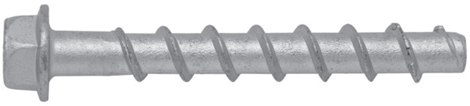
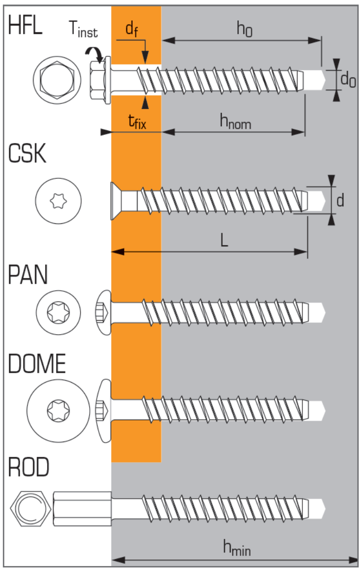


Concrete screw anchor for non-structural applications for use in concrete and beam slab

European Technical Assessment
ETA Part 6- 16/0373

INOX STAINLESS STEEL



APPLICATION

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

MATERIAL

Zinc coated steel version:

- **Body :**

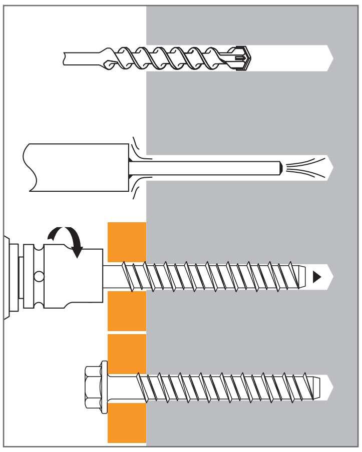
Min. zinc coated steel 5 µm ;
min. tensile strength: 700 N/mm²

Stainless steel version:

- **Body :** stainless steel A4

min. tensile strength: 700 N/mm²

INSTALLATION

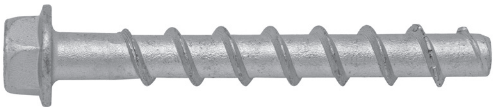


Technical data

Versions	Anchor size	Minimum embedment depth: Embed. depth min. (mm) h_{nom}	Max. thick. of part to be fixed (mm) t_{fix}	Drilling depth (mm) h_0	Min. thick. of base material (mm) h_{min}	Maximum embedment depth: Embed. depth max. (mm) h_{nom}	Max. thick. of part to be fixed (mm) t_{fix}	Drilling depth (mm) h_0	Min. thick. of base material (mm) h_{min}	Thread Ø (mm) d	Drilling Ø (mm) d_0	Total anchor length (mm) L	Tighten torque (Nm) T_{inst}	Code
Zinc coated steel versions														
HFL	5X40/5	35	5	40	80	-	-	-	-	6,5	5	40	8	058726
	5X50/15		15									50		058727
	5X60/25		25									60		058728
	6X40/5	35	5	40	80	-	-	-	-	7,5	6	40	10	058729
	6X50/15		15			-	-	-	-			50		058730
	6X80/45-25		45			55	25	60	100			80		058731
	6X100/65-45		65			55	45	60	100			100		058732
CSK	5X40/5	35	5	40	80	-	-	-	-	6,5	5	40	8	058770
	5X60/25		25									60		058771
	6X40/5	35	5	40	80	-	-	-	-	7,5	6	40	10	058772
	6X60/25-5		25			55	5	60	100			60		058773
	6X80/45-25		45			55	25	60	100			80		058774
	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
PAN	5X40/5	35	5	40	80	-	-	-	-	6,5	5	40	8	058779
	5X50/15		15									50		058780
	5X60/25		25									60		058781
	6X40/5	35	5	40	80	-	-	-	-	7,5	6	40	10	058782
DOME	6X40/5	35	5	40	80	-	-	-	-	7,5	6	40	10	058783
	6X60/25-5		25			55	5	60	100			60		058784
ROD	6X35/M8-M10	35	-	40	80	-	-	-	-	7,5	6	35	10	058785
	6X55/M8-M10	55	-	60	100							55		058786
Stainless steel A4 versions														
HFL	6X50/15 A4	35	15	40	80	-	-	-	-	7,5	6	50	10	058806
	6X60/25-5 A4		25			55	5	60	100			60		058807

Anchor mechanical properties

Anchor size Zinc coated & A4		Ø5	Ø6
As (mm²)	Stressed cross-section	33,0	44,2
W_{el} (mm³)	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
Non-cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{Rk}*	1,5	1,5	7,5
Cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{Rk}*	1,5	1,5	7,5

* multiple use for non-strutural application

SHEAR

Anchor size Zinc coated & A4	Ø5	Ø6
Cracked & non-cracked concrete (C20/25)		
V_{Rk}	4,4	7,0

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 Zinc coated & A4	Ø5	Ø6	Ø6
Non-cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{Rd}*	0,8	0,8	5,0
Cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{Rd}*	0,8	0,8	5,0

γ_{Mc} = 1,8 for h_{nom} 35 mm and γ_{Mc} = 1,5 for h_{nom} 55 mm
* multiple use for non-strutural application

SHEAR

Anchor size Zinc coated & A4	Ø5	Ø6
Cracked & non-cracked concrete (C20/25)		
V_{Rd}	2,9	4,6

γ_{Ms} = 1,5

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
Non-cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{rec}*	0,6	0,6	3,6
Cracked concrete (C20/25)			
h_{nom}	**35**	**35**	**55**
N_{rec}*	0,6	0,6	3,6

γ_F = 1,4 ; γ_{Mc} = 1,8 for h_{nom} 35 mm and γ_{Mc} = 1,5 for h_{nom} 55 mm
* multiple use for non-strutural application

SHEAR

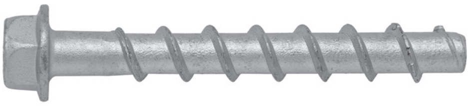
Anchor size Zinc coated & A4	Ø5	Ø6
Cracked & non-cracked concrete (C20/25)		
V_{rec}	2,0	3,3

γ_F = 1,4 ; γ_{Ms} = 1,5

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

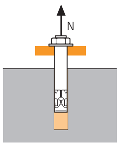
Hollow concrete slab	Edge distance & minimum spacing ≥100 mm		
	wall thickness ≥ 25 mm	wall thickness ≥ 30 mm	wall thickness ≥ 35 mm
Anchor size	F_{rec}	F_{rec}	F_{rec}
Ø6	0,4	0,8	1,2

Mechanical anchors



SPIT CC Method

TENSILE in kN



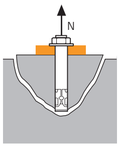
Pull-out resistance

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

$N^0_{Rd,p}$ — Design pull-out resistance

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)			
h_{nom}	35	35	55
$N^0_{Rd,p}$ (C20/25)	0,8	0,8	5,0

$\gamma_{Mc} = 1{,}8$ for h_{nom} 35 mm and $\gamma_{Mc} = 1{,}5$ for h_{nom} 55 mm



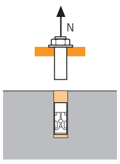
Concrete cone resistance

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

$N^0_{Rd,c}$ — Design cone resistance

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)			
h_{nom}	35	35	55
$N^0_{Rd,c}$ (C20/25)	2,8	2,8	9,8

$\gamma_{Mc} = 1{,}8$ for h_{nom} 35 mm and $\gamma_{Mc} = 1{,}5$ for h_{nom} 55 mm



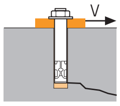
Steel resistance

$N_{Rd,s}$ — Steel design tensile resistance

Anchor size Zinc coated & A4	Ø5	Ø6
$N_{Rd,s}$	6,2	9,8

$\gamma_{Ms} = 1{,}4$

SHEAR in kN



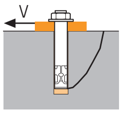
Concrete edge resistance

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

$V^0_{Rd,c}$ — Design concrete edge resistance at minimum edge distance (C_{min})

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)			
h_{nom}	35	35	55
C_{min}	35	35	40
S_{min}	35	35	40
$V^0_{Rd,c}$ (C20/25)	1,4	1,4	1,9

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



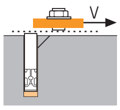
Pryout failure

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

$V^0_{Rd,cp}$ — Design pryout resistance

Anchor size Zinc coated & A4	Ø5	Ø6	Ø6
Cracked and non-cracked concrete (C20/25)			
$h_{nom,min}$	35	35	55
$V^0_{Rd,cp}$	3,4	3,4	9,8

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



Steel resistance

$V_{Rd,s}$ — Steel design shear resistance

Anchor size Zinc coated & A4	Ø5	Ø6
$V_{Rd,s}$	2,9	4,6

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

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

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

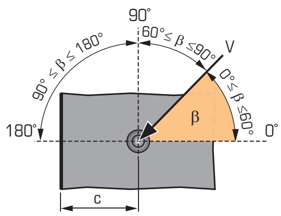
$$\beta_N + \beta_V \leq 1{,}2$$

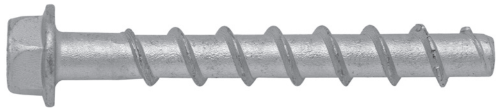
f_b INFLUENCE OF CONCRETE

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

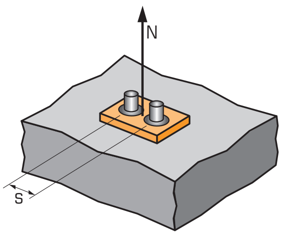
Angle β [°]	$f_{\beta,V}$
0 to 55	1
60	1,1
70	1,2
80	1,5
90 to 180	2





SPIT CC Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



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

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

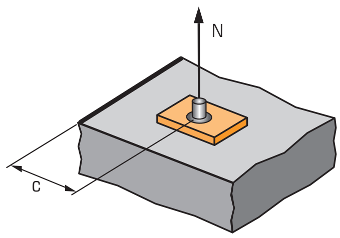
$s_{cr,N} = 3.h_{ef}$

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

SPACING S — Reduction factor Ψ_s — 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

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



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

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

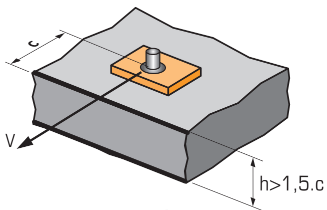
$c_{cr,N} = 1,5.h_{ef}$

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

EDGE C — Reduction factor $\Psi_{c,N}$ — 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

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

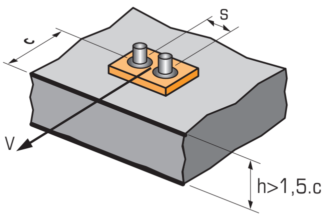


$$\Psi_{s-c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For single anchor fastening

Reduction factor $\Psi_{s-c,V}$ — 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
$\Psi_{s-c,V}$	1,00	1,31	1,66	2,02	2,41	2,83	3,26	3,72	4,19	4,69	5,20	5,72

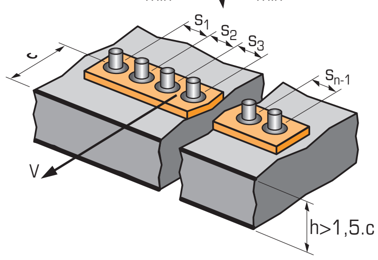


$$\Psi_{s-c,V} = \frac{3.c + s}{6.c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

For 2 anchors fastening

Reduction factor $\Psi_{s-c,V}$ — 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	4,65



For 3 anchors fastening and more

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

Mechanical anchors