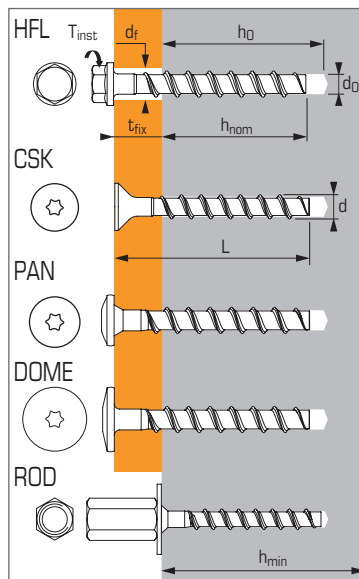




Concrete screw anchor for non-structural applications for use in concrete and beam slab



APPLICATION

- Channel, cable tray
- Brackets
- E-Clips, cowhorn
- Rod hanging

MATERIAL

Zinc coated steel version:

Min. tensile strength: 700 N/mm²

HFL version:

Zinc flake coating 5 µm, EN ISO 10683
Salt spray: 500 hours

Other versions:

Min. zinc coated steel 5 µm

Stainless steel version:

Min. tensile strength: 700 N/mm²

HFL version: Stainless steel A4

Technical data

Versions	Anchor size	Minimum embedment depth				Maximum embedment depth				Thread Ø	Drilling Ø	Total anchor length	Tighten torque	Code
		Embed. depth min.	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base material	Embed. depth max.	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base material					
		(mm) h _{nom}	(mm) t _{fix}	(mm) h ₀	(mm) h _{min}	(mm) h _{nom}	(mm) t _{fix}	(mm) h ₀	(mm) h _{min}	(mm) d	(mm) d ₀	(mm) L	(Nm) T _{inst}	

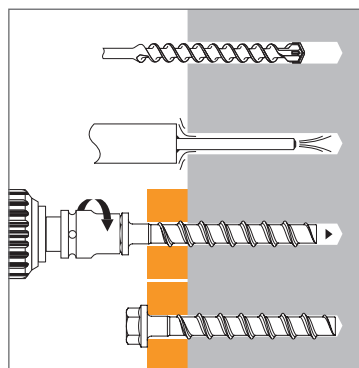
Zinc coated steel versions

HFL	5X40/5		5									40		058726
	5X50/15	35	15	40	80	-	-	-	-	6,5	5	50	8	058727
	5X60/25		25									60		058728
	6X40/5		5			-	-	-	-			40		058729
	6X50/15		15			-	-	-	-			50		058730
	6X80/45-25	35	45	40	80	55	25	60	100	7,5	6	80	10	058731
CSK	6X100/65-45		65			55	45	60	100			100		058732
	5X40/5	35	5	40	80	-	-	-	-	6,5	5	40	8	058770
	5X60/25		25									60		058771
	6X40/5		5			-	-	-	-			40		058772
	6X60/25-5		25			55	5	60	100			60		058773
	6X80/45-25	35	45	40	80	55	25	60	100	7,5	6	80	10	058774
PAN	6X100/65-45		65			55	45	60	100			100		058775
	6X120/85-65		85			55	65	60	100			120		058776
	6X140/105-85		105			55	85	60	100			140		058777
	5X40/5		5			-	-	-	-			40		058779
	5X50/15	35	15	40	80	-	-	-	-	6,5	5	50	8	058780
	5X60/25		25									60		058781
DOME	6X30/5 ⁽¹⁾	25	3	28	80	-	-	-	-	7,0	6	28	10	058787
	6X40/5	35	5	40		-	-	-	-	7,5	6	40		058782
ROD	6X40/5		5			-	-	-	-			40		058783
	6X60/25-5	35	25	40	80	55	5	60	100	7,5	6	60	10	058784
ROD	6X35/M8-M10	35	-	40	80	-	-	-	-			35		058785
	6X55/M8-M10	55	-	60	100	-	-	-	-	7,5	6	55	10	058786

Stainless steel A4 versions

HFL	6X50/15 A4	35	15	40	80	55	5	60	100	7,5	6	50	10	058806
	6X60/25-5 A4		25									60		058807

INSTALLATION



Anchor mechanical properties

Anchor size		Ø5	Ø6
Zinc coated & A4			
As (mm ²)	Stressed cross-section	33,0	44,2
W _{el} (mm ³)	Elastic section modulus	27,0	41,4
M ⁰ _{rk,s} (Nm)	Characteristic bending moment	5,3	10,0
M (Nm)	Recommended bending moment	7,15	5,0



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).

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 Zinc coated & A4	Ø5	Ø6	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)				
h _{nom}	35	25	35	55
N _{Rk} *	1,5	0,9	1,5	7,5

* multiple use for non-strutural application

SHEAR

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked & non-cracked concrete (C20/25)			
h _{nom}	35	25 ⁽¹⁾	≥35
V _{Rk}	4,4	0,9	7,0

⁽¹⁾ for h_{nom} = 25 mm, V_{Rk} = N_{Rk}

Mechanical anchors

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 Zinc coated & A4	Ø5	Ø6	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)				
h _{nom}	35	25	35	55
N _{Rd} *	0,8	0,6	0,8	5,0

γ_{Mc} = 1,8 for h_{nom} 35 mm

γ_{Mc} = 1,5 for h_{nom} 25 mm and h_{nom} 55 mm

* multiple use for non-strutural application

SHEAR

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked & non-cracked concrete (C20/25)			
h _{nom}	35	25 ⁽¹⁾	≥35
V _{Rd}	2,9	0,6	4,6

γ_{Ms} = 1,5

⁽¹⁾ for h_{nom} = 25 mm, V_{Rd} = N_{Rd}

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 Zinc coated & A4	Ø5	Ø6	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)				
h _{nom}	35	25	35	55
N _{rec} *	0,6	0,4	0,6	3,6

γ_F = 1,4

γ_{Mc} = 1,8 for h_{nom} 35 mm

γ_{Mc} = 1,5 for h_{nom} 25 mm and h_{nom} 55 mm

* multiple use for non-strutural application

SHEAR

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked & non-cracked concrete (C20/25)			
h _{nom}	35	25 ⁽¹⁾	≥35
V _{rec}	2,0	0,4	3,3

γ_F = 1,4 ; γ_{Ms} = 1,5

⁽¹⁾ for h_{nom} = 25 mm, V_{rec} = N_{rec}

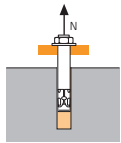
Recommended loads (F_{rec}) in beam slab in kN

Hollow concrete slab	Edge distance & minimum spacing ≥100 mm		
	wall thickness ≥ 25 mm	wall thickness ≥ 30 mm	wall thickness ≥ 35 mm
Anchor size	F _{rec}	F _{rec}	F _{rec}
Ø6 (h _{nom} = 25 mm)	0,25	0,5	0,5
Ø6 (h _{nom} = 35 mm)	0,4	0,8	1,2



SPIT CC Method

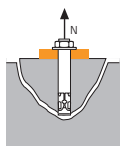
TENSILE in kN



→ Pull-out resistance

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

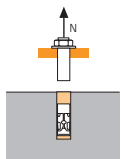
$N_{Rd,p}^0$	Design pull-out resistance			
Anchor size	Ø5	Ø6	Ø6	Ø6
Zinc coated & A4				
Cracked and non-cracked concrete (C20/25)				
h_{nom}	35	25	35	55
$N_{Rd,p}^0$ (C20/25)	0,8	0,6	0,8	5,0
$\gamma_{Mc} = 1,8$ for h_{nom} 35 mm				
$\gamma_{Mc} = 1,5$ for h_{nom} 25 mm and h_{nom} 55 mm				



→ Concrete cone resistance

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

$N_{Rd,c}^0$	Design cone resistance			
Anchor size	Ø5	Ø6	Ø6	Ø6
Zinc coated & A4				
Cracked and non-cracked concrete (C20/25)				
h_{nom}	35	25	35	55
$N_{Rd,c}^0$ (C20/25)	2,8	1,7	2,8	9,8
$\gamma_{Mc} = 1,8$ for h_{nom} 35 mm				
$\gamma_{Mc} = 1,5$ for h_{nom} 25 mm and h_{nom} 55 mm				



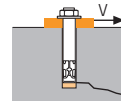
→ Steel resistance

$N_{Rd,s}$	Steel design tensile resistance	
Anchor size	Ø5	Ø6
Zinc coated & A4		
$N_{Rd,s}$	6,2	9,8
$\gamma_{Ms} = 1,4$		

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

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

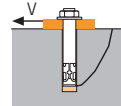
SHEAR in kN



→ Concrete edge resistance

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

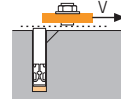
$V_{Rd,c}^0$	Design concrete edge resistance at minimum edge distance (C_{min})			
Anchor size	Ø5	Ø6	Ø6	Ø6
Zinc coated & A4				
Cracked and non-cracked concrete (C20/25)				
h_{nom}	35	25	35	55
C_{min}	35		35	40
S_{min}	35		35	40
$V_{Rd,c}^0$ (C20/25)	1,4	(1)	1,4	1,9
$\gamma_{Mc} = 1,5$				



→ Pryout failure

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

$V_{Rd,cp}^0$	Design pryout resistance			
Anchor size	Ø5	Ø6	Ø6	Ø6
Zinc coated & A4				
Cracked and non-cracked concrete (C20/25)				
$h_{nom,min}$	35	25	35	55
$V_{Rd,cp}^0$	3,4	(1)	3,4	9,8
$\gamma_{Mc} = 1,5$				



→ Steel resistance

$V_{Rd,s}$	Steel design shear resistance		
Anchor size	Ø5	Ø6	Ø6
Zinc coated & A4			
$h_{nom,min}$	35	25	≥35
$V_{Rd,s}$	2,9	(1)	4,6
$\gamma_{Ms} = 1,5$			

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

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

(1) For $h_{nom} = 25$ mm, $V_{Rd} = N_{Rd}$

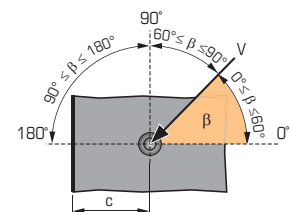
$$\beta_N + \beta_V \leq 1,2$$

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

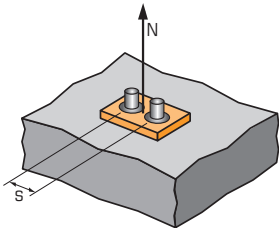
Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2





SPIT CC Method

Ψ_S INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



Ψ_S = 0,5 + $\frac{s}{6 \cdot h_{ef}}$

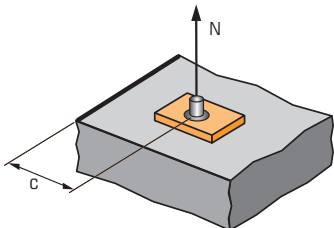
s_{min} < s < s_{cr,N}

s_{cr,N} = 3 · h_{ef}

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

SPACING S		Reduction factor Ψ _S Cracked & non-cracked concrete		
Anchor size		Ø5	Ø6	Ø6
h _{ef}		27	27	44
35		0,72	0,72	
40		0,75	0,75	0,65
50		0,81	0,81	0,69
60		0,87	0,87	0,73
80		1,00	1,00	0,80
100				0,88
120				0,95
130				1,00

Ψ_{C,N} INFLUENCE OF EDGE FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



Ψ_{C,N} = 0,23 + 0,51 · $\frac{c}{h_{ef}}$

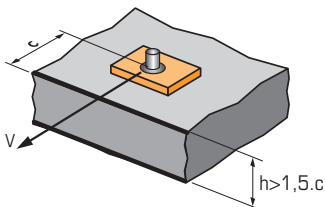
c_{min} < c < c_{cr,N}

c_{cr,N} = 1,5 · h_{ef}

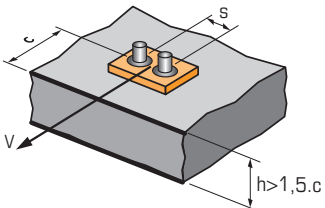
Ψ_{C,N} must be used for each distance influenced the anchors group.

EDGE C		Reduction factor Ψ _{C,N} Cracked & non-cracked concrete		
Anchor size		Ø5	Ø6	Ø6
h _{ef}		27	27	44
35		0,89	0,89	
40		0,98	0,98	0,69
50		1,00	1,00	0,80
65				1,00

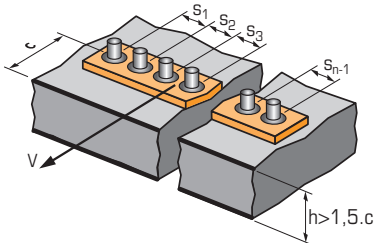
Ψ_{S-C,V} INFLUENCE OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD



Ψ_{S-C,V} = $\frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$



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



For single anchor fastening

		Reduction factor Ψ _{S-C,V} Cracked & 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
Ψ _{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 fastening

		Reduction factor Ψ _{S-C,V} Cracked & 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

For 3 anchors fastening and more

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