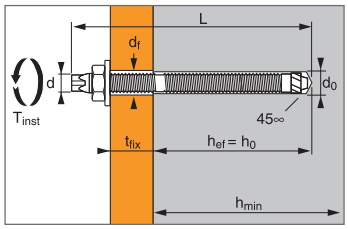
Epcon C8
Zinc Coated Steel

European Technical Approval

ETA Option 1

APPROVED WRAS MATERIAL n° 0901501



Applications

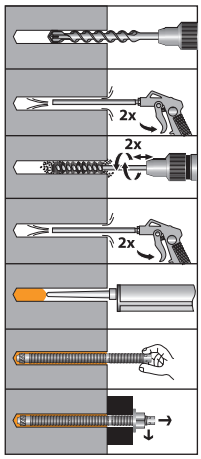
- Fixing steel framed structures
- Fixing machinery (resistant to vibration)
- Fixing protective barriers and safety rails

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

Premium cleaning*



***Premium cleaning:**

- Blow with compressed air X2
- Clean with a brush attached to a drilling machine X2
- Blow with compressed air X2

Epoxy resin - extreme performance

Technical data

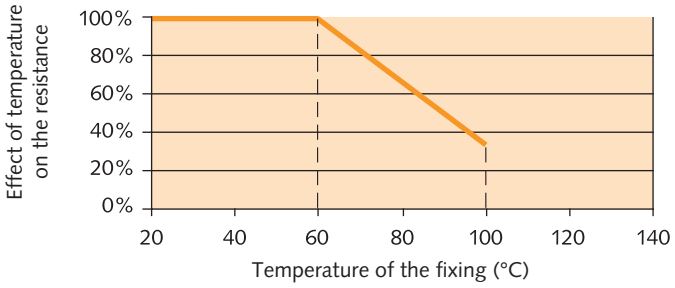
SPIT EPCON C8 resin with Zinc coated steel MAXIMA rod	Max. anchor depth (mm)	Max. thick of part to be fixed (mm)	Min thick of base material (mm)	Ø Thread (mm)	Drilling depth (mm)	Ø Drill bit (mm)	Ø Clearance (mm)	Total length (mm)	Tighten torque (Nm)	Eurocode
	h_{ef}	t_{fix}	h_{min}	d	h_o	d_o	d_f	L	T_{inst}	
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										050085

Anchor mechanical properties

Threaded part (Maxima rod)		M8	M10	M12	M16	M20	M24	M30
f_{uk} (N/mm²)	Min. tensile strength	600	600	600	600	520	520	520
f_{yk}(N/mm²)	Yield strength	420	420	420	420	420	420	420
As (mm²)	Stressed cross-section	36.6	58	84.3	157	227	326.9	522.8
W_{el} (mm³)	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

Ambient temperature (°C)	SPIT EPCON C8 resin		
	Max. time for installation (min.)	Waiting time for 45% load (h)	Curing time (h)
40°C	5	3	6
30°C	8	5	8
20°C	14	6	12
10°C	20	12	23
5°C	26	15	26



Chemical resistance of the SPIT EPCON C8 resin

Chemical substances	Concentration (%)	Resistance
Sulfuric acid	10	(o)
Hydrochloric 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 (%)	Resistance
Acetone		(-)
Toluène		(o)
Ethanol		(o)
Methyl-ethyl-ketone (MEK)		(-)
Methanol		(-)
Demineralized water		(+)
Sea water	100	(+)
Engine Petrol	100	(+)
Motor oil	100	(+)

The loads specified on this page are derived from internal test results. For results derived from CC Methodology, please see overleaf. The data given in the pages "CC - Method" have to be applied.

Number of fixings per cartridge

Anchor size	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
Number of fixings for one cartridge							
EPCON C8 450 ml	166	121	83	56	12	11	5

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*
$N_{Ru,m}$	34.8	50.7	78.9	82.9	136.4	202.3	315.0
N_{Rk}	33.9	42.3	62.0	69.1	102.3	151.7	252.8

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

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

*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}	18.8	23.5	34.5	38.4	56.9	84.3	140.4

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 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	M20	M24	M30
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
N_{Rec}	13.5	16.8	24.6	27.4	40.6	60.2	100.3

γ_{F} = 1.4 ; γ_{Mc} = 1.8

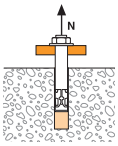
SHEAR

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 CC - Method

TENSILE in kN

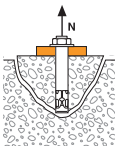


Pull-out resistance for dry and wet concrete (1)

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

$N^0_{Rd,p}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design pull-out resistance						
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
-40°C to +40°C	13.9	19.4	27.8	33.3	52.8	63.9	94.4
-40°C to +80°C	8.9	13.9	19.4	22.2	33.3	52.8	63.9

$\gamma_{Mc} = 1.8$

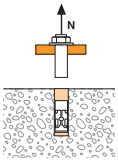


Concrete cone resistance for dry and wet concrete (1)

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

$N^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design cone resistance						
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
-40°C to +40°C	13.9	19.4	27.8	33.3	52.8	63.9	94.4
-40°C to +80°C	8.9	13.9	19.4	22.2	33.3	52.8	63.9

$\gamma_{Mc} = 1.8$

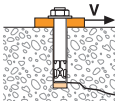


Steel resistance

$N_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design steel tensile resistance						
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 to M16 and $\gamma_{Ms} = 1.49$ for M20 to M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.5$
Std. rod grade 10.9: $\gamma_{Ms} = 1.4$

SHEAR in kN

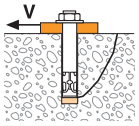


Concrete edge resistance

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

$V^0_{Rd,c}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design concrete edge resistance at minimum edge distance (C_{min})						
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
$V^0_{Rd,c}$	2.5	3.3	4.8	6.9	12.1	17.9	31.2

$\gamma_{Mc} = 1.5$

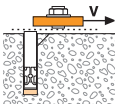


Pryout failure

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

$V^0_{Rd,cp}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design pryout resistance						
h_{ef}	*80*	*90*	*110*	*125*	*170*	*210*	*280*
-40°C to +40°C	33.3	46.7	66.7	80.0	126.7	153.3	226.7
-40°C to +80°C	21.3	33.3	46.7	53.3	80.0	126.7	153.3

$\gamma_{Mcp} = 1.5$



Steel resistance

$V_{Rd,s}$ Anchor size	M8	M10	M12	M16	M20	M24	M30
	Design steel shear resistance						
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: $\gamma_{Ms} = 1.71$ for M8 to M16 and $\gamma_{Ms} = 1.49$ for M20 to M30
Std. rod grade 5.8 and 8.8: $\gamma_{Ms} = 1.5$
Std. rod grade 10.9: $\gamma_{Ms} = 1.4$

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

* Special grade available on request

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

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

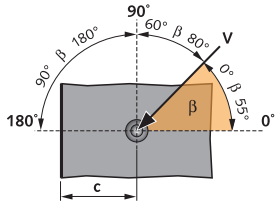
$$\beta_N + \beta_V \leq 1.2$$

f_B Influence of Concrete

Concrete class	f_B
C25/30	1.1
C30/40	1.14
C40/60	1.26
C50/60	1.34

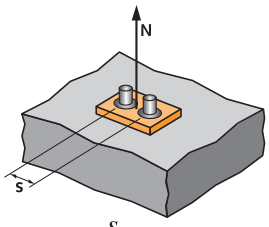
$f_{\beta,V}$ Influence of Shear Loading Direction

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



SPIT CC - Method

Ψ_s Influence of spacing for concrete cone resistance in tensile load



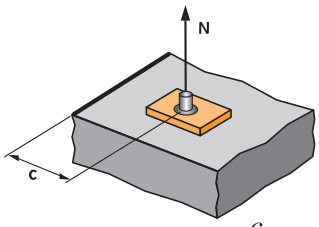
$$\Psi_S = 0{,}5 + \frac{s}{4.h_{ef}}$$

$S_{min} < S < S_{cr,N}$
$S_{cr,N} = 2.h_{ef}$
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



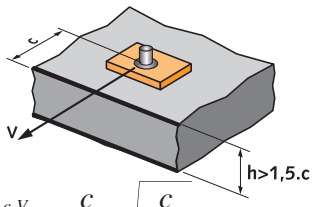
$$\Psi_{c,N} = 0{,}27 + 0{,}725 \cdot \frac{c}{h_{ef}}$$

$C_{min} < C < C_{cr,N}$
$C_{cr,N} = 1.h_{ef}$
$\Psi_{c,N}$ must be used for each distance influenced the anchors group.

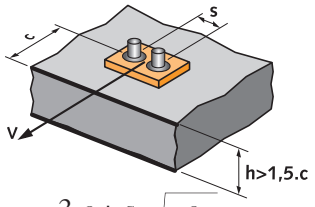
EDGE C	Reduction factor $\Psi_{c,N}$ Non-cracked concrete			
	M8	M10	M12	M16
40	0,63			
45	0,68	0,63		
55	0,77	0,71	0,63	
65	0,86	0,79	0,70	0,66
85	1,00	0,95	0,83	0,76
90		1,00	0,86	0,79
110			1,00	0,91
125				1,00

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

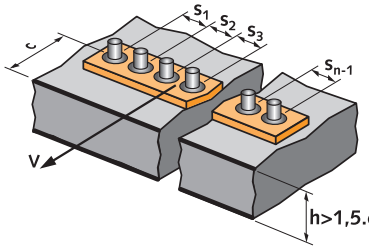
$\Psi_{s-c,V}$ Influence of spacing and edge distance for concrete edge resistance in shear load



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



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



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

For 2 anchors

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 or more

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