R-KER with Threaded Rods

High performance vinylester resin approved for use in cracked and non-cracked concrete

Approvals and Reports

- ETA-10/0055

Product information

Features and benefits

- Approved for use with threaded rods for use in cracked and non-cracked concrete (ETAG001 Option 1)
- Suitable for use in low temperatures (down to -20°C for winter option) enables use throughout the year
- Winter version can be used in warmer temperatures for faster curing
- Suitable for use in dry and wet substrates as well as holes and substrates covered with water
- Rapid bonding time enables quick execution of works
- Very high load capacity
- Anchor does not generate tensions in the substrate which enables R-KER to be specified where closer edge and spacing distances are required

Applications

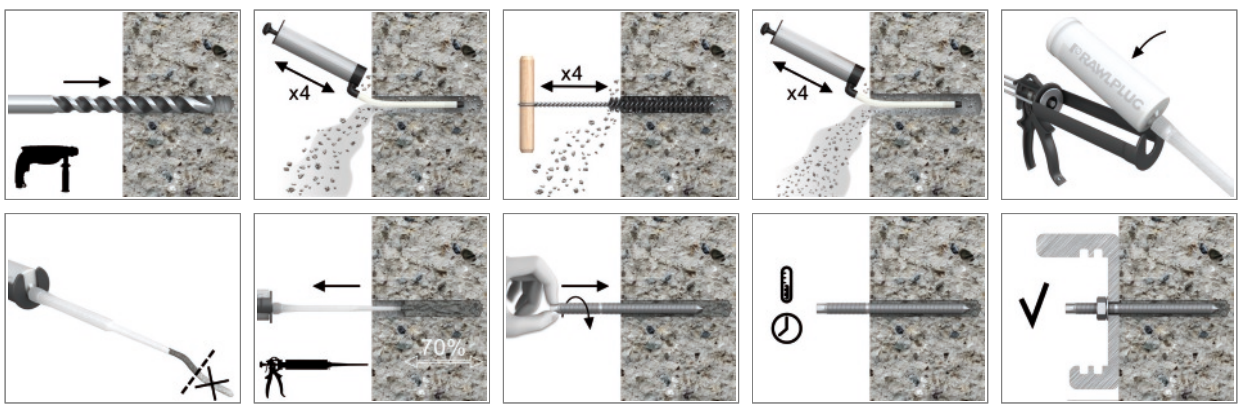
- Curtain walling
- Balustrading
- Handrails
- Canopies
- Large panel reinforcing system -Copy Eco
- Cable conduits and trays
- Fencing & gates manufacturing and installation
- Pipework/ductwork supports
- Platforms
- Pipelines systems
- Passenger lifts

Base materials

Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60

Installation guide



Product information

1. Drill hole to the required diameter and depth for stud size being used.
2. Clean the hole with brush and hand pump at least four times each. It is very important and necessary before installation.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until even colour is obtained.
5. Insert the mixing nozzle to the far end of the hole and inject resin, slowly withdrawing the nozzle as the hole is filled to 2/3 of its depth.
6. Immediately insert the stud, slowly and with slight twisting motion. Remove any excess resin around the hole before it sets and leave it undisturbed until the curing time elapses.
7. Attach fixture and tighten the nut to the required torque.

Product Code	Resin	Description / Resin Type	Volume [ml]
R-KER-280	R-KER	Styrene Free Vinylester Resin	280
R-KER-300			300
R-KER-310			310
R-KER-345			345
R-KER-380			380
R-KER-400			400
R-KER-300-W	R-KER-W	Low Temperature (Winter) / Rapid Cure Styrene Free Vinylester Resin	300
R-KER-380-W			380
R-KER-400-W			400
R-KER-380-S	R-KER-S	High Temperature (Summer) / Slow Cure Styrene Free Vinylester Resin	380
R-KER-400-S			400

R-STUDS

Size	Product Code			Anchor		Fixture			
	Steel class 5.8	Steel class 8.8	Steel grade A4	Diameter	Length	Hole diameter	Max. thickness t_{fix} for:		
				d	L	d_f	$h_{nom,min}$	$h_{nom,std}$	$h_{nom,max}$
				[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M8	R-STUDS-08110	R-STUDS-08110-88	R-STUDS-08110-A4	8	110	9	40	20	-
	R-STUDS-08160	-	R-STUDS-08160-A4	8	160	9	90	70	50
M10	R-STUDS-10130	R-STUDS-10130-88	R-STUDS-10130-A4	10	130	12	48	28	-
	R-STUDS-10170	-	R-STUDS-10170-A4	10	170	12	88	68	38
	R-STUDS-10190	-	R-STUDS-10190-A4	10	190	12	108	88	58
M12	R-STUDS-12160	R-STUDS-12160-88	R-STUDS-12160-A4	12	160	14	65	35	-
	R-STUDS-12190	-	R-STUDS-12190-A4	12	190	14	95	65	30
	R-STUDS-12220	-	R-STUDS-12220-A4	12	220	14	125	95	60
	R-STUDS-12260	-	R-STUDS-12260-A4	12	260	14	165	135	100
	R-STUDS-12300	-	R-STUDS-12300-A4	12	300	14	205	175	140
M16	R-STUDS-16190	R-STUDS-16190-88	R-STUDS-16190-A4	16	190	18	71	46	-
	R-STUDS-16220	R-STUDS-16220-88	R-STUDS-16220-A4	16	220	18	101	76	11
	R-STUDS-16260	-	R-STUDS-16260-A4	16	260	18	141	116	51
	R-STUDS-16300	-	R-STUDS-16300-A4	16	300	18	181	156	91
	R-STUDS-16380	-	R-STUDS-16380-A4	16	380	18	261	236	171
M20	R-STUDS-20260	R-STUDS-20260-88	R-STUDS-20260-A4	20	260	22	117	67	-
	R-STUDS-20300	-	R-STUDS-20300-A4	20	300	22	157	107	37
	R-STUDS-20350	-	R-STUDS-20350-A4	20	350	22	207	157	87
M24	R-STUDS-24300	R-STUDS-24300-88	R-STUDS-24300-A4	24	300	26	132	62	-
M30	R-STUDS-30380	R-STUDS-30380-88	R-STUDS-30380-A4	30	380	32	181	106	-

Installation data

R-STUDS

Size			M8	M10	M12	M16	M20	M24	M30
Thread diameter	d	[mm]	8	10	12	16	20	24	30
Hole diameter in substrate	d_0	[mm]	10	12	14	18	24	28	35
Installation torque	T_{inst}	[Nm]	10	20	40	80	120	180	300
Min. hole depth in substrate	h_0	[mm]	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5	h_{ef} + 5
MINIMUM EMBEDMENT DEPTH									
Installation depth	$h_{nom, min}$	[mm]	60	70	80	100	120	140	165
STANDARD EMBEDMENT DEPTH									
Installation depth	$h_{nom,s}$	[mm]	80	90	110	125	170	210	240
MAXIMUM EMBEDMENT DEPTH									
Installation depth	$h_{nom, max}$	[mm]	100	120	145	190	240	290	360
Min. substrate thickness	h_{min}	[mm]	h_{ef} + 30 100	h_{ef} + 30 100	h_{ef} + 30 100	h_{ef} + 30 100	h_{ef} + 2*d_0	h_{ef} + 2*d_0	h_{ef} + 2*d_0
Min. spacing	s_{min}	[mm]	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40
Min. edge distance	c_{min}	[mm]	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40	0.5 * h_{ef} 40

Minimum working and curing time

R-KER

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	-	-
5	-15	-	-
5	-10	-	-
5	-5	6 h	60
5	0	3 h	40
5	5	2 h	20
10	10	80	12
15	15	60	8
20	20	45	5
25	25	30	3
25	30	20	2
25	40	10	0.5
25	45	-	-
25	50	-	-

R-KER-W

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	24 h	100
5	-15	16 h	60
5	-10	8 h	30
5	-5	4 h	16
5	0	2 h	12
5	5	1 h	8
10	10	45	5
15	15	30	3
20	20	10	2
25	25	-	-
25	30	-	-
25	40	-	-
25	45	-	-
25	50	-	-

Installation data

R-KER-S

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	-	-
5	-15	-	-
5	-10	-	-
5	-5	24 h	65
5	0	16 h	50
5	5	12 h	35
10	10	8 h	20
15	15	6 h	12
20	20	4 h	9
25	25	3 h	7
25	30	2 h	6
25	40	45	4
25	45	35	3
25	50	25	2

Mechanical properties

Size			M8	M10	M12	M16	M20	M24	M30
R-STUDS Metric Threaded Rods - Steel Class 5.8									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	500	500	500	500	500	500	500
Nominal yield strength - tension	f_{yk}	[N/mm²]	400	400	400	400	400	400	400
Cross sectional area - tension	A_s	[mm²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	561	1124
Design bending resistance	M	[Nm]	15	30	52	133	259	449	899
Allowable bending resistance	M_{rec}	[Nm]	11	21	37	95	185	321	642
R-STUDS Metric Threaded Rods - Steel Class 8.8									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	800	800	800	800	800	800	800
Nominal yield strength - tension	f_{yk}	[N/mm²]	640	640	640	640	640	640	640
Cross sectional area - tension	A_s	[mm²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	898	1799
Design bending resistance	M	[Nm]	24	48	84	213	416	718	1439
Allowable bending resistance	M_{rec}	[Nm]	17	34	60	152	297	513	1028
R-STUDS Metric Threaded Rods - A4									
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	700	700	700	700	700	700	700
Nominal yield strength - tension	f_{yk}	[N/mm²]	350	350	350	350	350	350	350
Cross sectional area - tension	A_s	[mm²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm³]	31.2	62.3	109.2	277.5	541	935	1868
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	233	454	786	1574
Design bending resistance	M	[Nm]	17	34	59	149	291	504	1009
Allowable bending resistance	M_{rec}	[Nm]	12	24	42	107	208	360	721

Basic performance data

R-STUDS

Performance data for single anchor without influence of edge distance and spacing

Size		M8	M10	M12	M16	M20	M24	M30	M12	M16	M20	M24
Substrate		Non-cracked concrete							Cracked concrete			
MEAN ULTIMATE LOAD												
TENSION LOAD $N_{Ru,m}$												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8												
Minimum embedment depth	[kN]	21.6	34.8	50.4	78.0	102.5	129.1	165.0	30.2	34.8	46.6	65.1
Standard embedment depth	[kN]	21.6	34.8	50.4	87.3	115.2	156.1	185.4	41.7	43.7	65.9	97.6
Maximum embedment depth	[kN]	21.6	34.8	50.4	93.6	146.4	211.2	256.7	50.4	66.3	93.0	135.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8												
Minimum embedment depth	[kN]	30.2	44.1	55.6	78.0	102.5	129.1	165.0	30.2	34.8	46.6	65.1
Standard embedment depth	[kN]	34.8	55.2	56.6	87.3	115.2	156.1	185.4	41.7	43.7	65.9	97.6
Maximum embedment depth	[kN]	34.8	55.2	76.0	114.4	156.6	215.5	256.7	54.8	66.3	93.0	135.0
R-STUDS METRIC THREADED RODS - A4												
Minimum embedment depth	[kN]	30.2	44.1	55.6	78.0	102.5	129.1	165.0	30.2	34.8	46.6	65.1
Standard embedment depth	[kN]	31.2	49.2	56.6	87.3	115.2	156.1	185.4	41.7	43.7	65.9	97.6
Maximum embedment depth	[kN]	31.2	49.2	70.8	114.4	156.6	215.5	256.7	54.8	66.3	93.0	135.0
SHEAR LOAD $V_{Ru,m}$												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18.3	29.0	42.2	78.5	122.5	176.5	280.5	42.2	78.5	122.5	176.5
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	29.3	46.4	67.4	125.6	196.0	282.4	448.8	67.4	125.6	196.0	282.4
R-STUDS METRIC THREADED RODS - A4	[kN]	25.6	40.6	59.0	109.9	171.5	247.1	392.7	59.0	109.9	171.5	247.1
CHARACTERISTIC LOAD												
TENSION LOAD N_{Rk}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8												
Minimum embedment depth	[kN]	18.0	28.6	36.1	50.5	66.4	83.7	107.0	19.6	22.6	30.2	42.2
Standard embedment depth	[kN]	18.0	29.0	42.0	69.1	101.5	142.5	158.3	27.0	28.3	42.7	63.3
Maximum embedment depth	[kN]	18.0	29.0	42.0	78.0	122.0	176.0	237.5	35.5	43.0	60.3	87.5
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8												
Minimum embedment depth	[kN]	19.6	28.6	36.1	50.5	66.4	83.7	107.0	19.6	22.6	30.2	42.2
Standard embedment depth	[kN]	26.1	36.8	53.9	69.1	101.5	142.5	158.3	27.0	28.3	42.7	63.3
Maximum embedment depth	[kN]	29.0	46.0	67.0	105.1	143.3	196.8	237.5	35.5	43.0	60.3	87.5
R-STUDS METRIC THREADED RODS - A4												
Minimum embedment depth	[kN]	19.6	28.6	36.1	50.5	66.4	83.7	107.0	19.6	22.6	30.2	42.2
Standard embedment depth	[kN]	26.0	36.8	53.9	69.1	101.5	142.5	158.3	27.0	28.3	42.7	63.3
Maximum embedment depth	[kN]	26.0	41.0	59.0	105.1	143.3	196.8	237.5	35.5	43.0	60.3	87.5
SHEAR LOAD V_{Rk}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	9.00	14.0	21.0	39.0	61.0	88.0	140.0	21.0	39.0	61.0	88.0
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	224.0	34.0	63.0	98.0	141.0
R-STUDS METRIC THREADED RODS - A4	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	196.0	29.0	55.0	86.0	124.0

Basic performance data

Size		M8	M10	M12	M16	M20	M24	M30	M12	M16	M20	M24
DESIGN LOAD												
TENSION LOAD N_{Rd}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8												
Minimum embedment depth	[kN]	10.9	15.9	20.1	28.1	36.9	39.9	51.0	10.9	12.6	16.8	20.1
Standard embedment depth	[kN]	12.0	19.3	28.0	38.4	56.4	67.9	75.4	15.0	15.7	23.7	30.2
Maximum embedment depth	[kN]	12.0	19.3	28.0	52.0	79.6	93.7	113.1	19.7	23.9	33.5	41.7
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8												
Minimum embedment depth	[kN]	10.9	15.9	20.1	28.1	36.9	39.9	51.0	10.9	12.6	16.8	20.1
Standard embedment depth	[kN]	14.5	20.4	29.9	38.4	56.4	67.9	75.4	15.0	15.7	23.7	30.2
Maximum embedment depth	[kN]	18.2	27.2	39.5	58.4	79.6	93.7	113.1	19.7	23.9	33.5	41.7
R-STUDS METRIC THREADED RODS - A4												
Minimum embedment depth	[kN]	10.9	15.9	20.1	28.1	36.9	39.9	51.0	10.9	12.6	16.8	20.1
Standard embedment depth	[kN]	13.9	20.4	29.9	38.4	56.4	67.9	75.4	15.0	15.7	23.7	30.2
Maximum embedment depth	[kN]	13.9	21.9	31.6	58.4	79.6	93.7	113.1	19.7	23.9	33.5	41.7
SHEAR LOAD V_{Rd}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	112.0	16.8	31.2	48.8	70.4
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	12.0	18.4	27.2	50.4	78.4	112.8	179.2	27.2	50.4	78.4	112.8
R-STUDS METRIC THREADED RODS - A4	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	125.6	19.6	35.3	55.1	79.5
RECOMMENDED LOAD												
TENSION LOAD N_{rec}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8												
Minimum embedment depth	[kN]	7.78	11.4	14.3	20.0	26.4	28.5	36.4	7.78	8.98	12.0	14.4
Standard embedment depth	[kN]	8.57	13.8	20.0	27.4	40.3	48.5	53.8	10.7	11.2	17.0	21.5
Maximum embedment depth	[kN]	8.57	13.8	20.0	37.1	56.9	66.9	80.8	14.1	17.1	23.9	29.8
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8												
Minimum embedment depth	[kN]	7.78	11.4	14.3	20.0	26.4	28.5	36.4	7.78	8.98	12.0	14.4
Standard embedment depth	[kN]	10.4	14.6	21.4	27.4	40.3	48.5	53.8	10.7	11.2	17.0	21.5
Maximum embedment depth	[kN]	13.0	19.4	28.2	41.7	56.9	66.9	80.8	14.1	17.1	23.9	29.8
R-STUDS METRIC THREADED RODS - A4												
Minimum embedment depth	[kN]	7.78	11.4	14.3	20.0	26.4	28.5	36.4	7.78	8.98	12.0	14.4
Standard embedment depth	[kN]	9.93	14.6	21.4	27.4	40.3	48.5	53.8	10.7	11.2	17.0	21.5
Maximum embedment depth	[kN]	9.93	15.7	22.5	41.7	56.9	66.9	80.8	14.1	17.1	23.9	29.8
SHEAR LOAD V_{rec}												
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	5.14	8.00	12.0	22.3	34.9	50.3	80.0	12.0	22.3	34.9	50.3
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	8.57	13.1	19.4	36.0	56.0	80.6	128.0	19.4	36.0	56.0	80.6
R-STUDS METRIC THREADED RODS - A4	[kN]	5.95	9.16	13.3	25.2	39.4	56.8	89.7	13.3	25.2	39.4	56.8

Design performance data

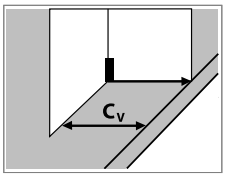
R-STUDS Minimum embedment depth

Size			M8	M10	M12	M16	M20	M24	M30
Effective embedment depth	h_{ef}	[mm]	60.00	70.00	80.00	100.00	120.00	140.00	165.00
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	12.00	19.33	28.00	52.00	81.33	117.33	186.67
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	449.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	19.33	30.67	44.67	84.00	130.67	188.00	299.33
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	393.00
Design resistance γ_{Ms}= 1.87	$N_{Rd,s}$	[kN]	13.90	21.93	31.55	58.82	91.44	132.09	210.16
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance = MOCK	$N_{Rk,p}$	[kN]	19.60	28.60	36.10	50.50	66.40	83.70	107.00
Design resistance	$N_{Rd,p}$	[kN]	10.89	15.89	20.06	28.06	36.89	39.86	50.95
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	15.10	24.20	30.20	45.20	56.50	73.90	85.50
Design resistance	$N_{Rd,p}$	[kN]	8.39	13.44	16.78	25.11	31.39	35.19	40.71
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	180.00	210.00	240.00	300.00	360.00	420.00	495.00
Edge distance	$c_{cr,N}$	[mm]	90.00	105.00	120.00	150.00	180.00	210.00	248.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	19.60	22.62	30.16	42.22	-
Design resistance	$N_{Rd,p}$	-	-	-	10.89	12.57	16.76	20.10	-
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	16.59	20.11	22.62	31.67	-
Design resistance	$N_{Rd,p}$	-	-	-	9.22	11.17	12.57	15.08	-
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	40.00	40.00	40.00	50.00	60.00	70.00	83.00
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	5.27	5.68	6.09	9.06	12.51	16.42	22.23
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	[kN]	3.51	3.79	4.06	6.04	8.34	10.94	14.82
CONCRETE EDGE FAILURE; CRACKED CONCRETE C20/25									
Edge distance	c_1	-	-	-	40.00	50.00	60.00	70.00	-
Characteristic resistance for c_1	$V_{Rk,c}$	-	-	-	4.31	6.42	8.86	11.63	-
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	-	-	-	2.87	4.28	5.91	7.75	-
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	7.20	11.20	16.80	31.20	48.80	70.40	112.00
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	12.00	18.40	27.20	50.40	78.40	112.80	179.20
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
Design resistance γ_{Ms}= 1.56	$V_{Rd,s}$	[kN]	8.33	12.82	18.59	35.26	55.13	79.49	125.64

Design performance data

Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



Tables only valid for one edge $>c_{min}$ and $s \geq 3c_V$ For other cases use the Rawlplug Anchor Calculator

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for non-cracked concrete from Design Performance table

C_V [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
40	1,00	1,00	1,00	1,00	1,00	1,00								
50	1,40	1,40	1,40	1,40	1,40	1,40	1,00	1,00						
60	1,84	1,84	1,84	1,84	1,84	1,84	1,31	1,31	1,00	1,00				
70	2,32	2,26	2,32	2,26	2,32	2,32	1,66	1,66	1,26	1,26	1,00	1,00		
83	2,99	2,68	2,99	2,68	2,99	2,81	2,14	2,14	1,63	1,63	1,29	1,29	1,00	1,00
90	3,38	2,90	3,38	2,90	3,38	3,05	2,41	2,37	1,84	1,84	1,46	1,46	1,13	1,13
100	3,95	3,23	3,95	3,23	3,95	3,39	2,83	2,63	2,15	2,15	1,71	1,71	1,32	1,32
115	4,87	3,71	4,87	3,71	4,87	3,89	3,49	3,03	2,65	2,62	2,11	2,11	1,63	1,63
150		4,84	7,26	4,84	7,26	5,08	5,20	3,95	3,95	3,42	3,14	2,93	2,43	2,43
165				5,33	8,38	5,59	5,99	4,34	4,56	3,76	3,62	3,22	2,80	2,73
200				6,45		6,77	8,00	5,27	6,09	4,55	4,83	3,90	3,74	3,31
250						8,46	11,18	6,58	8,51	5,69	6,75	4,88	5,23	4,14
300								7,90	11,18	6,83	8,87	5,86	6,87	4,97
350								9,22		7,97	11,18	6,83	8,66	5,79
400								10,53		9,11	13,66	7,81	10,58	6,62
450										10,25		8,78	12,62	7,45
500										11,39		9,76	14,55	8,28
600												11,71		9,93
700												13,66		11,59
900														14,90

Design performance data

Edge distance (tension)

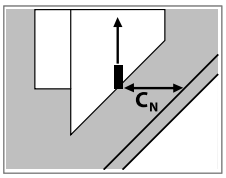


Table only valid for one edge $<C_{cr,N}$ and $S \geq S_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for edge distance $<C_{cr,N}$ applicable to N_{Rd} or N_{rec} for cracked and non-cracked concrete from 'Basic Performance' table

c_N [mm]	M8		M10		M12		M16		M20	M24	M30
	$h \geq 1.13h_{min}$	h_{min}	$h \geq 1.25h_{min}$	h_{min}	$h \geq 1.28h_{min}$	h_{min}	$h \geq 1.33h_{min}$	h_{min}			
40	0,60	0,53	0,56	0,50	0,53	0,50					
50	0,65	0,58	0,62	0,54	0,58	0,54	0,53	0,50			
60	0,71	0,63	0,68	0,59	0,64	0,58	0,57	0,53	0,53		
70	0,77	0,68	0,75	0,63	0,69	0,63	0,62	0,57	0,57	0,53	
85	0,87	0,77	0,85	0,70	0,78	0,70	0,68	0,62	0,62	0,58	0,54
90	0,90	0,80	0,89	0,72	0,81	0,72	0,70	0,64	0,64	0,59	0,55
105	0,96	0,85	1,00	0,80	0,90	0,80	0,77	0,69	0,69	0,64	0,59
120	1,00	0,90		0,84	1,00	0,88	0,85	0,75	0,75	0,68	0,63
150		1,00		0,93		0,97	1,00	0,88	0,87	0,78	0,71
165				0,97		1,00		0,91	0,93	0,84	0,75
180				1,00				0,95	1,00	0,89	0,79
210								1,00		1,00	0,88
250											1,00

Spacing

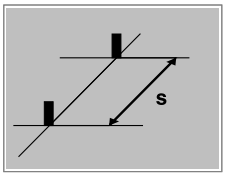


Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete from 'Basic Performance' table

s [mm]	M8		M10		M12		M16		M20	M24	M30
	$h \geq 1.13h_{min}$	h_{min}	$h \geq 1.25h_{min}$	h_{min}	$h \geq 1.28h_{min}$	h_{min}	$h \geq 1.33h_{min}$	h_{min}			
40	0,61	0,57	0,60	0,56	0,58	0,56					
50	0,64	0,58	0,62	0,57	0,60	0,58	0,58	0,56			
60	0,67	0,60	0,64	0,59	0,63	0,59	0,60	0,58	0,58		
70	0,69	0,62	0,67	0,60	0,65	0,61	0,62	0,59	0,60	0,58	
85	0,72	0,64	0,70	0,62	0,68	0,63	0,64	0,61	0,62	0,60	0,59
100	0,75	0,67	0,74	0,64	0,71	0,66	0,67	0,63	0,64	0,62	0,60
125	0,80	0,71	0,80	0,68	0,76	0,70	0,71	0,66	0,67	0,65	0,63
150	0,85	0,75	0,86	0,71	0,81	0,73	0,75	0,69	0,71	0,68	0,65
180	0,90	0,80	0,93	0,76	0,88	0,78	0,80	0,73	0,75	0,71	0,68
200	0,94	0,83	0,98	0,79	0,92	0,81	0,83	0,75	0,78	0,74	0,70
225	0,99	0,88	1,00	0,82	0,97	0,85	0,88	0,78	0,81	0,77	0,73
250	1,00	0,92		0,86	1,00	0,89	0,92	0,81	0,85	0,80	0,75
275		0,96		0,89		0,93	0,96	0,84	0,88	0,83	0,78
300		1,00		0,93		0,97	1,00	0,88	0,92	0,86	0,80
325				0,96		1,00		0,91	0,95	0,89	0,83
360				1,00				0,95	1,00	0,93	0,86
400								1,00		0,98	0,90
440										1,00	0,94
500											1,00

Design performance data

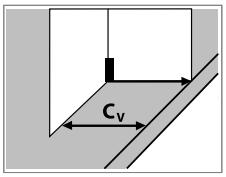
Standard embedment depth

Size			M8	M10	M12	M16	M20	M24	M30
Effective embedment depth	h_{ef}	[mm]	80.00	90.00	110.00	125.00	170.00	210.00	240.00
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	12.00	19.30	28.00	52.00	81.30	117.30	186.70
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	449.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	19.30	30.70	44.70	84.00	130.70	188.00	299.30
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	393.00
Design resistance γ_{Ms}= 1.87	$N_{Rd,s}$	[kN]	13.90	21.90	31.60	58.80	91.40	132.10	210.20
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	26.10	36.80	53.90	69.10	101.50	142.50	158.30
Design resistance	$N_{Rd,p}$	[kN]	14.50	20.40	29.90	38.40	56.40	67.90	75.40
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	20.10	31.10	41.50	56.50	80.10	110.80	124.40
Design resistance	$N_{Rd,p}$	[kN]	11.20	17.30	23.10	31.40	44.50	52.80	59.20
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	211.00	263.00	316.00	375.00	450.00	526.00	580.00
Edge distance	$c_{cr,N}$	[mm]	105.00	132.00	158.00	188.00	225.00	263.00	290.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	27.00	28.30	42.70	63.30	-
Design resistance	$N_{Rd,p}$	-	-	-	15.00	15.70	23.70	30.20	-
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	22.80	25.10	32.00	47.50	-
Design resistance	$N_{Rd,p}$	-	-	-	12.70	14.00	17.80	22.60	-
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	40.00	45.00	55.00	63.00	85.00	105.00	120.00
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	5.60	7.00	9.84	12.80	21.10	30.10	38.70
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	[kN]	3.73	4.67	6.56	8.53	14.10	20.10	25.80
CONCRETE EDGE FAILURE; CRACKED CONCRETE C20/25									
Edge distance	c_1	-	-	-	55.00	63.00	85.00	105.00	-
Characteristic resistance for c_1	$V_{Rk,c}$	-	-	-	6.97	9.07	15.00	21.30	-
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	-	-	-	4.65	6.05	9.97	14.23	-
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	7.20	11.20	16.80	31.20	48.80	70.40	112.00
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	12.00	18.40	27.20	50.40	78.40	112.80	179.20
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
Design resistance γ_{Ms}= 1.56	$V_{Rd,s}$	[kN]	8.33	12.80	18.60	35.30	55.10	79.50	125.60

Design performance data

Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



Tables only valid for one edge $>c_{min}$ and $s \geq 3c_V$ For other cases use the Rawlplug Anchor Calculator

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for non-cracked concrete from Design Performance table

C_V [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
40	1,00	1,00												
45	1,19	1,19	1,00	1,00										
55	1,61	1,61	1,35	1,35	1,00	1,00								
63	1,98	1,98	1,66	1,66	1,23	1,23	1,00	1,00						
85	3,10	2,88	2,60	2,52	1,92	1,92	1,57	1,57	1,00	1,00				
105	4,25	3,55	3,56	3,11	2,64	2,49	2,15	2,13	1,37	1,37	1,00	1,00		
120		4,06	4,35	3,56	3,22	2,84	2,63	2,44	1,68	1,68	1,22	1,22	1,00	1,00
150				4,44	4,50	3,55	3,67	3,05	2,34	2,31	1,71	1,71	1,40	1,40
180					5,92	4,26	4,83	3,66	3,08	2,77	2,24	2,23	1,84	1,84
225						5,33	6,75	4,57	4,31	3,46	3,14	2,78	2,57	2,46
250							7,90	5,08	5,04	3,85	3,67	3,09	3,01	2,73
300								6,10	6,63	4,62	4,83	3,71	3,95	3,28
350								7,12		5,38	6,09	4,33	4,98	3,83
400										6,15	7,44	4,95	6,09	4,37
450										6,92		5,57	7,26	4,92
500												6,19	8,51	5,47
550												6,81		6,01
600												7,43		6,56
650														7,11
800														8,75

Design performance data

Edge distance (tension)

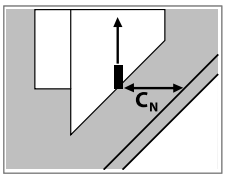


Table only valid for one edge $<C_{cr,N}$ and $S \geq S_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for edge distance $<C_{cr,N}$ applicable to N_{Rd} or N_{rec} for cracked and non-cracked concrete from 'Basic Performance' table

c_N [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.28h_{min}$	h_{min}	$h \geq 1.31h_{min}$	h_{min}	$h \geq 1.35h_{min}$	h_{min}	$h \geq 1.38h_{min}$	h_{min}	$h \geq 1.34h_{min}$	h_{min}	$h \geq 1.36h_{min}$	h_{min}	$h \geq 1.34h_{min}$	h_{min}
40	0,56	0,49												
45	0,59	0,51	0,54	0,48										
55	0,65	0,55	0,59	0,51	0,54	0,50								
63	0,70	0,58	0,62	0,54	0,57	0,53	0,53	0,50						
85	0,85	0,67	0,74	0,62	0,66	0,60	0,61	0,56	0,56	0,54				
105	0,98	0,76	0,84	0,69	0,75	0,66	0,68	0,62	0,62	0,59	0,57	0,55		
120	1,00	0,80	0,93	0,75	0,82	0,72	0,73	0,66	0,66	0,63	0,61	0,58	0,58	0,55
140		0,85	1,00	0,81	0,91	0,79	0,81	0,72	0,72	0,69	0,66	0,62	0,63	0,59
165		0,91		0,87	1,00	0,88	0,91	0,80	0,80	0,76	0,72	0,68	0,68	0,63
180		0,95		0,90		0,91	0,97	0,85	0,85	0,80	0,76	0,71	0,72	0,66
200		1,00		0,94		0,95	1,00	0,90	0,91	0,86	0,82	0,76	0,77	0,71
225				1,00		1,00		0,95	1,00	0,94	0,89	0,82	0,83	0,76
265								1,00		1,00	1,00	0,92	0,93	0,85
300												0,98	1,00	0,92
320												1,00		0,94
360														1,00

Design performance data

Spacing

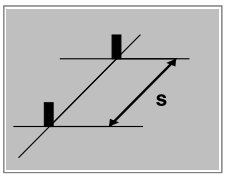


Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete from 'Basic Performance' table

s [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.28h_{min}$	h_{min}	$h \geq 1.31h_{min}$	h_{min}	$h \geq 1.35h_{min}$	h_{min}	$h \geq 1.38h_{min}$	h_{min}	$h \geq 1.34h_{min}$	h_{min}	$h \geq 1.36h_{min}$	h_{min}	$h \geq 1.34h_{min}$	h_{min}
40	0,59	0,55												
45	0,61	0,56	0,59	0,55										
55	0,63	0,57	0,60	0,56	0,59	0,56								
63	0,65	0,58	0,62	0,57	0,60	0,57	0,58	0,56						
85	0,70	0,61	0,66	0,59	0,63	0,60	0,61	0,59	0,59	0,58				
105	0,75	0,63	0,70	0,62	0,67	0,62	0,64	0,61	0,62	0,60	0,60	0,58		
120	0,78	0,65	0,73	0,63	0,69	0,64	0,66	0,62	0,63	0,62	0,61	0,60	0,60	0,58
150	0,86	0,69	0,78	0,67	0,74	0,67	0,70	0,65	0,67	0,65	0,64	0,62	0,63	0,60
180	0,93	0,73	0,84	0,70	0,78	0,70	0,74	0,68	0,70	0,68	0,67	0,64	0,66	0,63
200	0,96	0,75	0,88	0,72	0,82	0,73	0,77	0,70	0,72	0,70	0,69	0,66	0,67	0,64
225	1,00	0,78	0,93	0,75	0,86	0,76	0,80	0,73	0,75	0,72	0,71	0,68	0,69	0,66
280		0,85	1,00	0,81	0,94	0,82	0,87	0,78	0,81	0,77	0,77	0,72	0,74	0,69
320		0,90		0,86	1,00	0,86	0,93	0,82	0,86	0,81	0,80	0,75	0,78	0,72
400		1,00		0,94		0,95	1,00	0,90	0,94	0,89	0,88	0,82	0,85	0,78
450				1,00		1,00		0,95	1,00	0,94	0,93	0,86	0,89	0,81
500								1,00		0,99	0,98	0,90	0,93	0,85
550										1,00	1,00	0,94	0,97	0,88
630												1,00	1,00	0,94
760														1,00

Design performance data

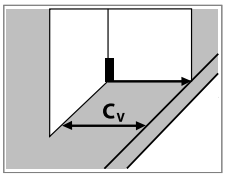
Maximum embedment depth

Size			M8	M10	M12	M16	M20	M24	M30
Effective embedment depth	h_{ef}	[mm]	100.00	120.00	145.00	190.00	240.00	290.00	360.00
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.00	29.00	42.00	78.00	122.00	176.00	280.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	12.00	19.30	28.00	52.00	81.30	117.30	186.70
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	449.00
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	19.30	30.70	44.70	84.00	130.70	188.00	299.30
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.00	41.00	59.00	110.00	171.00	247.00	393.00
Design resistance γ_{Ms}= 1.87	$N_{Rd,s}$	[kN]	13.90	21.90	31.60	58.80	91.40	132.10	210.20
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	32.70	49.00	71.10	105.10	143.30	196.80	237.50
Design resistance	$N_{Rd,p}$	[kN]	18.20	27.20	39.50	58.40	79.60	93.70	113.10
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	25.10	41.50	54.70	86.00	113.10	153.10	186.60
Design resistance	$N_{Rd,p}$	[kN]	13.90	23.10	30.40	47.80	62.80	72.90	88.90
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.04	1.04	1.04	1.04	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.07	1.07	1.07	1.07	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.09	1.09	1.09	1.09	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	211.00	263.00	316.00	388.00	450.00	526.00	580.00
Edge distance	$c_{cr,N}$	[mm]	105.00	132.00	158.00	194.00	225.00	263.00	290.00
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	35.50	43.00	60.30	87.50	-
Design resistance	$N_{Rd,p}$	-	-	-	19.70	23.90	33.50	41.60	-
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	30.10	38.20	45.20	65.60	-
Design resistance	$N_{Rd,p}$	-	-	-	16.70	21.20	25.10	31.20	-
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	50.00	60.00	73.00	95.00	120.00	145.00	180.00
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	7.83	10.80	15.00	23.80	35.30	48.80	70.70
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	[kN]	5.22	7.20	10.00	15.80	23.60	32.50	47.20
CONCRETE EDGE FAILURE; CRACKED CONCRETE C20/25									
Edge distance	c_1	-	-	-	73.00	95.00	120.00	145.00	-
Characteristic resistance for c_1	$V_{Rk,c}$	-	-	-	10.60	16.80	25.00	34.60	-
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	-	-	-	7.09	11.20	16.70	23.00	-
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.00	14.00	21.00	39.00	61.00	88.00	140.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	7.20	11.20	16.80	31.20	48.80	70.40	112.00
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	224.00
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	12.00	18.40	27.20	50.40	78.40	112.80	179.20
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.00	20.00	29.00	55.00	86.00	124.00	196.00
Design resistance γ_{Ms}= 1.56	$V_{Rd,s}$	[kN]	8.33	12.80	18.60	35.30	55.10	79.50	125.60

Design performance data

Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



Tables only valid for one edge $>c_{min}$ and $s \geq 3c_V$ For other cases use the Rawlplug Anchor Calculator

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for non-cracked concrete from Design Performance table

C_V [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
50	1,00	1,00												
60	1,31	1,31	1,00	1,00										
73	1,76	1,76	1,34	1,34	1,00	1,00								
95	2,62	2,50	1,99	1,99	1,48	1,48	1,00	1,00						
100	2,83	2,63	2,15	2,15	1,60	1,60	1,08	1,08						
105		2,76	2,32	2,26	1,73	1,73	1,16	1,16						
120			2,83	2,58	2,11	2,08	1,42	1,42	1,00	1,00				
145			3,76	3,12	2,80	2,51	1,89	1,89	1,33	1,33	1,00	1,00		
180				3,87	3,87	3,12	2,61	2,35	1,84	1,84	1,38	1,38	1,00	1,00
200						3,46	3,05	2,62	2,15	2,11	1,62	1,62	1,17	1,17
230							3,77	3,01	2,65	2,42	2,00	2,00	1,44	1,44
250							4,27	3,27	3,01	2,64	2,26	2,17	1,64	1,64
300								3,92	3,95	3,16	2,98	2,61	2,15	2,10
350								4,58	4,98	3,69	3,75	3,04	2,71	2,45
400										4,22	4,58	3,48	3,31	2,80
450												3,91	3,95	3,15
500												4,35	4,63	3,51
550													5,34	3,86
675														4,73

Design performance data

Edge distance (tension)

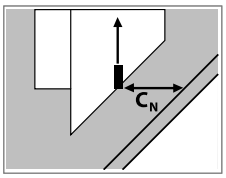


Table only valid for one edge $<C_{cr,N}$ and $S \geq S_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for edge distance $<C_{cr,N}$ applicable to N_{Rd} or N_{rec} for cracked and non-cracked concrete from 'Basic Performance' table

c_N [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.33h_{min}$	h_{min}	$h \geq 1.37h_{min}$	h_{min}	$h \geq 1.40h_{min}$	h_{min}	$h \geq 1.44h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}
50	0,62	0,51												
60	0,68	0,54	0,61	0,50										
73	0,77	0,59	0,67	0,54	0,61	0,52								
95	0,89	0,67	0,79	0,60	0,70	0,58	0,63	0,53						
100	0,92	0,69	0,82	0,62	0,73	0,60	0,65	0,54						
120	0,99	0,74	0,93	0,68	0,82	0,66	0,72	0,58	0,66	0,57				
140	1,00	0,78	1,00	0,73	0,91	0,72	0,79	0,63	0,72	0,62				
145		0,79		0,74	0,94	0,73	0,81	0,64	0,73	0,63	0,72	0,58		
165		0,83		0,78	1,00	0,78	0,88	0,69	0,80	0,67	0,76	0,61		
180		0,86		0,80		0,81	0,94	0,72	0,85	0,70	0,82	0,64	0,72	0,59
200		0,90		0,83		0,84	1,00	0,76	0,91	0,75	0,89	0,68	0,77	0,62
225		0,95		0,88		0,89		0,80	1,00	0,81	1,00	0,73	0,83	0,66
265		1,00		0,94		0,96		0,85		0,87		0,80	0,93	0,73
300				1,00		1,00		0,89		0,92		0,84	1,00	0,78
360								0,97		1,00		0,91		0,83
400								1,00				0,96		0,87
450												1,00		0,92
550														1,00

Design performance data

Spacing

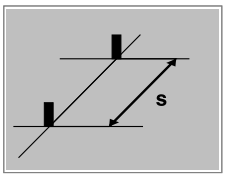


Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete from 'Basic Performance' table

s [mm]	M8		M10		M12		M16		M20		M24		M30	
	$h \geq 1.33h_{min}$	h_{min}	$h \geq 1.37h_{min}$	h_{min}	$h \geq 1.40h_{min}$	h_{min}	$h \geq 1.44h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}	$h \geq 1.41h_{min}$	h_{min}
50	0,62	0,55												
60	0,64	0,56	0,61	0,55										
73	0,67	0,57	0,64	0,56	0,62	0,56								
95	0,73	0,60	0,68	0,58	0,65	0,58	0,62	0,56						
100	0,74	0,60	0,69	0,58	0,66	0,59	0,63	0,57						
120	0,78	0,62	0,73	0,60	0,69	0,60	0,65	0,58	0,63	0,58				
145	0,84	0,65	0,78	0,62	0,73	0,63	0,69	0,60	0,66	0,60	0,64	0,58		
180	0,91	0,68	0,84	0,65	0,78	0,66	0,73	0,62	0,70	0,63	0,67	0,60	0,66	0,58
200	0,93	0,70	0,88	0,67	0,82	0,67	0,76	0,63	0,72	0,64	0,69	0,61	0,67	0,59
225	0,97	0,73	0,93	0,69	0,86	0,69	0,79	0,65	0,75	0,66	0,71	0,63	0,69	0,60
250	1,00	0,75	0,97	0,71	0,90	0,72	0,82	0,66	0,78	0,67	0,74	0,64	0,72	0,62
280		0,78	1,00	0,73	0,94	0,74	0,86	0,68	0,81	0,69	0,77	0,66	0,74	0,63
320		0,82		0,77	1,00	0,78	0,91	0,71	0,86	0,72	0,80	0,68	0,78	0,65
400		0,90		0,83		0,84	1,00	0,76	0,94	0,78	0,88	0,73	0,85	0,69
450		0,95		0,88		0,89		0,80	1,00	0,81	0,93	0,76	0,89	0,71
500		1,00		0,92		0,93		0,83		0,85	0,98	0,79	0,93	0,73
550				0,96		0,97		0,86		0,88	1,00	0,82	0,97	0,75
630				1,00		1,00		0,91		0,94		0,86	1,00	0,79
760								1,00		1,00		0,94		0,85
950												1,00		0,94
1100														1,00

Product commercial data

Size	Product Code	Volume [ml]	Quantity [pcs]			Weight [kg]			Bar Codes
			Box	Outer	Pallet	Box	Outer	Pallet	
Ø32	R-KER-280	280	10	10	840	5.7	5.7	511.4	5906675049663
	R-KER-300	300	10	10	840	6.3	6.3	559.2	5906675075167
	R-KER-310	310	10	10	840	6.5	6.5	573.7	5906675251851
	R-KER-345	345	10	10	840	7.1	7.1	623.3	5906675291086
	R-KER-380	380	10	10	560	8.2	8.2	486.6	5906675222707
	R-KER-400	400	10	10	560	8.1	8.1	483.8	5906675329444
	R-KER-300-W	300	10	10	840	6.3	6.3	559.2	5906675432021
	R-KER-380-W	380	10	10	560	8.2	8.2	486.6	5906675222981
	R-KER-400-W	400	10	10	560	8.2	8.2	489.2	5906675380445
	R-KER-380-S	380	10	10	560	6.5	6.5	391.2	5906675099088
	R-KER-400-S	400	10	10	560	8.2	8.2	489.2	5906675380452

1) ETA-10/0055