_{ef} (mm)	*95*	*120*	*144*	*192*	*220*	*280*	*330*
C_{min} (mm) 40	50	60	80	100	120	150	
S_{min} (mm) 40	50	60	80	100	120	150	
Non-cracked	2,6	3,5	5,1	7,5	12,7	18,9	32,2
Cracked	1,8	2,5	3,6	5,3	9	13,5	23

$\gamma_{Mc} = 1.5$

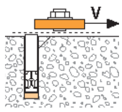


Pryout failure

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

$V^0_{Rd,cp}$ Anchor size	Design pryout resistance M8	M10	M12	M16	M20	M24	M30
h_{ef} (mm)	*95*	*120*	*144*	*192*	*220*	*280*	*330*
Non-cracked	42,4	67,0	96,5	149,0	182,7	262,4	335,7
Cracked	25,2	39,8	54,3	91,1	130,5	187,4	239,8

$\gamma_{Mcp} = 1.5$



Steel resistance

$V_{Rd,s}$ Anchor size	Steel design tensile resistance M8	M10	M12	M16	M20	M24	M30
SPIT MAXIMA SS rod	7,3	11,9	17,3	32,7	51,3	73,1	55,0
SPIT MAXIMA Zinc rod	7,7	12,2	17,7	32,9	39,3	56,7	90,7
Std. rod grade 5.8*	7,36	11,6	16,9	31,2	48,8	70,4	112,0
Std. rod grade 8.8*	11,68	18,6	27,0	50,4	78,4	112,8	179,2
Std. rod grade 10.9*	12,2	19,3	28,1	52,0	81,3	117,3	186,7

MAXIMA rod : $\gamma_{Ms} = 1.56$ for M8-M24 and $\gamma_{Ms} = 2.38$ for M30
MAXIMA Zinc rod: $\gamma_{Ms} = 1.43$ for M8-M16 and $\gamma_{Ms} = 1.5$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.25$
Std. rod grade 10.9: $\gamma_{Ms} = 1.5$

(1) The concrete in the area of the anchorage is water saturated.

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

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

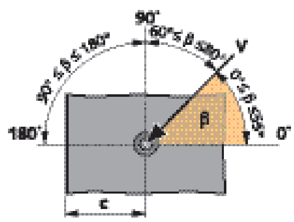
$$\beta_N + \beta_V \le 1.2$$

f_B INFLUENCE OF CONCRETE

Concrete class	f_B
C25/30	1.02
C30/40	1.08
C40/60	1.10
C50/60	1.12

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

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

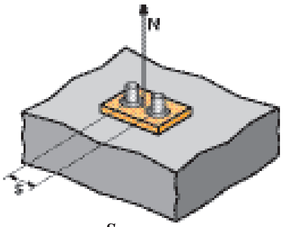


SPIT EPCON C8

Embedment 12xØ (Galvanized and SS)

SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



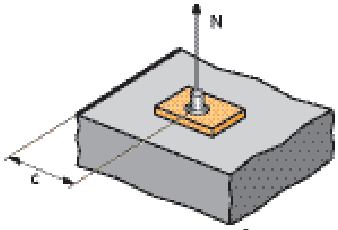
$$\Psi_s = 0,5 + \frac{s}{6.h_{ef}}$$

$S_{min} \leq S \leq S_{cr,N}$
$S_{cr,N} = 3.h_{ef}$
Ψ_S Must be used for each spacing influenced the anchors group.

SPACING S	Reduction factor Ψ_s Non-cracked concrete			
	M8	M10	M12	M16
40	0,57			
50	0,59	0,57		
60	0,61	0,58	0,57	0,55
80	0,64	0,61	0,59	0,57
100	0,68	0,64	0,62	0,59
150	0,76	0,71	0,67	0,63
200	0,85	0,78	0,73	0,67
290	1,00	0,90	0,84	0,75
360		1,00	0,92	0,81
435			1,00	0,88
580				1,00

SPACING S	Reduction factor Ψ_s Non-cracked concrete		
	M20	M24	M30
100	0,58		
120	0,59	0,57	
150	0,61	0,59	0,58
180	0,64	0,61	0,59
200	0,65	0,62	0,60
250	0,69	0,65	0,63
300	0,73	0,68	0,65
400	0,80	0,74	0,70
500	0,88	0,80	0,75
660	1,00	0,89	0,83
840		1,00	0,92
990			1,00

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



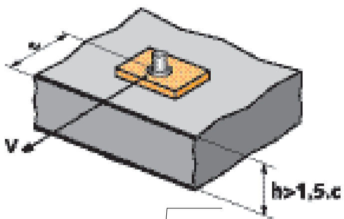
$$\Psi_{c,N} = 0,25 + 0,5 . \frac{c}{h_{ef}}$$

$C_{min} \leq C \leq C_{cr,N}$
$C_{cr,N} = 1,5.h_{ef}$
$\Psi_{c,N}$ Must be used for each spacing influenced the anchors group.

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete			
	M8	M10	M12	M16
40	0,46			
50	0,51	0,46		
60	0,57	0,50	0,46	
80	0,67	0,58	0,53	0,46
145	1,00	0,85	0,75	0,63
180		1,00	0,88	0,72
215			1,00	0,81
290				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete		
	M20	M24	M30
100	0,48		
120	0,52	0,46	
150	0,59	0,52	0,48
200	0,70	0,61	0,55
250	0,82	0,70	0,63
330	1,00	0,84	0,75
420		1,00	0,89
500			1,00

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

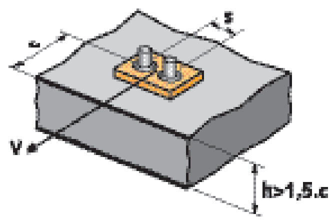


$$\Psi_{s-c,V} = \frac{c}{c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

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

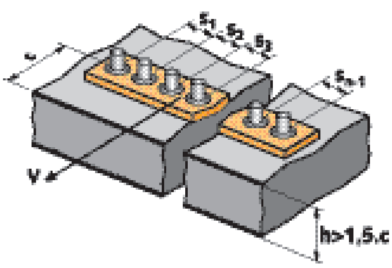


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

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	4.65



For 3 anchors fastening and more

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

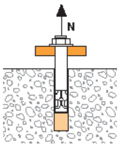
Chemische Ankers

SPIT EPCON C8

Embedment 16xØ (Galvanized and SS)

SPIT CC- Methode

TENSILE in kN

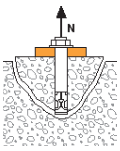


Pull - out resistance for dry and wet concrete (1)

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

$N^0_{Rd,p}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
				Design pull - out resistance			
h_{ef}	*128*	*160*	*192*	*256*	*320*	*384*	*480*
Non-cracked	28,6	44,7	64,3	107,2	156,4	209,1	326,7
Cracked	17,0	26,5	36,2	60,8	94,9	136,7	175,9

$\gamma_{Mc} = 1.8$

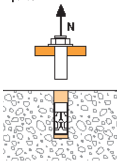


Concrete cone resistance for dry and wet concrete (1)

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

$N^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
					Design cone resistance		
h_{ef}	*128*	*160*	*192*	*256*	*320*	*384*	*480*
Non-cracked	40,5	56,7	74,5	114,7	160,3	210,7	294,5
Cracked	29,0	40,5	53,2	81,9	114,5	150,5	210,3

$\gamma_{Mc} = 1.8$

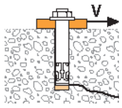


Steel resistance

$N_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
			Steel design tensile resistance				
Std. rod grade 5.8*	12,0	19,3	28,0	52,0	81,3	118,0	186,7
Std. rod grade 8.8*	19,3	30,7	44,7	84,0	130,7	188,0	299,3
Std. rod grade 10.9*	26,4	41,4	60,0	112,1	175,0	252,1	400,7

MAXIMA rod: $\gamma_{Ms} = 1.71$ for M8-M16 and $\gamma_{Ms} = 1.49$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.5$ and $10.9 = \gamma_{Ms} = 1.5$
MAXIMA SS rod: $\gamma_{Ms} = 1.87$ for M8-M24 and $\gamma_{Ms} = 2.86$ for M30

SHEAR in kN

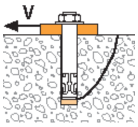


Concrete edge resistance

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

$V^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
			Design concrete edge resistance at minimun edge distance (C_{min})				
h_{ef} (mm)	*128*	*160*	*192*	*256*	*320*	*384*	*480*
C_{min} (mm) 40	50	60	80	100	120	150	
S_{min} (mm) 40	50	60	80	100	120	150	
Non-cracked	2,8	3,7	5,4	7,9	13,7	20,2	34,7
Cracked	2	2,6	3,8	5,6	9,7	14,4	24,7

$\gamma_{Mc} = 1.5$

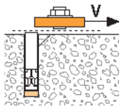


Pryout failure

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

$V^0_{Rd,cp}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
				Design pryout resistance			
h_{ef} (mm)	*128*	*160*	*192*	*256*	*320*	*384*	*480*
Non-cracked	57,2	89,4	128,7	214,5	312,8	418,2	588,9
Cracked	34,0	53,1	72,4	121,5	189,9	273,4	351,9

$\gamma_{Mcp} = 1.5$



Steel resistance

$V_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
				Steel design tensile resistance			
Std. rod grade 5.8*	7,36	11,6	16,9	31,2	48,8	70,4	112,0
Std. rod grade 8.8*	11,68	18,6	27,0	50,4	78,4	112,8	179,2
Std. rod grade 10.9*	12,2	19,3	28,1	52,0	81,3	117,3	186,7

MAXIMA SS rod: $\gamma_{Ms} = 1.56$ for M8-M24 and $\gamma_{Ms} = 2.38$ voor M30

MAXIMA zinc rod: $\gamma_{Ms} = 1.43$ for M8-M16 and $\gamma_{Ms} = 1.5$ for M20-M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.25$
Std. rod grade 10.9: $\gamma_{Ms} = 1.5$
(1) The concrete in the area of the anchorage is water saturated.

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

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

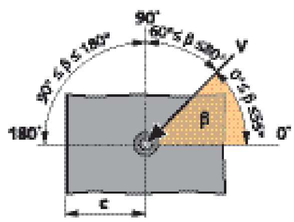
$$\beta_N + \beta_V \leq 1.2$$

f_B INFLUENCE OF CONCRETE

Concrete class	f_B
C25/30	1.02
C30/40	1.08
C40/60	1.10
C50/60	1.12

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

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

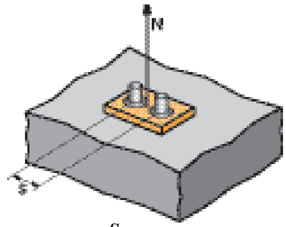


SPIT EPCON C8

Embedment 16xØ (Galvanized and SS)

SPIT CC- Methode

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



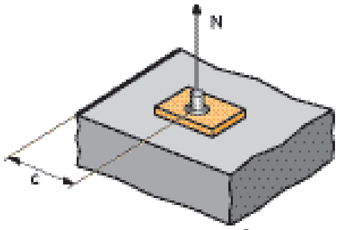
$$\Psi_S = 0,5 + \frac{s}{6.h_{ef}}$$

$S_{min} \leq S \leq S_{cr,N}$
$S_{cr,N} = 3.h_{ef}$
Ψ_S Must be used for each spacing influenced the anchors group.

SPACING S	Reduction factor Ψ_s Non-cracked concrete			
	M8	M10	M12	M16
40	0,55			
50	0,57	0,55		
60	0,58	0,56	0,55	0,54
80	0,60	0,58	0,57	0,55
120	0,66	0,63	0,60	0,58
200	0,76	0,71	0,67	0,63
250	0,83	0,76	0,72	0,66
385	1,00	0,90	0,83	0,75
480		1,00	0,92	0,81
580			1,00	0,88
770				1,00

SPACING S	Reduction factor Ψ_s Non-cracked concrete		
	M20	M24	M30
100	0,55		
120	0,56	0,55	
150	0,58	0,57	0,55
250	0,63	0,61	0,59
350	0,68	0,65	0,62
550	0,79	0,74	0,69
650	0,84	0,78	0,73
750	0,89	0,83	0,76
850	0,94	0,87	0,80
960	1,00	0,92	0,83
1150		1,00	0,90
1440			1,00

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



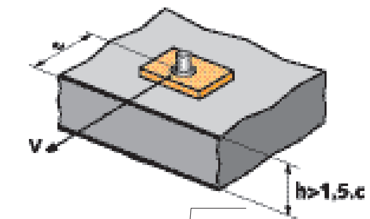
$$\Psi_{c,N} = 0,25 + 0,5 . \frac{c}{h_{ef}}$$

$C_{min} \leq C \leq C_{cr,N}$
$C_{cr,N} = 1,5.h_{ef}$
$\Psi_{c,N}$ Must be used for each spacing influenced the anchors group.

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete			
	M8	M10	M12	M16
40	0,41			
50	0,45	0,41		
60	0,48	0,44	0,41	
80	0,56	0,50	0,46	0,41
190	0,99	0,84	0,74	0,62
240		1,00	0,88	0,72
290			1,00	0,82
385				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete		
	M20	M24	M30
100	0,41		
120	0,44	0,41	
150	0,48	0,45	0,41
250	0,64	0,58	0,51
300	0,72	0,64	0,56
480	1,00	0,88	0,75
580		1,00	0,85
720			1,00

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

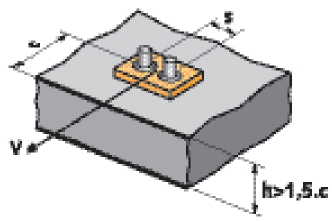


$$\Psi_{s-c,V} = \frac{c}{c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

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

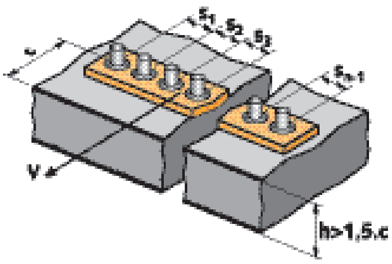


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} . \sqrt{\frac{c}{c_{min}}}$$

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	4.65



For 3 anchors fastening and more

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

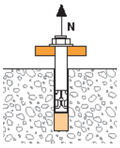
Chemische Ankers

SPIT EPCON C8

Embedment 20xØ (Galvanized and SS)

SPIT CC- Methode

TENSILE in kN

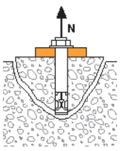


Pull - out resistance for dry and wet concrete (1)

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

$N^0_{Rd,p}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design pull - out resistance						
h_{ef}	*160*	*200*	*240*	*320*	*400*	*480*	*600*
Non-cracked	35,7	55,9	80,4	134,0	195,5	261,4	408,4
Cracked	21,2	33,2	45,2	76,0	118,7	170,9	219,9

γ_{Mc} = 1.8 Voor de technische gegevens van gescheurd beton zie website www.spit.com

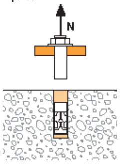


Concrete cone resistance for dry and wet concrete (1)

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

$N^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design cone resistance						
h_{ef}	*160*	*200*	*240*	*320*	*400*	*480*	*600*
Non-cracked	56,7	79,2	104,1	160,3	224,0	294,5	411,5
Cracked	40,5	56,6	74,4	114,5	160,0	210,3	293,9

γ_{Mc} = 1.8 Voor de technische gegevens van gescheurd beton zie website www.spit.com

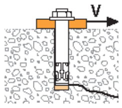


Steel resistance

$N_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Steel design tensile resistance						
Std. rod grade 5.8*	12,0	19,3	28,0	52,0	81,3	118,0	186,7
Std. rod grade 8.8*	19,3	30,7	44,7	84,0	130,7	188,0	299,3
Std. rod grade 10.9*	26,4	41,4	60,0	112,1	175,0	252,1	400,7

MAXIMA rod: γ_{Ms} = 1.71 for M8-M16 and γ_{Ms} = 1.49 for M20-M30
Std. rod grade 5.8 and 8.8: γ_{Ms} = 1.5 and 10.9 = γ_{Ms} = 1.5
MAXIMA SS rod: γ_{Ms} = 1.87 for M8-M24 and γ_{Ms} = 2.86 for M30

SHEAR in kN

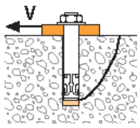


Concrete edge resistance

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

$V^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design concrete edge resistance at minimun edge distance (C_{min})						
h_{ef} (mm)	*160*	*200*	*240*	*320*	*400*	*480*	*600*
C_{min} (mm) 40	50	60	80	100	120	150	
S_{min} (mm) 40	50	60	80	100	120	150	
Non-cracked	2,9	3,9	5,7	8,3	14,3	21,1	36,3
Cracked	2	2,7	4	5,9	10,2	15	25,9

γ_{Mc} = 1.5

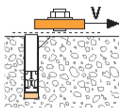


Pryout failure

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

$V^0_{Rd,cp}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design pryout resistance						
h_{ef} (mm)	*160*	*200*	*240*	*320*	*400*	*480*	*600*
Non-cracked	71,5	111,7	160,8	268,1	391,0	522,8	816,8
Cracked	42,4	66,3	90,5	151,9	237,4	341,8	439,8

γ_{Mcp} = 1.5



Steel resistance

$V_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Steel design tensile resistance						
Std. rod grade 5.8*	7,36	11,6	16,9	31,2	48,8	70,4	112,0
Std. rod grade 8.8*	11,68	18,6	27,0	50,4	78,4	112,8	179,2
Std. rod grade 10.9*	12,2	19,3	28,1	52,0	81,3	117,3	186,7

MAXIMA SS rod: γ_{Ms} = 1.56 for M8-M24 and γ_{Ms} = 2.38 for M30

MAXIMA zinc rod: γ_{Ms} = 1.43 for M8-M16 and γ_{Ms} = 1.5 for M20-M30
Std. rod grade 5.8 and 8.8: γ_{Ms} = 1.25
Std. rod grade 10.9: γ_{Ms} = 1.5

(1) The concrete in the area of the anchorage is water saturated.

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

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

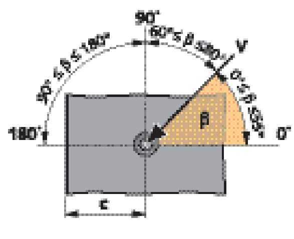
$$\beta_N + \beta_V \leq 1.2$$

f_B INFLUENCE OF CONCRETE

Concrete class	f_B
C25/30	1.02
C30/40	1.08
C40/60	1.10
C50/60	1.12

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

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

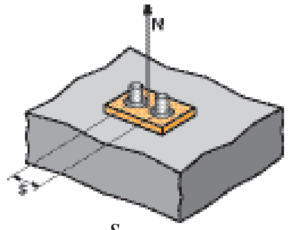


SPIT EPCON C8

Embedment 20xØ (Galvanized and SS)

SPIT CC- Methode

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



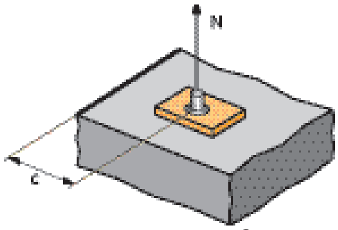
$$\Psi_S = 0{,}5 + \frac{s}{6.h_{ef}}$$

$S_{min} \leq S \leq S_{cr,N}$
$S_{cr,N} = 3.h_{ef}$
Ψ_S Must be used for each spacing influenced the anchors group.

SPACING S	Reduction factor Ψ_s Non-cracked concrete			
	M8	M10	M12	M16
40	0,54			
50	0,55	0,54		
60	0,56	0,55	0,54	0,53
80	0,58	0,57	0,56	0,54
150	0,66	0,63	0,60	0,58
250	0,76	0,71	0,67	0,63
350	0,86	0,79	0,74	0,68
480	1,00	0,90	0,83	0,75
600		1,00	0,92	0,81
720			1,00	0,88
960				1,00

SPACING S	Reduction factor Ψ_s Non-cracked concrete		
	M20	M24	M30
100	0,54		
120	0,55	0,54	
150	0,56	0,55	0,54
250	0,60	0,59	0,57
350	0,65	0,62	0,60
450	0,69	0,66	0,63
600	0,75	0,71	0,67
800	0,83	0,78	0,72
1000	0,92	0,85	0,78
1200	1,00	0,92	0,83
1450		1,00	0,90
1800			1,00

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



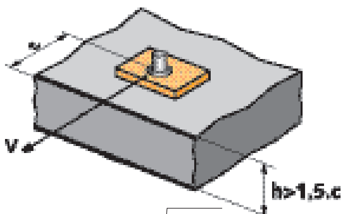
$$\Psi_{c,N} = 0{,}25 + 0{,}5\,.\frac{c}{h_{ef}}$$

$C_{min} \leq C \leq C_{cr,N}$
$C_{cr,N} = 1{,}5.h_{ef}$
$\Psi_{c,N}$ Must be used for each spacing influenced the anchors group.

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete			
	M8	M10	M12	M16
40	0,38			
50	0,41	0,38		
60	0,44	0,40	0,38	
80	0,50	0,45	0,42	0,38
240	1,00	0,85	0,75	0,63
300		1,00	0,88	0,72
360			1,00	0,81
480				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete		
	M20	M24	M30
100	0,38		
120	0,40	0,38	
150	0,44	0,41	0,38
250	0,56	0,51	0,46
400	0,75	0,67	0,58
600	1,00	0,88	0,75
720		1,00	0,85
900			1,00

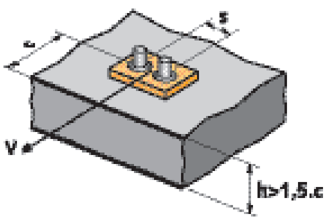
$\Psi_{s\text{-}c,V}$ INFLUENCE OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD



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

For single anchor fastening

$\frac{C}{C_{min}}$	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
$\Psi_{s\text{-}c,V}$ (Factor $\Psi_{s\text{-}c,V}$, Non-cracked concrete)	1.00	1.31	1.66	2.02	2.41	2.83	3.26	3.72	4.19	4.69	5.20	5.72

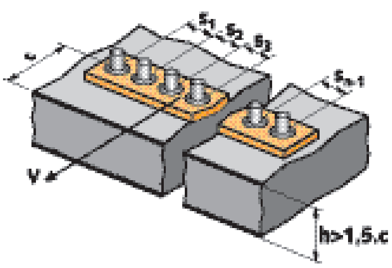


$$\Psi_{s-c,V} = \frac{3.c+s}{6.c_{\min}}.\sqrt{\frac{c}{c_{\min}}}$$

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

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

Chemische Ankers