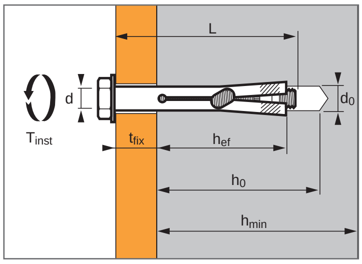
SPIT DYNABOLT

Zinc coated steel

Sleeve type expansion anchor



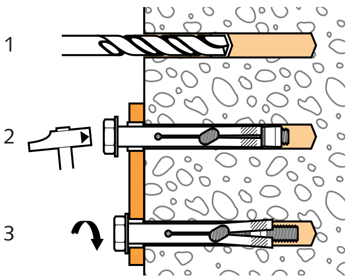
APPLICATION

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

MATERIAL

- Bolt class 6.8

INSTALLATION



1 Drill a hole corresponding to the external diameter of the anchor with a depth equal to the minimum anchor depth plus the diameter of the anchor.

2 Position the anchor into the hole until it just touches the part to be fixed.

3 Tighten the anchor until the recommended torque is achieved.

Technical data

DYNABOLT HEX NUT	Max. anchor depth (mm) h_{ef}	Max. thick of part to be fixed (mm) t_{fix}	Min thick of base material (mm) h_{min}	Ø thread (mm) d	Drilling depth (mm) h_o	Ø drill bit (mm) d_o	Total rod length (mm) L	Max. tighten torque (Nm) T_{inst}	Code
HN M6X40/8	26	8	55	M6	45	8	40	9	050234
HN M6X66/30	30	30	55	M6	45	8	65	9	050235
HN M6X92/56	30	56	55	M6	45	8	90	9	050236
HN M8X49/10	34	8	65	M8	50	10	50	20	050238
HN M8X76/35	34	35	65	M8	50	10	75	20	050239
HN M8X103/62	34	62	65	M8	50	10	100	20	050240
HN M8X124/84	34	83	65	M8	50	10	125	20	050241
HN M10X55/12	35	12	80	M10	65	12	60	40	050242
HN M10X70/18	44	18	80	M10	65	12	70	40	050243
HN M10X98/46	44	46	80	M10	65	12	100	40	050244
HN M10X126/74	44	74	80	M10	65	12	125	40	050245
HN M12X62/12	39	12	95	M12	65	16	65	70	050246
HN M12X106/49	46	49	95	M12	65	16	110	70	050247
HN M12X140/83	46	83	95	M12	65	16	140	70	050248
HN M16X81/20	50	20	100	M16	70	20	80	150	050249
HN M16X113/52	50	52	100	M16	70	20	115	150	050250
HN M16X157/96	50	96	100	M16	70	20	160	150	050251
DYNABOLT HEX HEAD									
HB M6X45/8	26	8	55	M6	45	8	45	9	050252
HB M6X70/30	30	30	55	M6	45	8	70	9	050253
HB M6X95/56	30	56	55	M6	45	8	95	9	050254
HB M8X55/10	28	8	65	M8	50	10	55	20	050255
HB M8X80/35	34	35	65	M8	50	10	80	20	050256
HB M8X105/62	34	62	65	M8	50	10	105	20	050257
HB M10X75/18	44	18	80	M10	65	12	75	40	050259
HB M10X105/45	44	46	80	M10	65	12	105	40	050260
HB M12X110/49	44	49	95	M12	65	16	110	70	050262
DYNABOLT COUNTER-SUNK									
CSK M4.5X60/28	25	28	50	M4.5	35	6	60	10	050264
CSK M6X60/25	30	27	55	M6	45	8	60	20	050267
CSK M6X85/51	30	53	55	M6	45	8	85	20	050268
CSK M8X75/30	34	35	65	M8	50	10	75	40	050269
CSK M8X100/58	34	62	65	M8	50	10	100	40	050270

Anchor mechanical properties

Threaded part		M4,5	M6	M8	M10	M12	M16
f_{uk} (N/mm²)	Min. tensile strength	600	600	600	600	600	600
f_{yk} (N/mm²)	Yield strength	480	480	480	480	480	480
W_{el} (mm³)	Elastic section modulus	5,4	12,7	31,2	62,3	109,2	277,5
$M^0_{Rk,s}$ (Nm)	Characteristic bending moment	3,8	9,15	22,5	44,8	72	166
M (Nm)	Recommended bending moment	1,9	4,5	11,2	22,4	36,0	83,0

the right fixing

SPIT DYNABOLT

Zinc coated steel

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.

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	M4,5	M6	M8	M10	M12	M16
Minimum anchorage depth						
h_{ef}	*25*	*26*	*28*	*35*	*39*	*50*
$N_{Ru,m}$	4,3	6,1	8,1	12,2	14,2	20,6
N_{Rk}	3,2	4,6	6,1	9,2	10,7	15,5
Maximum anchorage depth						
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	M4,5	M6	M8	M10	M12	M16
$V_{Ru,m}$	3,2	7,3	13,2	20,9	30,4	56,4
V_{Rk}	2,6	6,1	11,0	17,4	25,3	47,0

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	M4,5	M6	M8	M10	M12	M16
Minimum anchorage depth						
h_{ef}	*25*	*26*	*28*	*35*	*39*	*50*
N_{Rd}	1,5	2,2	2,9	4,4	5,1	7,4
Maximum anchorage depth						
h_{ef}	-	*30*	*34*	*44*	*46*	-
N_{Rd}	-	2,7	3,9	6,1	6,5	-

$\gamma_{Mc} = 2,1$

SHEAR

Anchor size	M4,5	M6	M8	M10	M12	M16
V_{Rd}	1,6	3,8	6,9	10,9	15,8	29,4

$\gamma_{Ms} = 1,6$

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	M4,5	M6	M8	M10	M12	M16
Minimum anchorage depth						
h_{ef}	*25*	*26*	*28*	*35*	*39*	*50*
N_{Rec}	1,1	1,6	2,1	3,1	3,6	5,3
Maximum anchorage depth						
h_{ef}	-	*30*	*34*	*44*	*46*	-
N_{Rec}	-	1,9	2,8	4,4	4,7	-

$\gamma_{Mc} = 2,1$

SHEAR

Anchor size	M4,5	M6	M8	M10	M12	M16
V_{Rec}	1,2	2,7	4,9	7,8	11,3	21,0

$\gamma_{Ms} = 1,6$

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

TENSILE

Anchor size	M6	M8	M10	M12
h_{ef}	*30*	*34*	*44*	*46*
N_{Rec}	1,6	2,1	3,8	4,2

SHEAR

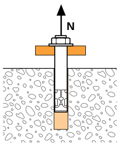
Anchor size	M6	M8	M10	M12
V_{Rec}	2,0	3,65	5,8	8,45

SPIT DYNABOLT

Zinc coated steel

SPIT CC- Method

TENSILE in kN

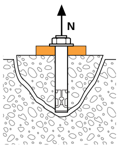


Pull-out resistance

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

$N^0_{Rd,p}$ Anchor size	M4,5	M6	M8	M10	M12	M16
			Design pull-out resistance			
Minimum anchorage depth						
h_{ef}	25	26	28	35	39	50
$N^0_{Rd,p}$ (C20/25)	1,5	2,2	2,9	4,4	5,1	7,4
Maximum anchorage depth						
h_{ef}	-	30	34	44	46	-
$N^0_{Rd,p}$ (C20/25)	-	2,7	3,9	6,1	6,5	-

$\gamma_{Mc} = 2,1$

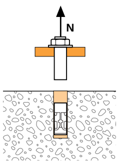


Concrete cone resistance

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

$N^0_{Rd,c}$ Anchor size	M4,5	M6	M8	M10	M12	M16
			Design cone resistance			
Minimum anchorage depth						
h_{ef}	25	26	28	35	39	50
$N^0_{Rd,c}$ (C20/25)	3,0	3,2	3,6	5,0	5,8	8,5
Maximum anchorage depth						
h_{ef}	-	30	34	44	46	-
$N^0_{Rd,c}$ (C20/25)	-	3,9	4,8	7,0	7,5	-

$\gamma_{Mc} = 2,1$

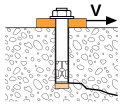


Steel resistance

$N_{Rd,s}$ Anchor size	M4,5	M6	M8	M10	M12	M16
			Steel design tensile resistance			
$N_{Rd,s}$	2,7	6,3	11,5	18,1	26,4	-

$\gamma_{Ms} = 2$

SHEAR in kN

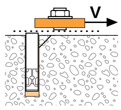


Concrete edge resistance

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

$V^0_{Rd,c}$ Anchor size	M4,5	M6	M8	M10	M12	M16
			Design concrete edge resistance at minimum edge distance (C_{min})			
Minimum anchorage depth						
h_{ef}	25	26	28	35	39	50
C_{min}	45	45	50	60	70	110
S_{min}	85	85	100	115	170	220
$V^0_{Rd,c}$ (C20/25)	2,1	2,3	2,9	4,2	5,9	13,0
Maximum anchorage depth						
h_{ef}	-	30	34	44	46	-
C_{min}	-	50	60	75	100	-
S_{min}	-	95	120	145	200	-
$V^0_{Rd,c}$ (C20/25)	-	2,7	3,9	6,1	10,4	-

$\gamma_{Mc} = 1,5$



Steel resistance

$V_{Rd,s}$ Anchor size	M4,5	M6	M8	M10	M12	M16
			Steel design shear resistance			
$V_{Rd,s}$	1,6	3,8	6,9	10,9	15,8	-

$\gamma_{Ms} = 1,6$

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

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

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

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

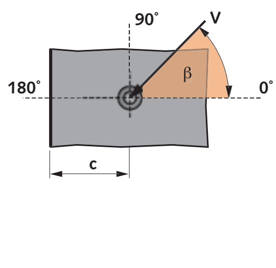
$$\beta_N^{1,5} + \beta_V^{1,5} \leq 1$$

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

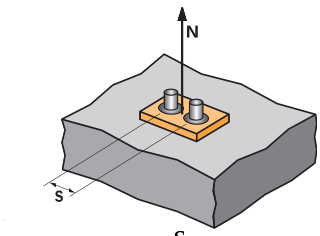


SPIT DYNABOLT

Zinc coated steel

SPIT CC- Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



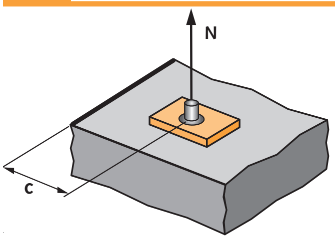
$$\Psi_S = 0,5 + \frac{s}{4.h_{ef}}$$

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

SPACING S	Reduction factor Ψ_s Minimum anchorage depth					
	M4,5	**M6**	**M8**	**M10**	**M12**	**M16**
85	1,00	1,00				
100			1,00			
115				1,00		
170					1,00	
220						1,00

SPACING S	Reduction factor Ψ_s Maximum anchorage depth			
	M6	**M8**	**M10**	**M12**
95	1,00			
120		1,00		
145			1,00	
200				1,00

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



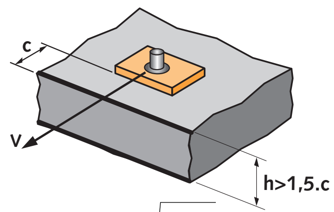
$$\Psi_{c,N} = 0,27 + 0,725.\frac{c}{h_{ef}}$$

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 Ψ_s Minimum anchorage depth					
	M4,5	**M6**	**M8**	**M10**	**M12**	**M16**
45	1,00	1,00				
50			1,00			
60				1,00		
70					1,00	
110						1,00

EDGE C	Reduction factor Ψ_s Maximum anchorage depth			
	M6	**M8**	**M10**	**M12**
50	1,00			
60		1,00		
75			1,00	
100				1,00

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

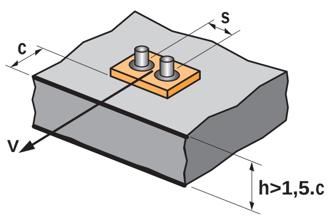


$$\Psi_{s-c,V} = \frac{c}{c_{min}}.\sqrt{\frac{c}{c_{min}}}$$

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

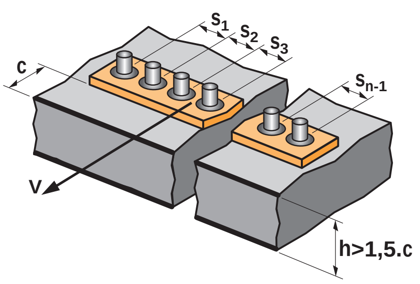


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}}.\sqrt{\frac{c}{c_{min}}}$$

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 other case of fastenings

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