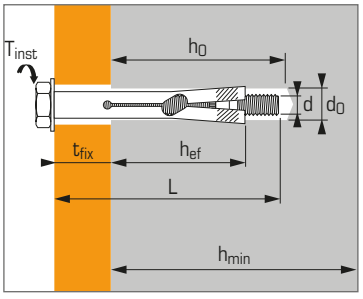
Sleeve type expansion anchor for use in concrete, solid masonries and beam slab



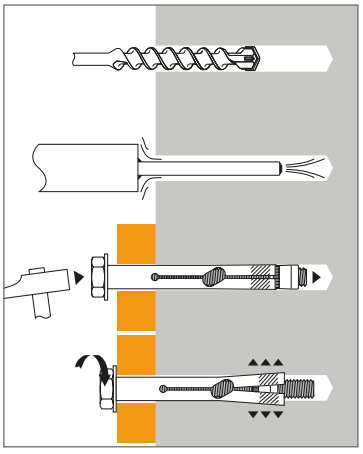
APPLICATION

- Wall plates,
- Porches,
- Signs,
- Angle rion, hand rails.

MATERIAL

- **Screw :** class 6.8

INSTALLATION



Technical data

Anchor size	Min. anchor depth (mm) h_{ef}	Max. thick. of part to be fixed (mm) t_{fix}	Thread diameter (mm) d	Drilling depth (mm) h_0	Drilling diameter (mm) d_0	Min. thick. of base material (mm) h_{min}	Total anchor length (mm) L	Tighten torque (Nm) T_{inst}	Code
M6X45/8 HB	25	8	6	45	8	55	45	9	050252
M6X70/30 HB	30	30	6	45	8	55	70	9	050253
M6X95/55 HB	30	56	6	45	8	55	95	9	050254
M8X55/10 HB	28	8	8	50	10	65	55	20	050255
M8X80/35 HB	34	35	8	50	10	65	80	20	050256
M8X105/60 HB	34	62	8	50	10	65	105	20	050257
M10X65/10 HB	44	12	10	65	12	80	65	40	050258
M10X75/20 HB	44	18	10	65	12	80	75	40	050259
M10X105/45 HB	44	46	10	65	12	80	105	40	050260
M12X110/50 HB	44	49	12	65	16	95	110	70	050262
Special products									
Hook version	30	-	6	45	8	55	-	-	050272
Eye version	30	-	6	45	8	55	-	-	050273

Anchor mechanical properties

Anchor size		M6	M8	M10	M12
Threaded part					
f_{uk} (N/mm²)	Min. tensile strength	600	600	600	600
f_{yk} (N/mm²)	Yield strength	480	480	480	480
W_{el} (mm³)	Elastic section modulus	12,7	31,2	62,3	109,2
$M^0_{rk,s}$ (Nm)	Characteristic bending moment	9,15	22,5	44,8	72
M (Nm)	Recommended bending moment	4,5	11,2	22,4	36,0

Special products - Recommended loads (N_{rec}) in kN

Anchor size	Tensile concrete ≥ C20/25	Diameter
Hook version	0,6	11
Eye version	0,6	8

DYNABOLT

2/4

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).

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	M6	M8	M10	M12
h_{ef}	**30**	**34**	**44**	**46**
$N_{Ru,m}$	7,6	10,8	17,2	18,2
N_{Rk}	5,7	8,1	12,9	13,7

SHEAR

Anchor size	M6	M8	M10	M12
$V_{Ru,m}$	7,3	13,2	20,9	30,4
V_{Rk}	6,1	11,0	17,4	25,3

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	M6	M8	M10	M12
h_{ef}	**30**	**34**	**44**	**46**
N_{Rd}	2,7	3,9	6,1	6,5

$\gamma_{Mc} = 2,1$

SHEAR

Anchor size	M6	M8	M10	M12
V_{Rd}	3,8	6,9	10,9	15,8

$\gamma_{Ms} = 1,6$

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	M6	M8	M10	M12
h_{ef}	**30**	**34**	**44**	**46**
N_{rec}	1,9	2,8	4,4	4,7

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

SHEAR

Anchor size	M6	M8	M10	M12
V_{rec}	2,7	4,9	7,8	11,3

$\gamma_F = 1,4$; $\gamma_{Ms} = 1,6$

Recommended loads (N_{rec}, V_{rec}) in engineering clay bricks BP 400 (fc > 40 N/mm²) in kN

TENSILE

Anchor size	M6	M8	M10	M12
h_{ef}	**30**	**34**	**44**	**46**
N_{rec}	2,2	2,9	5,3	5,9

$\gamma_M = 2,1$

SHEAR

Anchor size	M6	M8	M10	M12
V_{rec}	2,8	5,1	8,1	11,8

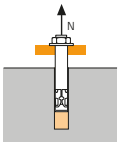
Design loads (N_{Rd}, V_{Rd}) in beam slab in kN

Hollow concrete slab (wall thickness : 30 mm)	Edge distance > 50 mm Minimum spacing : 125 mm		Edge distance > 100 mm Minimum spacing : 125 mm		Edge distance > 200 mm Minimum spacing : 125 mm	
	N_{Rd}	V_{Rd}	N_{Rd}	V_{Rd}	N_{Rd}	V_{Rd}
M12	4.1	4.1	4.5	4.5	6.7	6.7

$\gamma_M = 2,1$

SPIT CC Method

TENSILE in kN

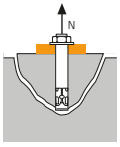


¬ Pull-out resistance

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

$N^{0}_{Rd,p}$		Design pull-out resistance			
Anchor size		M6	M8	M10	M12
h_{ef}		**30**	**34**	**44**	**46**
$N^{0}_{Rd,p}$	(C20/25)	2,7	3,9	6,1	6,5

$\gamma_{Mc} = 2,1$

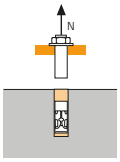


¬ Concrete cone resistance

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

$N^{0}_{Rd,c}$		Design cone resistance			
Anchor size		M6	M8	M10	M12
h_{ef}		**30**	**34**	**44**	**46**
$N^{0}_{Rd,c}$	(C20/25)	3,9	4,8	7,0	7,5

$\gamma_{Mc} = 2,1$

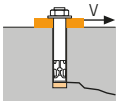


¬ Steel resistance

$N_{Rd,s}$		Steel design tensile resistance			
Anchor size		M6	M8	M10	M12
$N_{Rd,s}$		6,3	11,5	18,1	26,4

$\gamma_{Ms} = 2$

SHEAR in kN

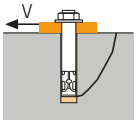


¬ Concrete edge resistance

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

$V^{0}_{Rd,c}$		Design concrete edge resistance at minimum edge distance (C_{min})			
Anchor size		M6	M8	M10	M12
h_{ef}		**30**	**34**	**44**	**46**
C_{min}		50	60	75	100
S_{min}		50	60	70	90
$V^{0}_{Rd,c}$	(C20/25)	2,7	3,9	6,1	10,4

$\gamma_{Mc} = 1,5$

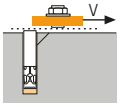


¬ Pryout failure

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

$V^{0}_{Rd,cp}$		Design pryout resistance			
Anchor size		M6	M8	M10	M12
h_{ef}		**30**	**34**	**44**	**46**
$V^{0}_{Rd,cp}$	(C20/25)	5,5	6,7	9,8	10,5

$\gamma_{Mcp} = 1,5$



¬ Steel resistance

$V_{Rd,s}$		Steel design shear resistance			
Anchor size		M6	M8	M10	M12
$V_{Rd,s}$		3,8	6,9	10,9	15,8

$\gamma_{Ms} = 1,6$

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

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

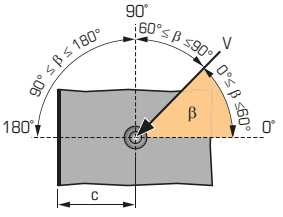
$$\beta_N + \beta_V \leq 1,2$$

f_b INFLUENCE OF CONCRETE

Concrete class	f_b	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

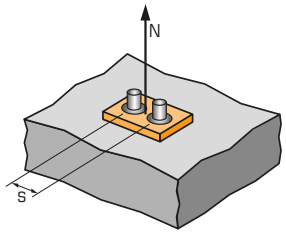
$f_{\beta,V}$ INFLUENCE OF SHEAR LOADING DIRECTION

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



SPIT CC Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



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

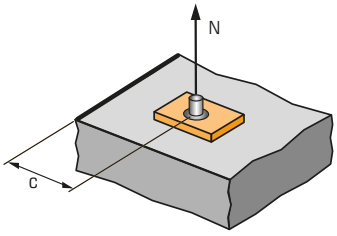
$s_{min} < s < s_{cr,N}$

$s_{cr,N} = 3.h_{ef}$

Ψ_s must be used for each spacing influenced the anchors group

SPACING S				Reduction factor Ψ_s Non-cracked concrete
Anchor size	M6	M8	M10	M12
50	0,78			
60	0,83	0,80		
70	0,89	0,85	0,77	
80	0,94	0,90	0,80	
90	1,00	0,95	0,84	0,83
100		1,00	0,88	0,86
120			0,95	0,93
130			1,00	0,97
140				1,00

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



$$\Psi_{c,N} = 0{,}23 + 0{,}51 \cdot \frac{c}{h_{ef}}$$

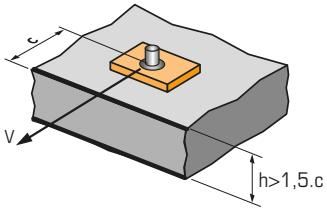
$c_{min} < c < c_{cr,N}$

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

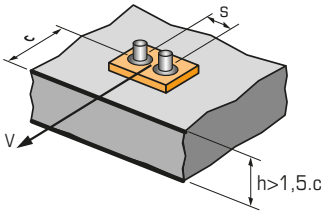
$\Psi_{c,N}$ must be used for each distance influenced the anchors group.

EDGE C				Reduction factor $\Psi_{c,N}$ Non-cracked concrete
Anchor size	M6	M8	M10	M12
50	1,00			
60		1,00		
75			1,00	
100				1,00

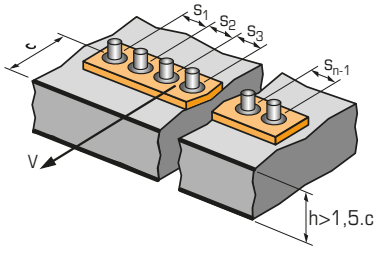
$\Psi_{s\text{-}c,V}$ INFLUENCE OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD



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



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



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

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

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