

R-KEM II with Threaded Rods for Concrete

Universal polyester (styrene free) resin - European Approval for 15 substrates



Approvals and Reports

- ETA-12/0394



Product information

Features and benefits

- The most convenient bonded anchor for general purpose use
- Quick, secure and simple installation
- Product with wide spectrum of use in the medium load capacity area
- Ideal for applications where mechanical anchors are not suitable
- Easy dosage thanks to patented self-opening system and use of manual or pneumatic gun
- Option of use standard manual silicone gun
- Suitable for multiple use. Partly used product can be reused after fitting new nozzle

Applications

- Consoles
- Staircases
- Gates
- High racking
- Canopies
- Sanitary appliances
- Steel constructions
- Railings
- Handrails
- Ladders
- Cable trays

Base materials

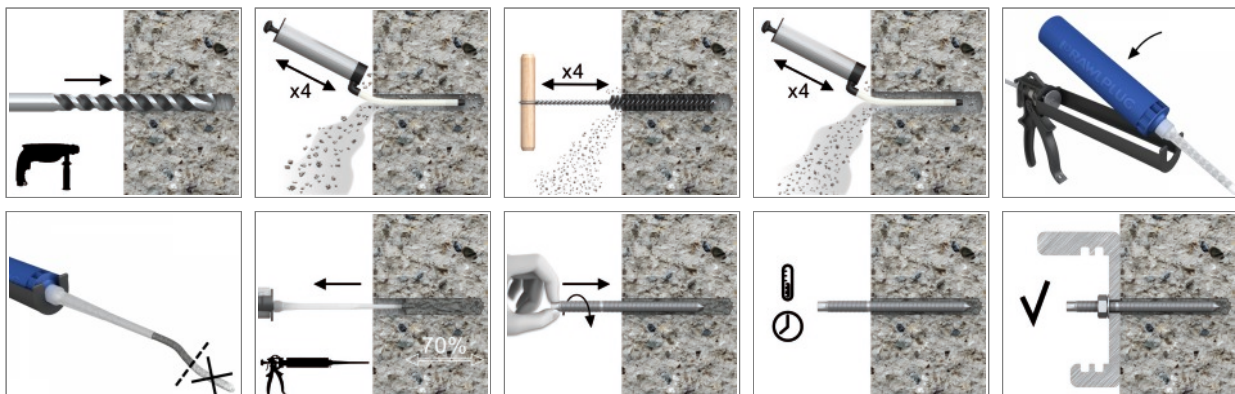
Approved for use in:

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

Also suitable for use in:

- Natural Stone

Installation guide



Product information

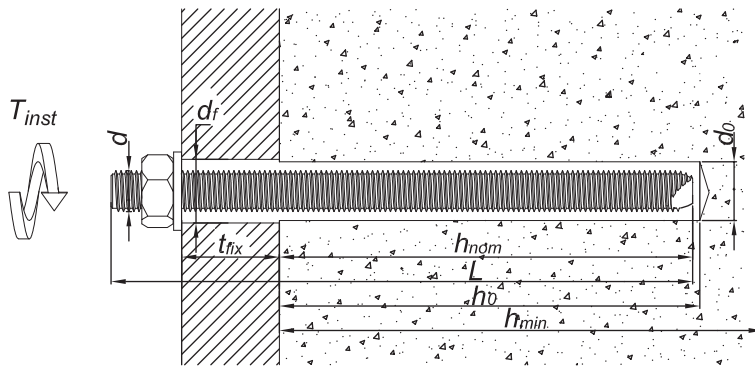
1. Drill hole to the required diameter and depth for stud size being used.
2. Solid substrates: clean the hole with brush and hand pump at least four times each. It is very important and necessary before installation. Hollow substrates: insert mesh sleeve into the hole.
3. Insert cartridge into gun and 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
			[m]
R-KEM-II-175	R-KEMII	Styrene Free Polyester Resin	175
R-KEM-II-175-SET		Set with 4 studs and plastic sleeves	
R-KEM-II-300		Styrene Free Polyester Resin	300
R-KEM-II-300-SET		Set with 4 studs and plastic sleeves	
R-KEM-II-300-S	R-KEMII-S	High Temperature (Summer) / Slow Cure Styrene Free Polyester Resin	
R-KEM-II-300-W	R-KEMII-W	Low Temperature (Winter) / Rapid Cure Styrene Free Polyester Resin	
R-KEM-II-380	R-KEMII	Styrene Free Polyester Resin	380
R-KEM-II-410		Styrene Free Polyester Resin	410
R-KEM-II-300-STONE		Stone colour Styrene Free Polyester Resin	300
R-KEM-II-300-GREY		Grey colour Styrene Free Polyester Resin	

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-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	h _{ef} + 30	h _{ef} + 30	h _{ef} + 30	h _{ef} + 2*d ₀	h _{ef} + 2*d ₀	h _{ef} + 2*d ₀
Min. spacing	s _{min}	[mm]	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}
Min. edge distance	c _{min}	[mm]	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}	0.5 * h _{ef}

Minimum working and curing time

R-KEM II

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	-	-
5	-15	-	-
5	-10	-	-
5	-5	8 h	70
5	0	4 h	45
5	5	2 h	25
10	10	1.5 h	15
15	15	1 h	9
20	20	45	5
25	30	30	2
25	35	-	-
25	40	-	-

Installation data

R-KEMII-W

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	24 h	45
5	-15	18 h	30
5	-10	8 h	20
5	-5	5 h	11
5	0	2 h	7
5	5	1 h	5
10	10	45	2
15	15	30	1.5
20	20	15	1
25	30	-	-
25	35	-	-
25	40	-	-

R-KEMII-S

Resin temperature	Concrete temperature	Curing time*	Working time
[°C]	[°C]	[min]	[min]
5	-20	-	-
5	-15	-	-
5	-10	-	-
5	-5	24 h	180
5	0	18 h	120
5	5	12 h	60
10	10	8 h	45
15	15	6 h	25
20	20	4 h	15
25	30	1.5 h	7
25	35	1 h	6
25	40	45	5

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/mm ²]	520	520	520	520	520	520	520
Nominal yield strength - tension	f_{yk}	[N/mm ²]	420	420	420	420	420	420	420
Cross sectional area - tension	A_s	[mm ²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm ³]	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/mm ²]	800	800	800	800	800	800	800
Nominal yield strength - tension	f_{yk}	[N/mm ²]	640	640	640	640	640	640	640
Cross sectional area - tension	A_s	[mm ²]	36.6	58	84.3	157	245	352.8	559.8
Elastic section modulus	W_{el}	[mm ³]	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

Mechanical properties

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	
Substrate	Non-cracked concrete							
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{R,u,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	16	24	31	47	68	77	96
Standard embedment depth	[kN]	20	32	43	69	103	115	151
Maximum embedment depth	[kN]	22	35	50	90	137	159	209
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	16	24	31	47	68	77	96
Standard embedment depth	[kN]	20	32	43	69	103	115	151
Maximum embedment depth	[kN]	22	35	50	90	137	159	209
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	16	24	31	47	68	77	96
Standard embedment depth	[kN]	20	32	43	69	103	115	151
Maximum embedment depth	[kN]	22	35	50	90	137	159	209
SHEAR LOAD $V_{R,u,m}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	18	29	42	79	123	177	281
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	29	46	67	126	196	282	449
R-STUDS METRIC THREADED RODS - A4	[kN]	26	41	59	110	172	247	393
CHARACTERISTIC LOAD								
TENSION LOAD $N_{R,k}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8								
Minimum embedment depth	[kN]	14	21	27	40	60	69	86
Standard embedment depth	[kN]	18	27	37	50	86	103	124
Maximum embedment depth	[kN]	18	29	42	76	121	142	187
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8								
Minimum embedment depth	[kN]	14	21	27	40	60	69	86
Standard embedment depth	[kN]	19	27	37	50	86	103	124
Maximum embedment depth	[kN]	24	36	49	76	121	142	187
R-STUDS METRIC THREADED RODS - A4								
Minimum embedment depth	[kN]	14	21	27	40	60	69	86
Standard embedment depth	[kN]	19	27	37	50	86	103	124
Maximum embedment depth	[kN]	24	36	49	76	121	142	187
SHEAR LOAD $V_{R,k}$								
R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8	[kN]	9	14	21	39	61	88	140
R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8	[kN]	15	23	34	63	98	141	224
R-STUDS METRIC THREADED RODS - A4	[kN]	13	20	29	55	86	124	196

Basic performance data

Design performance data

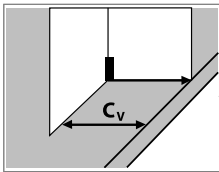
R-STUDS Minimum embedment depth

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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.87$	$N_{Rd,s}$	[kN]	13.90	21.93	31.55	58.82	91.44	132.09	210.16
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	14.30	20.90	27.10	40.20	60.30	68.60	85.50
Design resistance	$N_{Rd,p}$	[kN]	6.82	11.61	15.06	22.33	33.50	38.12	47.52
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	12.10	17.60	22.60	35.20	49.00	52.80	70.00
Design resistance	$N_{Rd,p}$	[kN]	5.74	9.78	12.56	19.56	27.22	29.32	38.88
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
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 $V_{Mc} = 1.5$	$V_{Rd,c}$	[kN]	3.51	3.79	4.06	6.04	8.34	10.94	14.82
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 $V_{Ms} = 1.25$	$V_{Rd,s}$	[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 $V_{Ms} = 1.25$	$V_{Rd,s}$	[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 $V_{Ms} = 1.56$	$V_{Rd,s}$	[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
120		3,87	5,20	3,87	5,20	4,06	3,72	3,16	2,83	2,73	2,24	2,24	1,74	1,74
150				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
180				5,81		6,09	6,83	4,74	5,20	4,10	4,12	3,51	3,19	2,98
210						7,11	8,61	5,53	6,55	4,78	5,20	4,10	4,02	3,48
250						8,46	11,18	6,58	8,51	5,69	6,75	4,88	5,23	4,14
300								7,90		6,83	8,87	5,86	6,87	4,97
350								9,22		7,97		6,83	8,66	5,79
400								10,53				7,81	10,58	6,62
450												8,78		7,45
500														8,28
550														9,10
600														9,93

Design performance data

Edge distance (tension)

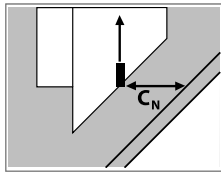


Table only valid for one edge $c_N < c_{cr,N}$ and $S \geq S_{cr,N}$. For other cases use the Rawplug Anchor Calculator

Reduction factors for edge distance $c_N < c_{cr,N}$ 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

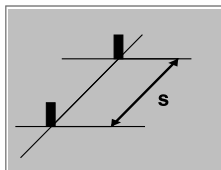


Table only valid for one spacing $s < s_{cr,N}$ and $c \geq c_{cr,N}$. For other cases use the Rawplug Anchor Calculator

Reduction factors for spacing $s < s_{cr,N}$ 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

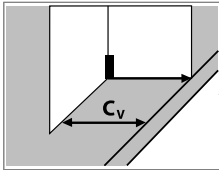
Standard embedment depth

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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.87$	$N_{Rd,s}$	[kN]	13.90	21.93	31.55	58.82	91.44	132.09	210.16
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	19.10	26.90	37.30	50.30	85.50	102.90	124.40
Design resistance	$N_{Rd,p}$	[kN]	9.10	14.94	20.72	27.94	47.50	57.18	69.12
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	16.10	22.60	31.10	44.00	69.40	79.20	101.80
Design resistance	$N_{Rd,p}$	[kN]	7.66	12.56	17.28	24.44	38.56	43.98	56.55
Increasing Factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.11	1.08	1.08	1.08	1.08	1.00	1.00
Increasing Factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.00	1.00
Increasing Factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	180.00	225.00	263.00	330.00	413.00	447.00	514.00
Edge distance	$c_{cr,N}$	[mm]	90.00	113.00	131.00	165.00	207.00	223.00	257.00
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	30.13	38.66
Design resistance $V_{Ms} = 1.5$	$V_{Rd,c}$	[kN]	3.73	4.67	6.56	8.53	14.07	20.09	25.77
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 $V_{Ms} = 1.25$	$V_{Rd,s}$	[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 $V_{Ms} = 1.25$	$V_{Rd,s}$	[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 $V_{Ms} = 1.56$	$V_{Rd,s}$	[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												
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		4,62	4,83	3,71	3,95	3,28
350								7,12				4,33	4,98	3,83
400												4,95	6,09	4,37
450														4,92
500														5,47
550														6,01

Design performance data

Edge distance (tension)

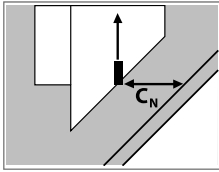


Table only valid for one edge $< C_{cr,N}$ and $S \geq S_{cr,N}$. For other cases use the Rawlplug Anchor Calculator

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 [m]	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	0,60	0,50												
45	0,64	0,52	0,57	0,49										
55	0,71	0,56	0,63	0,53	0,59	0,52								
63	0,77	0,60	0,68	0,56	0,62	0,54	0,56	0,51						
85	0,90	0,70	0,81	0,64	0,74	0,62	0,65	0,57	0,58	0,55				
105	0,98	0,76	0,94	0,72	0,85	0,69	0,73	0,63	0,64	0,60	0,62	0,56		
120	1,00	0,80	1,00	0,77	0,93	0,75	0,79	0,68	0,69	0,64	0,66	0,59	0,62	0,56
140		0,85		0,81	1,00	0,82	0,88	0,74	0,76	0,70	0,72	0,64	0,67	0,60
165		0,91		0,87		0,88	1,00	0,83	0,85	0,77	0,80	0,70	0,73	0,65
180		0,95		0,90		0,91		0,86	0,90	0,82	0,85	0,74	0,77	0,68
200		1,00		0,94		0,95		0,90	0,97	0,88	0,92	0,79	0,83	0,73
225				1,00		1,00		0,95	1,00	0,94	1,00	0,86	0,90	0,78
265								1,00		1,00		0,92	1,00	0,87
300												0,98		0,92
320												1,00		0,94
360														1,00

Design performance data

Spacing

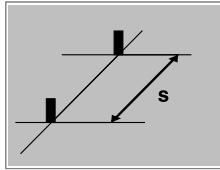


Table only valid for one spacing $< s_{cr,N}$ and $c \geq c_{cr,N}$. For other cases use the Rawlplug Anchor Calculator

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	0,61	0,55												
45	0,62	0,56	0,60	0,55										
55	0,65	0,57	0,62	0,56	0,60	0,56								
63	0,67	0,58	0,64	0,57	0,62	0,57	0,60	0,56						
85	0,74	0,61	0,69	0,59	0,66	0,60	0,63	0,59	0,60	0,58				
105	0,79	0,63	0,73	0,62	0,70	0,62	0,66	0,61	0,63	0,60	0,62			
120	0,83	0,65	0,77	0,63	0,73	0,64	0,68	0,62	0,65	0,62	0,63	0,60	0,62	0,58
150	0,88	0,69	0,83	0,67	0,79	0,67	0,73	0,65	0,68	0,65	0,67	0,62	0,65	0,60
180	0,93	0,73	0,90	0,70	0,84	0,70	0,77	0,68	0,72	0,68	0,70	0,64	0,68	0,63
200	0,96	0,75	0,94	0,72	0,88	0,73	0,80	0,70	0,74	0,70	0,72	0,66	0,69	0,64
225	1,00	0,78	0,98	0,75	0,93	0,76	0,84	0,73	0,77	0,72	0,75	0,68	0,72	0,66
280		0,85	1,00	0,81	1,00	0,82	0,92	0,78	0,84	0,77	0,81	0,72	0,77	0,69
320		0,90		0,86		0,86	0,98	0,82	0,89	0,81	0,86	0,75	0,81	0,72
400		1,00		0,94		0,95	1,00	0,90	0,98	0,89	0,95	0,82	0,89	0,78
450				1,00		1,00		0,95	1,00	0,94	1,00	0,86	0,94	0,81
500								1,00		0,99		0,90	0,99	0,85
550										1,00		0,94	1,00	0,88
630												1,00		0,94
760														1,00

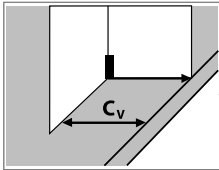
Maximum embedment depth

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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.5$	$N_{Rd,s}$	[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 $V_{Ms} = 1.87$	$N_{Rd,s}$	[kN]	13.90	21.93	31.55	58.82	91.44	132.09	210.16
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	23.90	35.80	49.20	76.40	120.60	142.10	186.60
Design resistance	$N_{Rd,p}$	[kN]	11.37	19.89	27.33	42.44	67.00	78.96	103.67
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	20.10	30.20	41.00	66.90	98.00	109.30	152.70
Design resistance	$N_{Rd,p}$	[kN]	9.57	16.78	22.78	37.17	54.44	60.74	84.82
Increasing factors for $N_{Rd,p} - C30/37$	ψ_c	-	1.11	1.08	1.08	1.08	1.08	1.00	1.00
Increasing factors for $N_{Rd,p} - C40/50$	ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.00	1.00
Increasing factors for $N_{Rd,p} - C50/60$	ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	180.00	225.00	263.00	330.00	413.00	447.00	514.00
Edge distance	$c_{cr,N}$	[mm]	90.00	113.00	131.00	165.00	207.00	223.00	257.00

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								3,27		2,64	2,26	2,17	1,64	1,64
300								3,92			2,98	2,61	2,15	2,10
350											3,04	2,71	2,45	
400												3,31	2,80	
450													3,15	

Design performance data

Edge distance (tension)

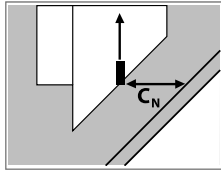


Table only valid for one edge $c_{cr,N}$ and $S \geq S_{cr,N}$. For other cases use the Rawlplug Anchor Calculator

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	0,67	0,52												
60	0,74	0,56	0,66	0,52										
73	0,81	0,61	0,74	0,56	0,67	0,54								
95	0,92	0,69	0,86	0,63	0,79	0,61	0,69	0,55						
100	0,93	0,70	0,88	0,64	0,82	0,62	0,71	0,56						
120	0,99	0,74	0,96	0,70	0,93	0,69	0,79	0,60	0,69	0,58				
140	1,00	0,78	1,00	0,73	1,00	0,74	0,88	0,65	0,76	0,63				
145		0,79		0,74		0,75	0,90	0,67	0,77	0,64	0,80	0,60		
165		0,83		0,78		0,78	1,00	0,72	0,85	0,69	0,85	0,64		
180		0,86		0,80		0,81		0,74	0,90	0,72	0,92	0,67	0,77	0,61
200		0,90		0,83		0,84		0,76	0,97	0,77	1,00	0,71	0,83	0,64
225		0,95		0,88		0,89		0,80	1,00	0,81		0,76	0,90	0,68
265		1,00		0,94		0,96		0,85		0,87		0,80	1,00	0,75
300				1,00		1,00		0,89		0,92		0,84		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

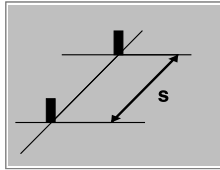


Table only valid for one spacing $< s_{cr,N}$ and $c \geq c_{cr,N}$. For other cases use the Rawlplug Anchor Calculator

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	
	$h \geq 1.28h_{min}$	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	0,61	0,55												
45	0,62	0,56	0,60	0,55										
55	0,65	0,57	0,62	0,56	0,60	0,56								
63	0,67	0,58	0,64	0,57	0,62	0,57	0,60	0,56						
85	0,74	0,61	0,69	0,59	0,66	0,60	0,63	0,59	0,60	0,58				
105	0,79	0,63	0,73	0,62	0,70	0,62	0,66	0,61	0,63	0,60	0,62			
120	0,83	0,65	0,77	0,63	0,73	0,64	0,68	0,62	0,65	0,62	0,63	0,60	0,62	0,58
150	0,88	0,69	0,83	0,67	0,79	0,67	0,73	0,65	0,68	0,65	0,67	0,62	0,65	0,60
180	0,93	0,73	0,90	0,70	0,84	0,70	0,77	0,68	0,72	0,68	0,70	0,64	0,68	0,63
200	0,96	0,75	0,94	0,72	0,88	0,73	0,80	0,70	0,74	0,70	0,72	0,66	0,69	0,64
225	1,00	0,78	0,98	0,75	0,93	0,76	0,84	0,73	0,77	0,72	0,75	0,68	0,72	0,66
280		0,85	1,00	0,81	1,00	0,82	0,92	0,78	0,84	0,77	0,81	0,72	0,77	0,69
320		0,90		0,86		0,86	0,98	0,82	0,89	0,81	0,86	0,75	0,81	0,72
400		1,00		0,94		0,95	1,00	0,90	0,98	0,89	0,95	0,82	0,89	0,78
450				1,00		1,00		0,95	1,00	0,94	1,00	0,86	0,94	0,81
500								1,00		0,99		0,90	0,99	0,85
550										1,00		0,94	1,00	0,88
630												1,00		0,94
760														1,00

Product commercial data

Size	Product Code	Volume [ml]	Quantity [pcs]			Weight [kg]			Bar Codes
			Box	Outer	Pallet	Box	Outer	Pallet	
M30	R-KEM-II-175 ¹⁾	175	10	50	600	3.8	18.9	257.2	5906675050249
	R-KEM-II-175-SET ¹⁾	175	5	5	525	3.0	3.0	348.3	5906675057866
	R-KEM-II-300 ¹⁾	300	10	10	840	5.9	5.9	529.0	5906675050256
	R-KEM-II-300-SET ¹⁾	300	5	5	320	4.9	4.9	345.9	5906675057859
	R-KEM-II-300-S ¹⁾	300	10	50	600	6.0	30.0	390.0	5906675064642
	R-KEM-II-300-W ¹⁾	300	10	50	600	5.9	29.6	385.1	5906675064666
	R-KEM-II-380 ¹⁾	380	10	10	560	8.2	8.2	486.3	5906675097770
	R-KEM-II-410 ¹⁾	410	10	10	560	8.4	8.4	498.7	5906675408163
	R-KEM-II-300-STONE ¹⁾	300	10	50	600	6.0	30.0	390.0	5906675038124
R-KEM-II-300-GREY ¹⁾	300	10	50	600	6.0	30.0	390.0	5906675038131	

¹⁾ ETA-12/0394