

SPIT EPCON

Zinc coated steel

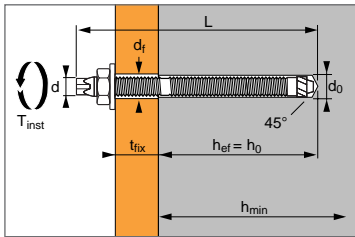


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➤ Epoxy resin - High performance

Technical data

Zinc coated steel MAXIMA rod with SPIT EPCON resin	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 rod length (mm)	Max. tighten torque (Nm)	Code
	h_{ef}	t_{fix}	h_{min}	d	h_o	d_o	d_f	L	T_{inst}	
EPCON M8	80	15	120	8	80	10	9	110	10	050950
EPCON M10	90	20	130	10	90	12	12	130	20	050960
EPCON M12	110	25	160	12	110	14	14	160	30	050970
EPCON M16	125	35	175	16	125	18	18	190	60	050980
EPCON M20	170	65	220	20	170	25	22	260	120	655220
EPCON M24	210	63	270	24	210	28	26	300	200	655240
EPCON M30	280	70	340	30	280	35	33	380	400	050940
EPOXY CERAMIC 6 Dual component cartridge, 100% epoxy resin								- vol. 530 ml		063220
								- vol. 200 ml		062630



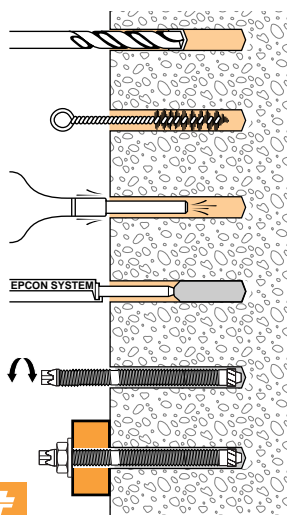
APPLICATION

- Fixing steel framed structures,
- Fixing machinery (resistant to vibration)
- Insulating fixings (public lighting, cable trays, etc.) (high dielectric strength, 10 000 volts)
- Waterproof fixings (dams, etc.)
- Fixing for protective barriers, safety rails
- Waterproof fixings for potable water reservoirs

MATERIAL

- Threaded rod M8-M16: cold formed steel NF A35-053
- Threaded rod M20-M30: 11 SMnPb37 - NFA 35-561
- Nut: Steel, EN 20898-2 grade 6 or 8
- Washer: Steel DIN 513
- Zinc coating 5 µm min. NF E25-009

INSTALLATION

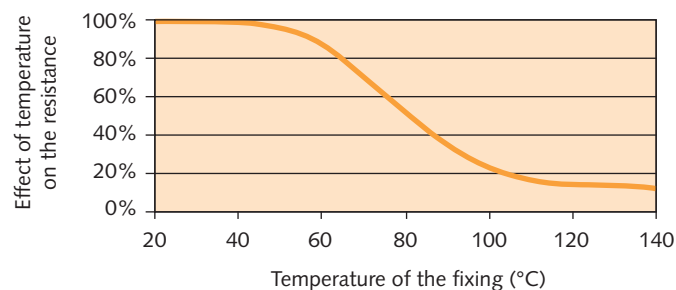


Anchor mechanical properties

Threaded part	M8	M10	M12	M16	M20	M24	M30
f_{uk} (N/mm ²) Min. tensile strength	600	600	600	600	520	520	520
f_{yk} (N/mm ²) Yield strength	420	420	420	420	420	420	420
A_s (mm ²) Stressed cross-section	36,6	58	84,3	157	227	326,9	522,8
W_{el} (mm ³) Elastic section modulus	31,2	62,3	109,2	277,5	482,4	833,7	1686,0
$M^{0}_{Rk,s}$ (Nm) Characteristic bending moment	22	45	78	200	301	520	1052
M (Nm) Recommended bending moment	9,0	18,4	31,8	81,6	122,9	212,2	429,4

Setting time before tightening torque and applying a load

Ambient temperature (°C)	SPIT EPCON resin		
	Max. time for installation (min.)	Waiting time before applying user loads (h)	Waiting time before torque application (h)
32°C	5	1	3
21°C	7	1	3
16°C	10	1,5	3,5
10°C	20	2	4
4°C	45	3	5



Chemical resistance of the SPIT EPCON anchor

Chemical substances	Concentration (%)	Resistance	Chemical substances	Concentration (%)	Resistance
Ammonium hydroxide	8,5	(o)	Saturated salt solution	100	(+)
Hydrochloric acid (HCL)	3,5	(o)	Sodium hypochlorite (NaOClO4)	5	
Nitric acid	10	(o)	Sulphuric acid (H2SO4)	10	(o)
Petrol	100	(+)	Toluene	100	(o)
Phosphoric acid (H3PO4)	9	(o)	Xylene	100	(+)
Pure water	100	(+)			

Resistant (+): the samples in contact with the substances did not show any visible damage such as cracks, attacked surfaces, burst corners nor large swelling.

Sensitive (o): use with care regarding exposure of the field of usage, precautions to be taken. The samples in contact with the substance slightly attacked the material.

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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.

Number of sealings per cartridge

Studs diameter	8	10	12	16	20	24	30
Drilling Ø (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 200	35	24	15	6	3	2	2
EPCON 530	106	71	46	19	9	7	3

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}	80	90	110	125	170	210	280
$N_{Ru,m}$	24,3	30,4	43,2	76,0	115,0	165,0	275,0
N_{Rk}	19,5	24,4	34,6	60,8	92,0	132,0	220,0

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
$V_{Ru,m}$	13,1	21,7	23,32	45,2	73,7	114,7	168,3
V_{Rk}	10,8	15,8	19,6	37,2	69,5	96,6	146,5

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	M8	M10	M12	M16	M20	M24	M30
h_{ef}	80	90	110	125	170	210	280
N_{Rd}	9,0	11,3	16,0	28,1	42,6	61,1	101,9

$\gamma_{Mc} = 2,16$

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
V_{Rd}	7,6	11,0	13,7	26,0	46,3	64,4	97,7

$\gamma_{Ms} = 1,43$ for M8 to M16 and $\gamma_{Ms} = 1,5$ for M20 to M30

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	M20	M24	M30
h_{ef}	80	90	110	125	170	210	280
N_{Rec}	6,4	8,1	11,4	20,1	30,4	43,7	72,8

$\gamma_F = 1,4$; $\gamma_{Mc} = 2,16$

SHEAR

Anchor size	M8	M10	M12	M16	M20	M24	M30
V_{Rec}	5,4	7,9	9,8	18,6	33,1	46,0	69,8

$\gamma_F = 1,4$; $\gamma_{Ms} = 1,43$ for M8 to M16 and $\gamma_{Ms} = 1,5$ for M20 to M30

SPIT EPCON

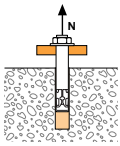
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SPIT CC- Method

TENSILE in kN

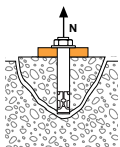


▮ Pull-out resistance

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

$N_{Rd,p}^O$	Design pull-out resistance						
Anchor size	M8	M10	M12	M16	M20	M24	M30
-40°C to +40°C							
h_{ef}	80	90	110	125	170	210	280
$N_{Rd,p}^O$	9,3	11,6	16,2	27,8	44,0	53,2	78,7

$\gamma_{Mc} = 2,16$

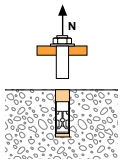


▮ Concrete cone resistance

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

$N_{Rd,c}^O$	Design cone resistance						
Anchor size	M8	M10	M12	M16	M20	M24	M30
-40°C to +40°C							
h_{ef}	80	90	110	125	170	210	280
$N_{Rd,c}^O$	7,4	11,6	18,5	27,8	34,7	53,2	64,8

$\gamma_{Mc} = 2,16$



▮ Steel resistance

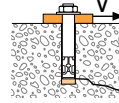
$N_{Rd,s}$	Steel design tensile resistance						
Anchor size	M8	M10	M12	M16	M20	M24	M30
SPIT MAXIMA rod	12,9	20,5	29,8	55,6	79,2	114,1	182,6
Std. rod grade 5.8*	12,0	19,3	28,0	52,0	81,3	118,0	186,7
Std. rod grade 8.8*	19,3	30,7	44,7	84,0	130,7	188,0	299,3
Std. rod grade 10.9*	26,4	41,4	60,0	112,1	175,0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

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

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

SHEAR in kN

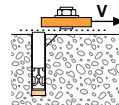


▮ Concrete edge resistance

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

$V_{Rd,c}^O$	Design concrete edge resistance at minimum edge distance (C_{min})						
Anchor size	M8	M10	M12	M16	M20	M24	M30
h_{ef}	80	90	110	125	170	210	280
C_{min}	40	45	55	65	85	105	140
S_{min}	40	45	55	65	85	105	140
$V_{Rd,c}^O$	2,1	2,7	4,0	5,7	10,1	14,9	26,0

$\gamma_{Mc} = 1,8$



▮ Steel resistance

$V_{Rd,s}$	Steel design shear resistance						
Anchor size	M8	M10	M12	M16	M20	M24	M30
SPIT MAXIMA 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 : $\gamma_{Ms} = 1,43$ 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 : $\gamma_{Ms} = 1,5$

* Special grade available on request

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

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

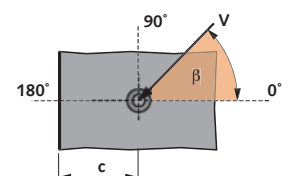
$$\beta_N^{1,5} + \beta_V^{1,5} \leq 1$$

f_B INFLUENCE OF CONCRETE

Concrete class	f_B
C20/25	1
C30/40	1,14
C40/60	1,26
C50/60	1,34

$f_{\beta,V}$ 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



SPIT EPCON

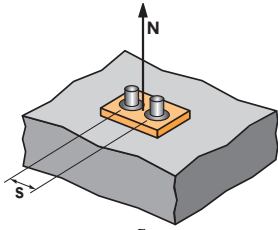
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SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_s = 0,5 + \frac{s}{4 \cdot h_{ef}}$$

$$s_{min} < s < s_{cr,N}$$

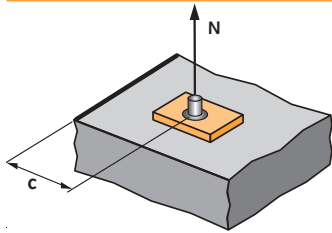
$$s_{cr,N} = 3 \cdot h_{ef}$$

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

SPACING S	Reduction factor Ψ_s Non-cracked concrete			
	M8	M10	M12	M16
40	0,63			
45	0,64	0,63		
55	0,67	0,65	0,63	0,61
65	0,70	0,68	0,65	0,63
85	0,77	0,74	0,69	0,67
105	0,83	0,79	0,74	0,71
140	0,94	0,89	0,82	0,78
160	1,00	0,94	0,86	0,82
180		1,00	0,91	0,86
220			1,00	0,94
250				1,00

SPACING S	Reduction factor Ψ_s Non-cracked concrete		
	M20	M24	M30
85	0,63		
105	0,65	0,63	
140	0,71	0,67	0,63
160	0,74	0,69	0,64
180	0,76	0,71	0,66
220	0,82	0,76	0,70
250	0,87	0,80	0,72
300	0,94	0,86	0,77
340	1,00	0,90	0,80
370		0,94	0,83
450		1,00	0,90
560			1,00

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



$$\Psi_{c,N} = 0,27 + 0,725 \cdot \frac{c}{h_{ef}}$$

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

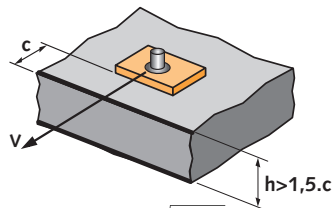
$$c_{cr,N} = 1,5 \cdot h_{ef}$$

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

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete			
	M8	M10	M12	M16
40	0,63			
45	0,68	0,63		
55	0,77	0,71	0,63	
65	0,86	0,79	0,70	0,66
85	1,00	0,95	0,83	0,76
90		1,00	0,86	0,79
110			1,00	0,91
125				1,00

EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete		
	M20	M24	M30
85	0,63		
105	0,72	0,63	
120	0,78	0,68	
140	0,87	0,75	0,63
170	1,00	0,86	0,71
210		1,00	0,81
250			0,92
280			1,00

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

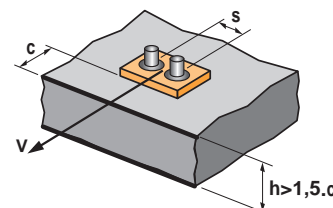


$$\Psi_{s-c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

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



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

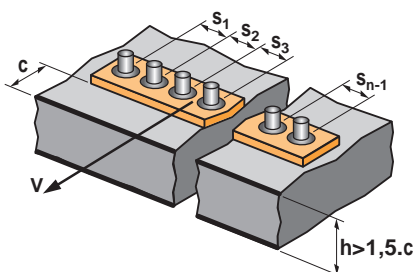
For 2 anchors fastening

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
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 other case of fastenings

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



Chemical anchors