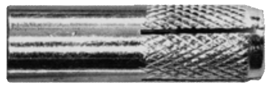
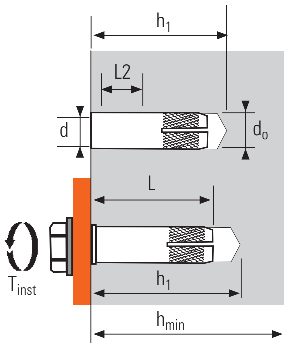
DROP-IN ANCHOR

Zinc Coated Steel



Deformation-control Expansion Female Anchor

Performance	Material	Installation



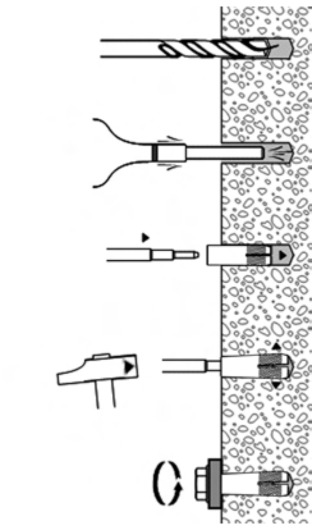
MATERIAL

Sleeve:
Steel

Expansion plug:
Steel

Coating:
Zinc coated (5μm)

INSTALLATION



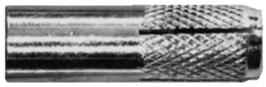
Technical Data

Drop-In	Anchor depth (mm) h_{ef}	Ø Internal thread (mm) d	Inner thread length (mm) L2	Total anchor length (mm) L	Min thick of base material (mm) h_{min}	Ø Drill bit (mm) h_o	Drilling depth (mm) h_1	Bolt size (mm)	Max tighten torque (Nm) T_{inst}	Ramset power tool code	Drill bit type-size	Setting tool
M6x25	25	6	8	25	50	8	28	M6	6	DD527	R3 PLUS-8	SETDS1
M8x30	30	8	12	30	60	10	33	M8	10	DD527	R3 PLUS-10	SETDS2
M10x40	40	10	16	40	80	12	43	M10	20	DD527	R3 PLUS-12	SETDS3
M10x30 (Flanged)	30	10	10	30	60	12	33	M10	12	DD527	R3 PLUS-12	SETDS3
M12x50	50	12	20	50	100	16	53	M12	40	DD527	R3 PLUS-16	SETDS4
M16x65	65	16	24	65	130	20	68	M16	95	DD543	R3 PLUS-20	SETDS5
M20x80	80	20	28	80	160	24	83	M20	180	DD543	R3 PLUS-24	SETDS6
5/16″x30	30	5/16″	12	30	60	10	33	5/16″	10	DD527	R3 PLUS-10	SETDS2
3/8″x40	40	3/8″	16	40	80	12	43	3/8″	20	DD527	R3 PLUS-12	SETDS3
3/8″x30 (Flanged)	30	3/8″	10	30	60	12	33	3/8″	12	DD527	R3 PLUS-12	SETDS3
1/2″x50	50	1/2″	20	50	100	16	53	1/2″	40	DD527	R3 PLUS-16	SETDS4
5/8″x65	65	5/8″	24	65	130	20	68	5/8″	95	DD543	R3 PLUS-20	SETDS5

Anchor Mechanical Properties

CARBON STEEL	M6	M8/5/16″	M10/3/8″	M12/1/2″	M16/5/8″	M20
f_{uk} (N/mm2) Min. tensile strength	440	440	430	320	450	450
f_{yk} (N/mm2) Yield strength	350	350	340	260	320	320
A_S (mm2) Stressed cross-section	24.3	32.0	40.7	96.3	125.5	159.8

DROP-IN ANCHOR
Zinc Coated Steel



Ultimate Loads ($N_{Ru,m}$, $V_{Ru,m}$) / Characteristic Loads (N_{Rk}, V_{Rk}) in kN

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
h_{ef} (mm)	25	30	40	50	65	80
$N_{Ru,m}$ (kN)	7.5	10.0	15.8	22.5	33.8	46.5
N_{Rk} (kN)	6.9	9.1	14.0	19.5	28.9	39.5

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
h_{ef} (mm)	30	30	30	40	50	65
$N_{Ru,m}$ (kN)	10.0	10.0	10.0	15.8	22.5	33.8
N_{Rk} (kN)	9.1	9.1	9.1	14.0	19.5	28.9

SHEAR @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
$V_{Ru,m}$ (kN)	6.6	9.8	17.0	26.3	44.8	68.1
V_{Rk} (kN)	5.3	7.8	13.6	21.0	35.8	54.5

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
$V_{Ru,m}$ (kN)	10.4	10.4	9.8	17.0	26.3	44.8
V_{Rk} (kN)	8.4	8.4	7.8	13.6	21.0	35.8

Design Loads (N_{Rd}, V_{Rd}) for one anchor without edge or spacing influence in kN

$$N_{Rd} = \frac{N_{Rk}}{\gamma_{Mc,N}} \qquad V_{Rd} = \frac{V_{Rk}}{\gamma_{Ms,V}}$$

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
h_{ef} (mm)	25	30	40	50	65	80
N_{Rd} (kN)	3.8	5.0	7.9	10.8	16.1	21.9

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
h_{ef} (mm)	30	30	30	40	50	65
N_{Rd} (kN)	5.0	5.0	5.0	7.8	10.8	16.1

$\gamma_{Mc,N} = 1.8$

SHEAR @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
V_{Rd} (kN)	4.2	6.3	10.9	16.8	28.7	43.6

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
V_{Rd} (kN)	6.7	6.7	6.3	10.9	16.8	28.7

$\gamma_{Ms,V} = 1.25$

Recommended Loads (N_{rec}, V_{rec}) for one anchor without edge or spacing influence in kN

$$N_{rec} = \frac{N_{Rk}}{\gamma_{Mc,N} \cdot \gamma_F} \qquad V_{rec} = \frac{V_{Rk}}{\gamma_{Ms,V} \cdot \gamma_F}$$

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
h_{ef} (mm)	25	30	40	50	65	80
N_{rec} (kN)	2.7	3.6	5.6	7.7	11.5	15.7

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
h_{ef} (mm)	30	30	30	40	50	65
N_{rec} (kN)	3.6	3.6	3.6	5.6	7.7	11.5

$\gamma_F = 1.4$

$\gamma_{Mc,N} = 1.8$

SHEAR @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16	M20
V_{rec} (kN)	3.0	4.5	7.8	12.0	20.5	31.2

Anchor size	3/8"*	M10*	5/16"	3/8"	1/2"	5/8"
V_{rec} (kN)	4.8	4.8	4.5	7.8	12.0	20.5

$\gamma_F = 1.4$

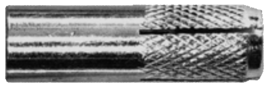
$\gamma_{Ms,V} = 1.25$

(*) Flanged type

Grade 8.8 bolt is used in conjunction with Drop-In anchor to derive on its performance

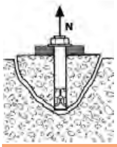
DROP-IN ANCHOR

Zinc Coated Steel



CC-Method

TENSILE in kN



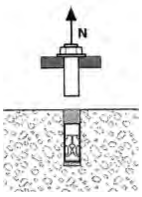
Concrete cone resistance
Concrete strength 30 N/mm²

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

$N^0_{Rd,c}$ Anchor size	Design cone resistance M6	M8	M10	M12	M16	M20
h_{ef} (mm)	25	30	40	50	65	80
$N^0_{Rd,c}$ (kN)	3.8	5.0	7.8	10.8	16.1	21.9

$N^0_{Rd,c}$ Anchor size	Design cone resistance 3/8″*	M10*	5/16″	3/8″	1/2″	5/8″
h_{ef} (mm)	30	30	30	40	50	65
$N^0_{Rd,c}$ (kN)	5.0	5.0	5.0	7.8	10.8	16.1

$\gamma_{Mc,N} = 1.8$
*Flanged type



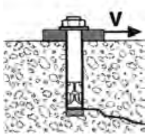
Steel resistance

$N_{Rd,s}$ Anchor size	Steel design tensile resistance M6	M8	M10	M12	M16	M20
$N_{Rd,s}$ (kN)	7.1	9.4	11.7	20.5	37.7	47.9

$N_{Rd,s}$ Anchor size	Steel design tensile resistance 3/8″*	M10*	5/16″	3/8″	1/2″	5/8″
$N_{Rd,s}$ (kN)	9.4	11.7	9.4	11.7	20.5	37.7

$\gamma_{Ms,N} = 1.5$ for bolt grade 5.8 and 8.8
* Flanged type

SHEAR in kN



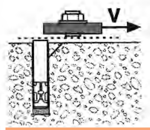
Concrete edge resistance
Concrete strength 30 N/mm²

$V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{\beta,V} \cdot \Psi_{s\text{-}c,V}$

$V^0_{Rd,c}$ Anchor size	Design concrete edge resistance at a minimum edge distance (c_{min}) M6	M8	M10	M12	M16	M20
h_{ef} (mm)	25	30	40	50	65	80
c_{min}	35	60	75	90	120	150
s_{min}	50	60	80	100	130	160
$V^0_{Rd,c}$ (kN)	5.1	7.6	13.3	20.5	34.8	53.0

$V^0_{Rd,c}$ Anchor size	Design concrete edge resistance at a minimum edge distance (c_{min}) 3/8″*	M10*	5/16″	3/8″	1/2″	5/8″
h_{ef} (mm)	30	30	30	40	50	65
c_{min}	60	60	60	75	90	120
s_{min}	60	60	60	80	100	130
$V^0_{Rd,c}$ (kN)	8.1	8.1	7.6	13.3	20.5	34.8

$\gamma_{Mc,V} = 1.8$
*Flanged type

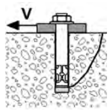


Steel resistance

$V_{Rd,s}$ Anchor size	Steel design shear resistance M6	M8	M10	M12	M16	M20
$V_{Rd,s}$ (kN)	3.3	4.4	5.5	9.6	17.6	22.5

$V_{Rd,s}$ Anchor size	Steel design shear resistance 3/8″*	M10*	5/16″	3/8″	1/2″	5/8″
$V_{Rd,s}$ (kN)	4.4	5.5	4.4	5.5	9.6	17.6

$\gamma_{Ms,V} = 1.6$
* Flanged type



Concrete pry-out failure
Concrete strength 30 N/mm²

$V^0_{Rd,cp}$ Anchor size	Design pry-out resistance M6	M8	M10	M12	M16	M20
$V^0_{Rd,cp}$ (kN)	7.7	10.1	15.5	21.7	32.1	43.9

$V_{Rd,s}$ Anchor size	Design pry-out resistance 3/8″*	M10*	5/16″	3/8″	1/2″	5/8″
$V^0_{Rd,cp}$ (kN)	10.1	10.1	10.1	15.5	21.7	32.1

$\gamma_{Mc,V} = 1.8$

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

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

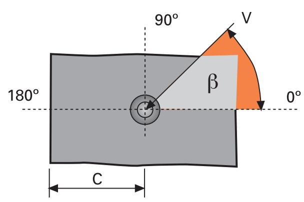
$\beta N + \beta V \leq 1.2$

f_B INFLUENCE OF CONCRETE

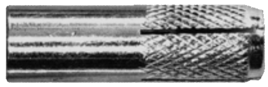
Concrete Grade	f_B	Concrete Grade	f_B
C16/20	0.81	C35/45	1.21
C20/25	0.90	C40/50	1.28
C25/30	1.00	C45/55	1.34
C30/37	1.10	C50/60	1.40

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

Angle β [°]	$f_{\beta,V}$
0~50	1.0
60	1.1
70	1.2
80	1.5
90~180	2.0

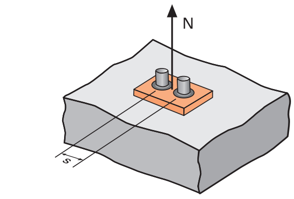


MECHANICAL ANCHORS



CC-Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_s = 0.5 + \frac{s}{6h_{ef}}$$

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

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

Ψ_s must be used for each spacing influenced the anchors group

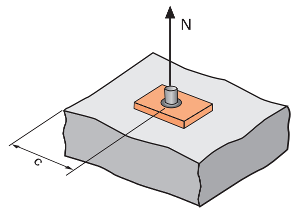
Spacing, s

Reduction Factor Ψ_s

Non-cracked concrete

	M6	M8 & 5/16“	M10 & 3/8“	M12 & 1/2“	M16 & 5/8“	M20
50	0.83					
60	0.90	0.83				
75	1.00	0.92	0.81			
80		0.94	0.83			
90		1.00	0.88	0.80		
100			0.92	0.83		
120			1.00	0.90	0.81	
130				0.93	0.83	
150				1.00	0.88	0.81
160					0.91	0.83
195					1.00	0.91
240						1.00

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



$c_{min} = 3.5h_{ef}$

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

Edge, c

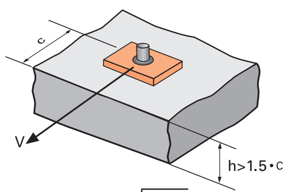
Reduction Factor $\Psi_{c,N}$

Non-cracked concrete

	M6	M8 & 5/16“	M10 & 3/8“	M12 & 1/2“	M16 & 5/8“	M20
88	1.00					
105		1.00				
140			1.00			
175				1.00		
230					1.00	
280						1.00

$\Psi_{c,N,min}$ = 1.0, no reduction is permitted

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



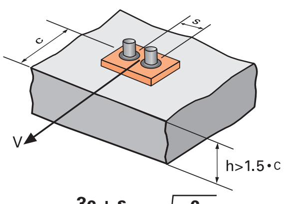
$$\Psi_{s\text{-}c,V} = \frac{c}{c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

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



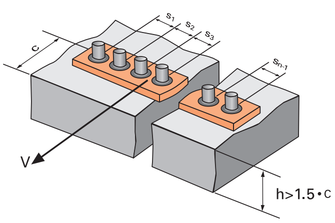
$$\Psi_{s\text{-}c,V} = \frac{3c + s}{6c_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

FOR 2 ANCHORS FASTENING

Reduction Factor $\Psi_{s\text{-}c,V}$

Non-cracked concrete

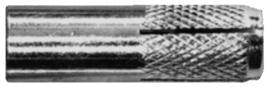
$\frac{s}{c_{min}}$ \ $\frac{c}{c_{min}}$	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
1.0	0.67	0.84	1.03	1.22	1.43	1.65	1.88	2.12	2.36	2.62	2.89	3.16
1.5	0.75	0.93	1.12	1.33	1.54	1.77	2.00	2.25	2.50	2.76	3.03	3.31
2.0	0.83	1.02	1.22	1.43	1.65	1.89	2.12	2.38	2.63	2.90	3.18	3.46
2.5	0.92	1.11	1.32	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	3.57	3.88	4.19	4.50
6.0						2.83	3.11	3.41	3.71	4.02	4.33	4.65



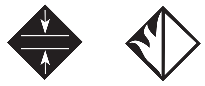
FOR OTHER CASE OF FASTENINGS

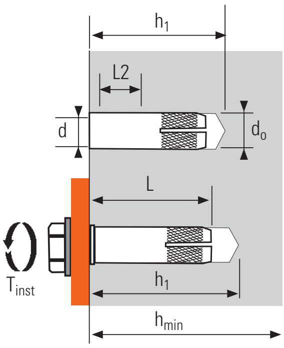
$$\Psi_{s\text{-}c,V} = \frac{3c + s_1 + s_2 + s_3 + ... + s_{n-1}}{3nc_{min}} \cdot \sqrt{\frac{c}{c_{min}}}$$

DROP-IN ANCHOR
Stainless Steel (SUS316)



Deformation-control Expansion Female Anchor

Performance	Material	Installation
		



Technical Data

Drop-In Stainless Steel	Anchor depth (mm)	Ø Internal thread (mm)	Inner thread length (mm)	Total anchor length (mm)	Min thick of base material (mm)	Ø Drill bit (mm)	Drilling depth (mm)	Bolt size (mm)	Max tighten torque (Nm)	Ramset power tool code	Drill bit type-size
	h_{ef}	d	L2	L	h_{min}	h_o	h_1		T_{inst}		
M6x25	25	6	8	25	50	8	28	M6	6	DD527	R3 PLUS-8
M8x30	30	8	12	30	60	10	33	M8	10	DD527	R3 PLUS-10
M10x40	40	10	16	40	80	12	43	M10	20	DD527	R3 PLUS-12
M12x50	50	12	20	50	100	16	53	M12	40	DD527	R3 PLUS-16
M16x65	65	16	24	65	130	20	68	M16	95	DD543	R3 PLUS-20

MATERIAL

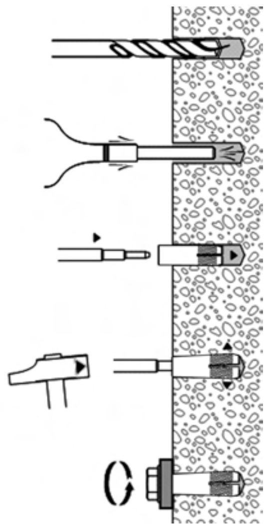
Sleeve:
SUS316

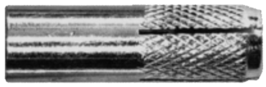
Expansion plug:
SUS316

Anchor Mechanical Properties

STAINLESS STEEL	M6	M8	M10	M12	M16
f_{uk} (N/mm2) Min. tensile strength	600	600	600	600	600
f_{yk} (N/mm2) Yield strength	480	480	480	480	480
A_s (mm2) Stressed cross-section	24.3	32.0	40.7	72.0	125.5

INSTALLATION





Ultimate Loads ($N_{Ru,m}$, $V_{Ru,m}$) / Characteristic Loads (N_{Rk}, V_{Rk}) in kN

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16
h_{ef} (mm)	25	30	40	50	65
$N_{Ru,m}$ (kN)	7.5	10.0	15.8	22.5	33.8
N_{Rk} (kN)	6.9	9.1	14.0	19.5	28.9

SHEAR @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16
$V_{Ru,m}$ (kN)	6.6	9.8	17.0	26.3	44.8
V_{Rk} (kN)	5.3	7.8	13.6	21.0	35.8

Design Loads (N_{Rd}, V_{Rd}) for one anchor without edge or spacing influence in kN

$$N_{Rd} = \frac{N_{Rk}}{\gamma_{Mc,N}}$$

$$V_{Rd} = \frac{V_{Rk}}{\gamma_{Ms,V}}$$

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16
h_{ef} (mm)	25	30	40	50	65
N_{Rd} (kN)	3.8	5.0	7.8	10.8	16.1

$\gamma_{Mc,N} = 1.8$

SHEAR @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16
V_{Rd} (kN)	3.3	4.9	8.5	13.1	22.4

$\gamma_{Ms,V} = 1.6$

Recommended Loads (N_{rec}, V_{rec}) for one anchor without edge or spacing influence in kN

$$N_{rec} = \frac{N_{Rk}}{\gamma_{Mc,N} \cdot \gamma_F}$$

$$V_{rec} = \frac{V_{Rk}}{\gamma_{Ms,V} \cdot \gamma_F}$$

TENSILE @ Concrete strength 30 N/mm2

Anchor size	M6	M8	M10	M12	M16
h_{ef} (mm)	25	30	40	50	65
N_{rec} (kN)	2.7	3.6	5.5	7.7	11.5

$\gamma_F = 1.4$

$\gamma_{Mc,N} = 1.8$

SHEAR @ Concrete strength 30 N/mm2

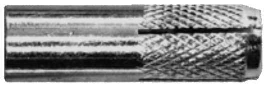
Anchor size	M6	M8	M10	M12	M16
V_{rec} (kN)	2.3	3.5	6.1	9.4	16.0

$\gamma_F = 1.4$

$\gamma_{Ms,V} = 1.6$

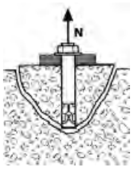
SUS316 bolt is used in conjunction with Drop-In anchor to derive on its performance

DROP-IN ANCHOR
Stainless Steel (SUS316)



CC-Method

TENSILE in kN

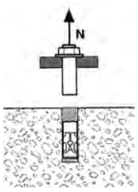


Concrete cone resistance
Concrete strength 30 N/mm²

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

$N^0_{Rd,c}$ Anchor size	M6	M8	M10	M12	M16
	Design cone resistance				
h_{ef} (mm)	25	30	40	50	65
$N^0_{Rd,c}$ (kN)	3.8	5.0	7.8	10.8	16.1

$\gamma_{Mc,N} = 1.8$



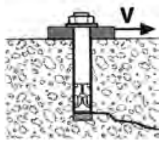
Steel resistance

$N_{Rd,s}$ Anchor size	M6	M8	M10	M12	M16
	Steel design tensile resistance				
$N_{Rd,s}$ (kN)	8.1	9.6	12.2	21.6	37.7

$\gamma_{Ms,N} = 1.8$ for M6

$\gamma_{Ms,N} = 2.0$ for M8 to M20

SHEAR in kN

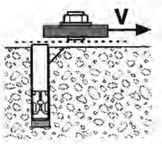


Concrete edge resistance
Concrete strength 30 N/mm²

$V_{Rd,c} = V^0_{Rd,c} \cdot f_B \cdot f_{\beta,V} \cdot \Psi_{s\text{-}c,V}$

$V^0_{Rd,c}$ Anchor size	M6	M8	M10	M12	M16
	Design concrete edge resistance at a minimum edge distance (c_{min})				
h_{ef} (mm)	25	30	40	50	65
c_{min}	35	60	75	90	120
s_{min}	50	60	80	100	130
$V^0_{Rd,c}$ (kN)	5.6	8.1	14.0	22.3	37.2

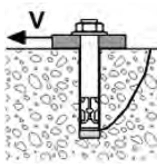
$\gamma_{Mc,V} = 1.8$



Steel resistance

$V_{Rd,s}$ Anchor size	M6	M8	M10	M12	M16
	Steel design shear resistance				
$V_{Rd,s}$ (kN)	4.6	6.0	7.6	13.5	23.5

$\gamma_{Ms,V} = 1.6$



Concrete pry-out failure
Concrete strength 30 N/mm²

$V^0_{Rd,cp}$ Anchor size	M6	M8	M10	M12	M16
	Steel design shear resistance				
$V^0_{Rd,cp}$ (kN)	7.7	10.1	15.5	21.7	32.1

$\gamma_{Mc,V} = 1.8$

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

$\beta N = N_{Sd} / N_{Rd} \leq 1$

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

$\beta V = V_{Sd} / V_{Rd} \leq 1$

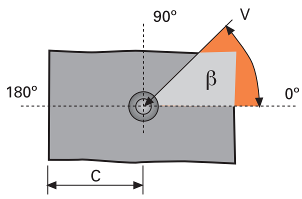
$\beta N + \beta V \leq 1.2$

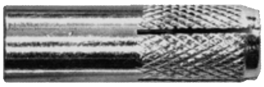
f_B INFLUENCE OF CONCRETE

Concrete Grade	f_B	Concrete Grade	f_B
C16/20	0.81	C35/45	1.21
C20/25	0.90	C40/50	1.28
C25/30	1.00	C45/55	1.34
C30/37	1.10	C50/60	1.40

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

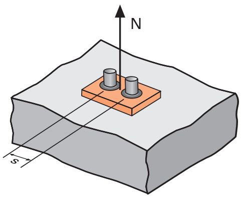
Angle β [°]	$f_{\beta,V}$
0~50	1.0
60	1.1
70	1.2
80	1.5
90~180	2.0





CC-Method

Ψ_s INFLUENCE OF SPACING FOR CONCRETE CONE RESISTANCE IN TENSILE LOAD



$$\Psi_s = 0.5 + \frac{s}{6h_{ef}}$$

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

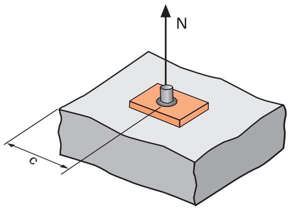
$s_{cr,N} = 3h_{ef}$

Ψ_s must be used for each spacing influenced the anchors group

Spacing, s — Reduction Factor Ψ_s, Non-cracked concrete

	M6	M8	M10	M12	M16
50	0.83				
60	0.90	0.83			
75	1.00	0.92	0.81		
80		0.94	0.83	0.77	
90		1.00	0.88	0.80	0.73
100			0.92	0.83	0.76
120			1.00	0.90	0.81
130				0.93	0.83
150				1.00	0.88
160					0.91
195					1.00

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



$c_{min} = 3.5h_{ef}$

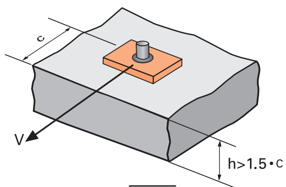
$\Psi_{c,N}$ must be used for each distance influenced the anchors group

Edge, c — Reduction Factor $\Psi_{c,N}$, Non-cracked concrete

	M6	M8	M10	M12	M16
88	1.00				
105		1.00			
140			1.00		
175				1.00	
230					1.00

$\Psi_{c,N,min}$ = 1.0, no reduction is permitted

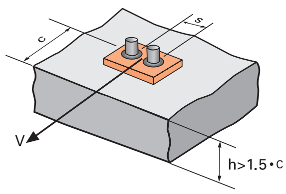
$\Psi_{s\text{-}c,V}$ INFLUENCED OF SPACING AND EDGE DISTANCE FOR CONCRETE EDGE RESISTANCE IN SHEAR LOAD



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

FOR SINGLE ANCHOR FASTENING — Reduction Factor $\Psi_{s\text{-}c,V}$, Non-cracked concrete

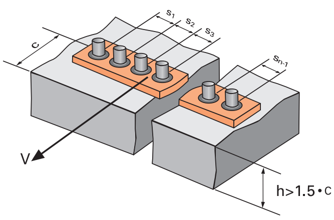
$\frac{c}{c_{min}}$	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
$\Psi_{s\text{-}c,V}$	1.00	1.31	1.66	2.02	2.41	2.83	3.26	3.72	4.19	4.69	5.20	5.72



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

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	3.57	3.88	4.19	4.50
6.0						2.83	3.11	3.41	3.71	4.02	4.33	4.65



FOR OTHER CASE OF FASTENINGS

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