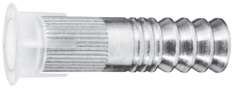
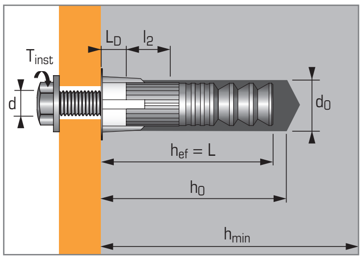


Female chemical anchoring, Heavy loads for use in non-cracked concrete with VIPER XTREM or EPCON C8 XTREM resin

INOX
STAINLESS
STEEL



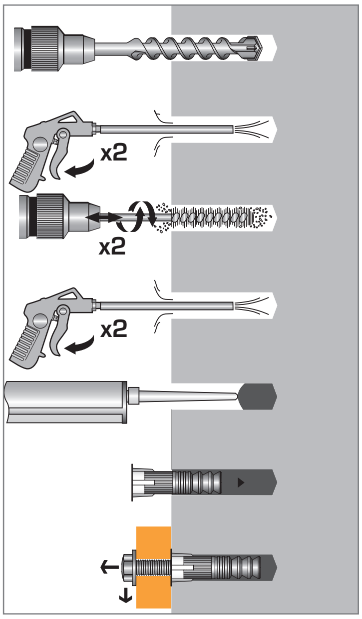
APPLICATION

- Fixing steel framed structures
- Fixing machinery (resistant to vibration)
- Electrical fixings (public lighting, cable trays, etc)
- Waterproof fixings (dams, etc.)
- Fixings for protective barriers, safety rails

MATERIAL

- **body :**
  zinc coated steel version :
  S 300 pb NFA 35561
  stainless steel A4 version:
  X2Cr Ni Mo 17-12-2
- **Centering cap:** high density PE

INSTALLATION*



***Premium cleaning :**
- 2 blowing with compressed air
- 2 brushing with brushed fitted on a drilling machine
- 2 blowing with compressed air

Technical data

Anchor size	Min. anchor depth (mm) h_{ef}	Min. thick. of base material (mm) h_{min}	Thread length (mm) l_2	Depth of threaded start (mm) LD	Thread diameter (mm) d	Drilling depth (mm) h_0	Drilling diameter (mm) d_0	Total anchor length (mm) L	Tighten torque (Nm) T_{inst}	Code zinc coated st.	Code stainless steel A4
M8X60	60	100	20	4,5	8	65	14	60	15	062770	062860
M10X65	65	100	25	7	10	70	20	65	30	062480	062960
M12X75	75	125	30	8	12	75	24	75	70	062760	063100
M12X120	120	180	38	5	12	125	18	120	70	062500	-
M16X125	125	180	40	9,5	16	130	28	125	120	052800	051175
M20X170	170	225	50	12,5	20	175	35	170	200	062810	-
VIPER XTREM cartridge 280 ml										060187	
VIPER XTREM cartridge 410 ml										060189 / 060188	
VIPER XTREM TR cartridge (Tropical Version) 410 ml										060201	
EPCON C8 XTREM Epoxy resin, dual component cartridge 450 ml										055887	

Anchor mechanical properties

Anchor size		M8	M10	M12	M16	M20
ATP - zinc coated steel version						
f_{uk} (N/mm^2)	Min. tensile strength	520	520	520	520	520
f_{yk} (N/mm^2)	Yield strength	420	420	420	420	420
ATP - stainless steel A4 version						
f_{uk} (N/mm^2)	Min. tensile strength	650	650	650	-	-
f_{yk} (N/mm^2)	Yield strength	350	350	350	-	-

Setting time

VIPER XTREM resin

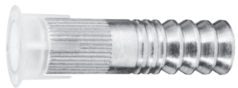
Temperature	**Max. time for installation**		**Curing time**	
	Standard version	Tropical version	Standard version	Tropical version
-10°C ► -5°C	90 min.	-	24 h	-
-4°C ► 0°C	50 min.	-	240 min.	-
1°C ► 5°C	25 min.	60 min.	120 min.	240 min.
6°C ► 10°C	15 min.	40 min.	90 min.	180 min.
11°C ► 20°C	7 min.	15 min.	60 min.	120 min.
21°C ► 30°C	4 min.	8 min.	45 min.	60 min.
31°C ► 40°C	2 min.	4 min.	30 min.	60 min.

EPCON C8 XTREM resin

Temperature	**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 resin

EPCON C8 XTREM : see page 86
VIPER XTREM : see page 102



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 and 4/4).

Number of sealings per cartridge

Anchor size	M8X60	M10X65	M12X75	M12X120	M16X125	M20X170
Drilling diameter (mm)	10	12	14	18	28	35
Drilling depth (mm)	65	70	80	125	130	175
Number of sealings per cartridge						
VIPER XTREM 410 ml	66	44	28	10	3.9	1.8
VIPER XTREM 280 ml	45	30	19	6.8	2.6	1.3
EPCON C8 XTREM 450 ml	72	48	31	11	4.2	2.0

Ultimate ($N_{Ru,m}$, $V_{Ru,m}$) and 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	M12	M16	M20
Screw grade 5.8 / A4-70						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
$N_{Ru,m}$	20,3	32,2	46,8	46,8	87,2	136,1
N_{Rk}	18,3	29	42,2	42,2	78,5	122,5
Screw grade 8.8						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
$N_{Ru,m}$	26,6	41,2	57,1	91,3	111,0	188,8
N_{Rk}	16,7	25,8	35,8	57,3	69,6	118,5

SHEAR

Anchor size	M8	M10	M12	M12	M16	M20
Screw grade 5.8						
$V_{Ru,m}$	11,34	18,18	26,28	26,28	48,96	76,14
V_{Rk}	9,45	15,15	21,9	21,9	40,8	63,45
Screw grade 8.8						
$V_{Ru,m}$	17,46	27,9	40,5	40,5	55,26	121,86
V_{Rk}	14,55	23,25	33,75	33,75	46,05	101,55
Screw grade A4-70						
$V_{Ru,m}$	15,27	24,47	35,38	35,38	65,91	-
V_{Rk}	12,72	20,39	29,48	29,48	54,92	-

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	M12	M16	M20
Screw grade 5.8 / A4-70						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
N_{Rd}	12,2	19,3	28,1	28,1	52,3	81,7
Screw grade 8.8						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
N_{Rd}	11,1	17,2	23,9	38,2	46,4	79,0

$\gamma_{Mc} = 1{,}5$

SHEAR

Anchor size	M8	M10	M12	M12	M16	M20
Screw grade 5.8						
V_{Rd}	7,6	12,1	17,5	17,5	32,6	50,8
Screw grade 8.8						
V_{Rd}	11,6	18,6	27,0	27,0	30,7	67,7
Screw grade A4-70						
V_{Rd}	8,2	13,1	18,9	18,9	35,2	-

Screw grade 5.8: $\gamma_{Ms} = 1{,}25$
Screw grade 8.8: $\gamma_{Ms} = 1{,}25$ for M8 to M12 and $\gamma_{Ms} = 1{,}5$ for M16 and M20
Screw grade A4-70: $\gamma_{Ms} = 1{,}56$

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	M12	M16	M20
Screw grade 5.8 / A4-70						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
N_{rec}	8,7	13,8	20,1	20,1	37,4	58,3
Screw grade 8.8						
h_{ef}	**60**	**65**	**75**	**120**	**125**	**170**
N_{rec}	8,0	12,3	17,0	27,3	33,1	56,4

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

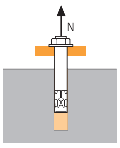
SHEAR

Anchor size	M8	M10	M12	M12	M16	M20
Screw grade 5.8						
V_{rec}	5,4	8,7	12,5	12,5	23,3	36,3
Screw grade 8.8						
V_{rec}	8,3	13,3	19,3	19,3	21,9	48,4
Screw grade A4-70						
V_{rec}	5,8	9,3	13,5	13,5	25,1	-

Screw grade 5.8: $\gamma_F = 1{,}4$; $\gamma_{Ms} = 1{,}25$
Screw grade 8.8: $\gamma_F = 1{,}4$; $\gamma_{Ms} = 1{,}25$ for M8 to M12 and $\gamma_{Ms} = 1{,}5$ for M16 and M20
Screw grade A4-70: $\gamma_F = 1{,}4$; $\gamma_{Ms} = 1{,}56$

SPIT CC Method

TENSILE in kN

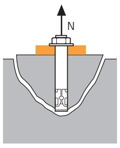


Pull-out resistance - Premium cleaning

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

$N^0_{Rd,p}$				Design pull-out resistance		
Anchor size	M8	M10	M12	M12	M16	M20
h_{ef}	60	65	75	120	125	170
$N^0_{Rd,p}$ (C20/25)	10,7	13,3	20,0	30,0	40,0	63,3

$\gamma_{Mc} = 1{,}5$

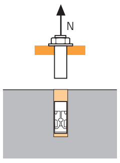


Concrete cone resistance - Premium cleaning

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

$N^0_{Rd,c}$				Design cone resistance		
Anchor size	M8	M10	M12	M12	M16	M20
h_{ef}	60	65	75	120	125	170
$N^0_{Rd,c}$ (C20/25)	10,7	13,3	20,0	30,0	40,0	63,3

$\gamma_{Mc} = 1{,}5$



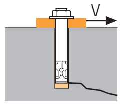
Steel resistance

$N_{Rd,s}$				Steel design tensile resistance		
Anchor size	M8	M10	M12	M12	M16	M20
Screw grade 5.8						
$N_{Rd,s}$	12,0	19,3	28,0	28,0	52,0	81,2
Screw grade 8.8						
$N_{Rd,s}$	19,3	30,7	44,7	44,70	73,3	122,0
Screw grade A4-70						
$N_{Rd,s}$	12,4	19,9	29,0	29,0	54,8	-

Screw grade 5.8 and 8.8 : $\gamma_{Ms} = 1{,}5$

Screw grade A4-70 : $\gamma_{Ms} = 1{,}86$

SHEAR in kN

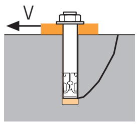


Concrete edge resistance

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

$V^0_{Rd,c}$				Design concrete edge resistance at minimum edge distance (C_{min})		
Anchor size	M8	M10	M12	M12	M16	M20
h_{ef}	60	65	75	120	125	170
C_{min}	40	45	55	65	65	85
S_{min}	40	45	55	65	65	85
$V^0_{Rd,c}$ (C20/25)	2,5	3,4	5,0	6,5	7,3	12,5

$\gamma_{Mc} = 1{,}5$

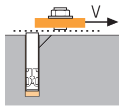


Pryout failure

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

$V^0_{Rd,cp}$				Design pryout resistance		
Anchor size	M8	M10	M12	M12	M16	M20
h_{ef}	60	65	75	120	125	170
$V^0_{Rd,cp}$ (C20/25)	21,3	26,7	40,0	60,0	80,0	126,7

$\gamma_{Mcp} = 1{,}5$



Steel resistance

$V_{Rd,s}$				Steel design shear resistance		
Anchor size	M8	M10	M12	M12	M16	M20
Screw grade 5.8						
$V_{Rd,s}$	7,4	11,6	16,9	16,9	31,2	48,8
Screw grade 8.8						
$V_{Rd,s}$	11,7	18,6	27,0	27,0	36,7	60,7
Screw grade A4-70						
$V_{Rd,s}$	7,3	11,9	17,3	17,3	32,7	-

Screw grade 5.8 : $\gamma_{Ms} = 1{,}25$

Screw grade 8.8 : $\gamma_{Ms} = 1{,}25$ for M8 to M12 and $\gamma_{Ms} = 1{,}5$ for M16 and M20

Screw grade A4-70 : $\gamma_{Ms} = 1{,}56$

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

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

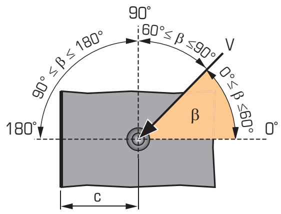
$$\beta_N + \beta_V \le 1{,}2$$

f_b INFLUENCE OF CONCRETE

Concrete class	f_b
C25/30	1,06
C30/40	1,17
C40/60	1,26
C50/60	1,34

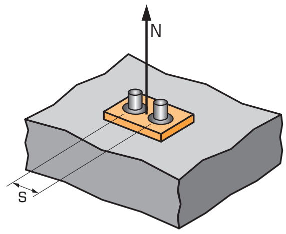
$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

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



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

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

$s_{cr,N} = 2.h_{ef}$

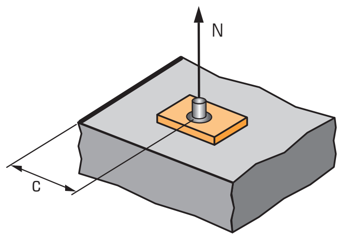
Ψ_s must be used for each spacing influenced the anchors group.

SPACING S

Reduction factor Ψ_s
Non-cracked concrete

Anchor size	M8	M10	M12	M12	M16	M20
40	0,67					
45	0,69	0,67				
55	0,73	0,71	0,68			
65	0,77	0,75	0,72	0,64	0,63	
85	0,85	0,83	0,78	0,65	0,67	0,60
100	0,92	0,88	0,83	0,71	0,70	0,65
120	1,00	0,96	0,90	0,75	0,74	0,68
130		1,00	0,93	0,77	0,76	0,69
150			1,00	0,81	0,80	0,72
200				0,92	0,90	0,79
250				1,00	1,00	0,87
300						0,94
340						1,00

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



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

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

$c_{cr,N} = h_{ef}$

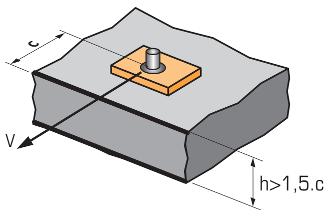
$\Psi_{c,N}$ must be used for each distance influenced the anchors group.

EDGE C

Reduction factor $\Psi_{c,N}$
Non-cracked concrete

Anchor size	M8	M10	M12	M12	M16	M20
40	0,75					
45	0,81	0,77				
55	0,93	0,88	0,80			
65	1,00	1,00	0,90	0,66	0,65	0,55
85			1,00	0,68	0,76	0,63
90				0,81	0,79	0,65
100				0,87	0,85	0,70
125				1,00	1,00	0,80
150						0,91
170						1,00

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

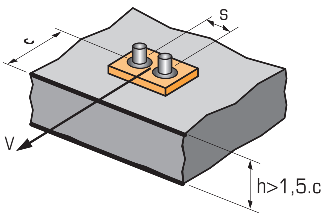


$$\Psi_{s\text{-}c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

Reduction 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

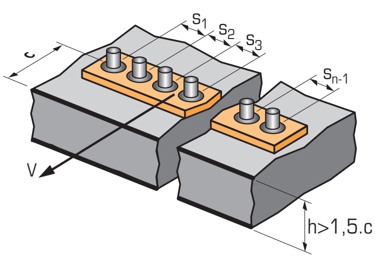


$$\Psi_{s\text{-}c,V} = \frac{3.c + s}{6.c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For 2 anchors fastening

Reduction 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

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