OSCRETE CHEMICAL ANCHOR

Resin Based Chemical Anchor

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DESCRIPTION

OSCRETE CHEMICAL ANCHOR are generic terms relating to steel studs, bolts and anchorages which are bonded into a substrate, usually masonry and concrete, using a resin based adhesive system. Ideally suited for high load applications, in virtually all cases the resulting bond is stronger than the base material itself and as the system is based on chemical adhesion, no load stress is imparted to the base material as with expansion type anchor.

They are therefore ideal for close to edge fixing, reduced centre and group anchoring and use in concrete of unknown quality or low compressive strength.

FEATURES

- Approved for cracked concrete with threaded rods
- High performance in non-cracked concrete
- Expansion-free anchoring allows smaller spacing and edge distances
- Wide range of applications in the medium load range
- Available in standard and winter version. Winter version will cure at down to -20°C and, in other ambient temperatures, has the advantage of being rapid cure resin
- Suitable for repetitive use. Partly used product can be reused fitting a new mixing nozzle
- Several embedment depths possible
- Easy pumping thanks to manual or pneumatic dispensers

BASE MATERIALS

Approved for use in:

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

APPLICATION

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

INSTALLATION GUIDE

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 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.

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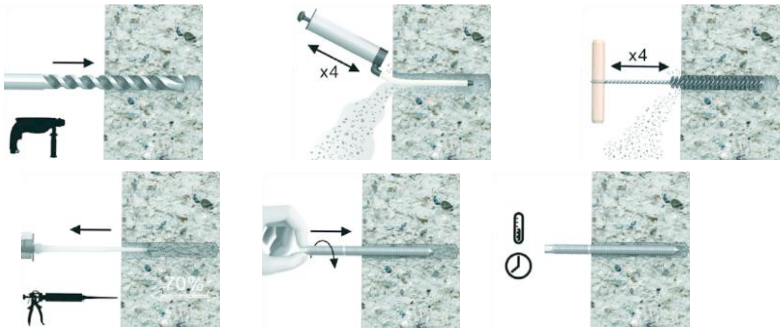
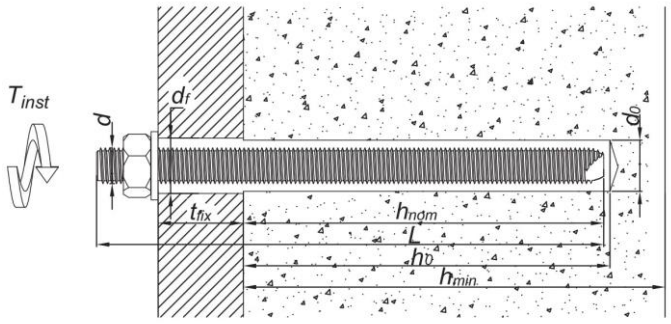


PRODUCT INFORMATION - R-STUDS

Size	Steel Class 5.8	Steel Class 8.8	Steel Grade A4	d	L	d_f	$t_{fix,min}$	$t_{fix,s}$	$t_{fix,min}$
				[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



OSCRETE CONSTRUCTION PRODUCTS

OSCRETE CHEMICAL ANCHOR

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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						
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
MINIMUM 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} + 2*d_0		
Min. spacing	s_{min}	[mm]	0.5 * h_{ef} ≥ 40						
Min. edge distance	c_{min}	[mm]	0.5 * h_{ef} ≥ 40						

MINIMUM WORKING AND CURING TIME

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

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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	325	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
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
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

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

BASIC PERFORMANCE DATA

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												
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]	26.1	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**
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	14.00	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**

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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	**18.6**	**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	23.3	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	9.13	13.3	25.2	39.4	56.8	89.7	**13.3**	**25.2**	**39.4**	**56.8**

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R-STUDS Minimum embedment depth

DESIGN PERFORMANCE DATA									
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M30**
Embedment depth	h_{ef}	[mm]	60.0	70.0	80.0	100.0	120.0	140.0	165.0
TENSION LOAD									
STEEL FAILURE; STEEL CLASS 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18.0	29.0	42.0	78.0	122.0	176.0	280.0
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	12.0	19.3	28.0	52.0	81.3	117.3	186.7
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29.0	46.0	67.0	126.0	196.0	282.0	449.0
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	19.3	30.7	44.7	84.0	130.7	188.0	299.3
STEEL FAILURE; STEEL GRADE A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	26.0	41.0	59.0	110.0	171.0	247.0	393.0
Design resistance γ_{Ms}= 1.87	$N_{Rd,s}$	[kN]	13.9	21.9	31.6	58.5	91.4	132.1	210.2
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance = MOCK	$N_{Rk,p}$	[kN]	19.6	28.6	36.1	50.5	66.4	83.7	107.0
Design resistance	$N_{Rd,p}$	[kN]	10.9	15.9	20.1	28.1	36.9	39.9	51.0
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance	$N_{Rk,p}$	[kN]	15.1	24.2	30.2	45.2	56.5	73.9	85.5
Design resistance	$N_{Rd,p}$	[kN]	8.39	13.4	16.8	25.1	31.4	35.2	40.7
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]	180.0	210.0	240.0	300.0	360.0	420.0	495.0
Edge Distance	$c_{cr,N}$	[mm]	90.0	105.0	120.0	150.0	180.0	210.0	248.0
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (40°C/24°C)									
Characteristic resistance	$N_{Rk,p}$	-	-	-	19.6	22.6	30.2	42.2	-
Design resistance	$N_{Rd,p}$	-	-	-	9.22	11.2	12.6	15.1	-
COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE C20/25 (80°C/50°C)									
Characteristic resistance = MOCK	$N_{Rk,p}$	-	-	-	16.6	20.1	22.6	31.7	-
Design resistance	$N_{Rd,p}$	-	-	-	9.22	11.2	12.6	15.1	-

OSCRETE CHEMICAL ANCHOR

Resin Based Chemical Anchor

SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge Distance	c_1	[mm]	40.0	40.0	40.0	50.0	60.0	70.0	83.0
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	5.27	5.68	6.09	9.06	12.5	16.4	22.2
Design resistance γ_{Mc}= 1.5	$V_{Rd,c}$	[kN]	3.51	3.79	4.06	6.04	8.34	10.9	14.8
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge Distance	c_1	-	-	-	40.0	50.0	60.0	70.0	-
Characteristic resistance for c_1	$V_{Rk,c}$	-	-	-	4.31	6.42	8.86	11.6	-
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	14.0	21.0	39.0	61.0	88.0	140.0
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	7.20	11.2	16.8	31.2	48.8	70.4	112.0
STEEL FAILURE; STEEL CLASS 8.8									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.0	23.0	34.0	63.0	98.0	141.0	224.0
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	12.0	18.4	27.2	50.4	78.4	112.8	179.2
STEEL FAILURE; STEEL CLASS A4-70									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	13.0	20.0	29.0	55.0	86.0	124.0	196.0
Design resistance γ_{Ms}= 1.56	$V_{Rd,s}$	[kN]	8.33	12.8	18.6	35.3	55.1	79.5	125.6

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