weberanc 505 ASF

TECHNICAL AND REPAIR MORTARS

Pure epoxy anchoring resin in cartridge - Seismic grade

PRODUCT

weberanc 505 ASF is a 2 component high strength pure epoxy chemical anchoring resin system. It is designed for deep embedment and large diameter holes due to its zero shrinkage, and longer working times.
For diamond drilled holes, with rebar, and in areas of high chemical exposure eg. Seasalt and swimming pools.

BENEFITS

- Suitable for Seismic Loads
- F120 fire resistance
- High bond strength with high load resistance
- Long working times
- High loads possible
- High chemical resistance
- Use with potable water
- Zero shrinkage
- Studs and rebar
- A+ Rating VOC content
- Low odour
- Seismic C1 & C2

PACKAGING

Available in Sizes: 385ml cartridge or 585ml cartridge.

SCOPE OF USE

- Used with all grades of threaded rod and rebar in accordance with TR029
- Ideal for deep embedment installations
- Used in non-cracked and cracked concrete
- Used in dry and wet concrete
- Used in flooded holes
- Used for overhead applications
- Ideal for diamond drilled holes
- Used for seismic design structures

Typical characteristic and design resistance performance with 5.8 grade studding and associated installation data

	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)
Stud Ø (mm)	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge	
	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	$C_{cr,}N$	$S_{cr,}N$	$C_{cr,}V$	$C_{min,}$ S_{min}
M8	19.00		12.70		9.07					
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40
	19.00		12.70		9.07					
M10	28.27		15.71		11.22					
	30.20	15.00	20.10	12.00	14.36	8.57	100	200	90	50
	30.20		20.10		14.36					
M12	39.58		21.99		15.71					
	43.80	21.00	29.20	16.80	20.86	12.00	120	240	110	60
	43.80		29.20		20.86					
M16	56.30		31.28		22.34					
	81.60	39.00	54.40	31.20	38.86	22.29	160	320	125	80
	81.60		54.40		38.86					
M20	73.51		35.01		25.00					
	127.40	61.00	84.90	48.80	60.64	34.86	200	400	180	100
	127.40		84.90		60.64					
M24	90.48		43.08		30.77					
	183.60	88.00	122.40	70.40	87.43	50.29	240	480	220	120
	183.60		122.40		87.43					
M27	111.97		53.32		38.08					
	238.00	115.00	159.10	92.00	109.52	65.71	270	540	240	135
	238.00		159.10		109.52					
M30	135.72		64.63		46.16					
	292.00	142.50	194.50	114.00	133.33	81.43	300	600	280	150
	292.00		194.50		133.33					

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Stud Ø (mm)	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)
	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge	
	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	C_{cr},N	S_{cr},N	C_{cr},V	C_{min}, S_{min}
M33	148.25		70.60		50.43					
	342.12	173.50	162.91	138.80	116.36	99.14	330	660	310	165
	360.00		240.60		165.20					
M36	174.74		83.21		59.43					
	396.07	212.50	188.60	170.00	134.72	121.43	360	720	330	180
	425.00		283.33		202.38					

= Steel failure

Nominal Embedment (mm)	Hole Diameter Concrete (mm)	Hole Diameter fixture (mm)	Max Torque (Nm)
60 80 160	10	9	10
60 90 200	12	12	20
70 110 240	14	14	40
80 125 320	18	18	80
90 170 400	24	22	120
100 210 480	28	26	160
110 240 540	32	30	180
120 280 600	35	32	200
130 300 660	37	36	250
130 300 660	40	38	300

DESIGN RESISTANCE USED WITH VARIOUS STUD STRENGTHS, MATERIAL AND REBAR.

5.8 Grade Steel Studding

Diameter	Diameter	Embedment depth hef																				h_{ef} failure	$F_{d,s}$ design load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	(mm)	(kN)
8	10	12.6	12.7																			61	12.7
10	12	15.7	18.3	20.1																		77	20.1
12	14		22.0	25.1	28.3	29.2																93	29.2
16	18			31.4	35.3	39.2	43.1	47.1	51.0	54.4												139	54.4
20	24			33.2	37.3	41.5	45.6	49.8	53.9	58.1	66.4	82.9	84.9									205	84.9
24	28					43.0	47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.4	122.4							285	122.4
27	32						53.2	58.0	62.9	67.7	77.4	96.7	116.1	135.4	154.7	159.1						329	159.1
30	35							64.5	69.8	75.2	86.0	107.5	128.9	150.4	171.9	194.5						362	194.5
33	38								71.4	76.9	87.9	109.9	131.9	153.9	175.9	219.8	240.6					438	240.6
36	40									77.6	88.7	110.8	133.0	155.2	177.4	221.7	266.0	283.2				511	283.2
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

8.8 Grade Steel Studding

Diameter	Diameter	Embedment depth hef																				h_{ef} failure	$F_{d,s}$ design load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	(mm)	(mm)
8	10	12.6	14.7	16.8	18.8	19.5																93	19.5
10	12	15.7	18.3	20.9	23.6	26.2	28.8	30.9														118	30.9
12	14		22.0	25.1	28.3	31.4	34.5	37.7	40.8	44.0	45.0											143	45.0
16	18			31.4	35.3	39.2	43.1	47.1	51.0	54.9	62.7	78.4	83.7									214	83.7
20	24			33.2	37.3	41.5	45.6	49.8	53.9	58.1	66.4	82.9	99.5	116.1	130.7							315	130.7
24	28					43.0	47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.4	137.5	171.9	188.3					438	188.3
27	32						53.2	58.0	62.9	67.7	77.4	96.7	116.1	135.4	154.7	193.4	232.1	244.8				506	244.8
30	35							64.5	69.8	75.2	86.0	107.5	128.9	150.4	171.9	214.9	257.9	290.1	299.2			557	299.2
33	38								71.4	76.9	87.9	109.9	131.9	153.9	175.9	219.8	263.8	296.7	329.7	362.7	370.1	674	370.1
36	40									77.6	88.7	110.8	133.0	155.2	177.4	221.7	266.0	299.3	332.5	365.8	399.1	786	435.7
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

DESIGN RESISTANCE USED WITH VARIOUS STUD STRENGTHS, MATERIAL AND REBAR.

10.9 Grade Steel Studding

Diameter	Diameter	Embedment depth hef																				h_{ef} failure	$F_{d,s}$ design load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720	(mm)	(mm)
8	10	12.6	14.7	16.8	18.8	20.9	23.0	25.1	27.2													130	27.2
10	12	15.7	18.3	20.9	23.6	26.2	28.8	31.4	34.0	36.6	41.9	43.1										165	43.1
12	14		22.0	25.1	28.3	31.4	34.5	37.7	40.8	44.0	50.3	62.6										199	62.6
16	18			31.4	35.3	39.2	43.1	47.1	51.0	54.9	62.7	78.4	94.1	109.8	116.6							297	116.6
20	24			33.2	37.3	41.5	45.6	49.8	53.9	58.1	66.4	82.9	99.5	116.1	132.7	165.9	182.0					439	182.0
24	28					43.0	47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.4	137.5	171.9	206.3	232.1	257.9	262.2		610	262.2
27	32						53.2	58.0	62.9	67.7	77.4	96.7	116.1	135.4	154.7	193.4	232.1	261.1	290.1	319.1	341.0	705	341.0
30	35							64.5	69.8	75.2	86.0	107.5	128.9	150.4	171.9	214.9	257.9	290.1	322.4	354.6	386.8	776	416.7
33	38								71.4	76.9	87.9	109.9	131.9	153.9	175.9	219.8	263.8	296.7	329.7	362.7	395.7	938	515.5
36	40									77.6	88.7	110.8	133.0	155.2	177.4	221.7	266.0	299.3	332.5	365.8	399.1	1095	606.9
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

A4-70 Stainless Steel Studding

Diameter (mm)	Diameter (mm)	Embedment depth hef																				h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		
8	10	12.6	12.7																			65	13.7
10	12	15.7	18.3	20.1																		83	21.7
12	14		22.0	25.1	28.3	29.2																100	31.6
16	18			31.4	35.3	39.2	43.1	47.1	51.0	54.9	58.8											150	58.8
20	24			33.2	37.3	41.5	45.6	49.8	53.9	58.1	66.4	82.9	91.7									221	91.7
24	28					43.0	47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.4	132.1							307	132.1
27	32						53.2	58.0	62.9	67.7	77.4	80.2									1	166	80.2
30	35							64.5	69.8	75.2	86.0	98.1									1	183	98.1
33	38								71.4	76.9	87.9	109.9	121								1	221	121.3
36	40									77.6	88.7	110.8	133.0	143							1	258	142.8
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

**1 = Tensile strength 500N/mm²*

A4-80 Stainless Steel Studding

Diameter (mm)	Diameter (mm)	Embedment depth hef																				h_{ef} failure (mm)	$F_{d,s}$ design load (kN)
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		
8	10	12.6	14.7	15.7																		75	15.7
10	12		18.3	20.9	23.6	24.8																95	24.8
12	14		22.0	25.1	28.3	31.4	34.5	36.1														115	36.1
16	18			31.4	35.3	39.2	43.1	47.1	51.0	54.9	62.7	67.2										1717	67.2
20	24			33.2	37.3	41.5	45.6	49.8	53.9	58.1	66.4	82.9	99.5	104.8								253	104.8
24	28					43.0	47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.4	132.1						2	307	132.1
27	32						53.2	58.0	62.9	67.7	77.4	80.2									1	166	80.2
30	35							64.5	69.8	75.2	86.0	98.1									1	183	98.1
33	38								71.4	76.9	87.9	109.9	121.3								1	221	121.3
36	40									77.6	88.7	110.8	133.0	142.8							1	258	142.8
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

**1 = Tensile strength 500N/mm²*
**2 = Tensile strength 700N/mm²*

High bond reinforcing bars Fyk=500N/mm²

Diameter (mm)	Diameter (mm)	Embedment depth hef																				h_{ef} failure (mm)	$F_{d,s}$ design load (mm)
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800		
8	10	9.2	10.8	12.3	13.8	15.4	16.9	18.4	20.0	21.5	21.9											142	21.9
10	12	11.5	13.4	15.4	17.3	19.2	21.1	23.0	25.0	26.9	30.7	34.1										178	34.1
12	14		14.7	16.8	18.9	20.9	23.0	25.1	27.2	29.3	33.5	41.9	49.2									235	49.2
16	18			21.2	23.9	26.5	29.2	31.8	34.5	37.1	42.5	53.1	63.7	74.3	84.9							330	87.4
20	24			22.9	25.8	28.7	31.5	34.4	37.3	40.1	45.8	57.3	68.8	80.2	91.7	114.6						477	136.6
24	28					33.7	37.0	40.4	43.8	47.1	53.9	67.3	80.8	94.3	107.7	134.7	168.3					584	196.5
27	32						39.2	42.7	46.3	19.9	57.0	71.2	85.5	99.7	113.9	142.4	178.0	199.4				752	267.8
30	35								52.9	57.0	65.1	81.4	97.7	113.9	130.2	162.8	203.5	227.9	260.5			859	349.7
33	38									60.3	68.9	86.2	103.4	120.7	137.9	172.4	215.5	241.3	275.8	310.3		1023	443.5
36	40										76.6	95.8	114.9	134.1	153.2	191.5	239.4	268.1	306.4	344.7	383.0	1141	546.3
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800		

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CHARACTERISTIC AND DESIGN LOAD RESISTANCES BASED ON CHARACTERISTIC BOND STRENGTHS FOR HEF 4D (MINIMUM EMBEDMENT) TO 20D

Stud	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embedment
Ø	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	(mm)
(mm)	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	
M8	22.62		12.57		8.98		Not Applicable		Not Applicable		Not Applicable		60
	30.16	9.00	16.76	7.20	11.97	5.14							80
	60.32		33.51		23.94								160
M10	28.27		15.71		11.22								60
	42.41	15.00	23.56	12.00	16.83	8.57							90
	94.25		52.36		37.40								200
M12	39.58		21.99		15.71		19.79		11.00		7.85		70
	62.20	21.00	34.56	16.80	24.68	12.00	31.10	21.00	17.28	16.80	12.34	12.00	110
	135.72		75.40		53.86		67.86		37.70		26.93		240
M16	56.30		31.28		22.34		26.14		14.52		10.37		80
	87.96	39.00	48.87	31.20	34.91	22.29	42.22	39.00	23.46	31.20	16.75	22.29	125
	225.19		125.11		89.36		104.55		58.08		41.49		320
M20	73.51		35.01		25.00		33.93		16.16		11.54		90
	138.86	61.00	66.12	48.80	47.23	34.86	63.90	61.00	30.41	48.80	21.72	34.86	170
	326.73		155.58		111.13		150.80		71.81		51.29		400
M24	90.48		43.08		30.77		41.47		19.75		14.11		100
	190.00	88.00	90.48	70.40	64.63	50.29	85.50	88.00	40.71	70.40	29.10	50.29	210
	434.29		206.81		147.72		199.05		94.79		67.70		480
M27	111.97		53.32		38.08		51.32		24.44		17.46		110
	244.29	115.00	116.33	92.00	83.09	65.71	107.49	115.00	51.18	92.00	36.56	65.71	240
	549.65		261.74		186.96		251.92		119.96		85.69		540
M30	135.72		64.63		46.16		62.20		29.62		21.16		120
	316.67	142.50	150.80	114.00	107.71	81.43	133.00	142.50	63.33	114.00	45.24	81.43	280
	678.59		323.14		230.81		311.02		148.10		105.79		600
M33	148.25		70.60		50.43		37.39		32.09		22.92		130
	342.12	173.50	162.91	138.80	116.37	99.14	140.27	173.50	66.80	138.80	47.71	99.14	300
	752.66		358.41		256.01		342.12		162.91		116.37		660
M36	174.74		83.21		59.43		76.34		36.35		25.97		150
	396.07	212.50	188.60	170.00	134.72	121.43	154.47	212.50	73.56	170.00	52.54	121.43	340
	838.73		399.40		285.28		366.44		174.49		124.64		720

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BOND STRENGTH FACTORS

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm2 (Mpa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
fc =	0.98	1.00	1.02	1.04	1.06	1.08	1.09	1.10

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Flooded	1.00	0.94	0.87	0.79	0.71	0.65	0.58	0.51	0.43	0.36
Temp II 60°C / 43°C	Dry and Wet	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	Flooded	0.65	0.63	0.61	0.59	0.57	0.54	0.50	0.49	0.46	0.55
Temp III 72°C / 43°C	Dry and Wet	0.57	0.56	0.54	0.53	0.52	0.51	0.50	0.49	0.47	0.46
	Flooded	0.57	0.54	0.52	0.51	0.50	0.49	0.46	0.45	0.43	0.42

Influence of environmental conditions in cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36
Temp I 40°C / 24°C	Dry and Wet	n/a	n/a	0.50	0.48	0.46	0.45	0.44	0.42	0.41	0.39
	Flooded	n/a	n/a	0.50	0.42	0.38	0.38	0.35	0.30	0.27	0.24
Temp II 60°C / 43°C	Dry and Wet	n/a	n/a	0.32	0.31	0.30	0.29	0.29	0.28	0.27	0.26
	Flooded	n/a	n/a	0.32	0.29	0.28	0.27	0.27	0.25	0.24	0.23
Temp III 72°C / 43°C	Dry and Wet	n/a	n/a	0.27	0.27	0.26	0.25	0.24	0.23	0.23	0.22
	Flooded	n/a	n/a	0.27	0.27	0.26	0.25	0.24	0.23	0.23	0.22

CHARACTERISTIC AND DESIGN LOAD RESISTANCES FOR REBAR BASED ON CHARACTERISTIC BOND STRENGTHS FOR HEF 4D (MIN EMBEDMENT) TO 20D

	Non Cracked Concrete						Cracked Concrete						
Rebar	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embedment
Ø	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	(mm)
(mm)	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	
	16.59		9.22		6.58								60
8	22.12	13.95	12.29	9.30	8.78	6.64	Not Applicable		Not Applicable		Not Applicable		80
	44.23		24.57		17.55								160
	20.73		11.52		8.23								60
10	31.10	21.45	17.28	14.30	12.34	10.21	Not Applicable		Not Applicable		Not Applicable		90
	69.12		38.40		27.43								200
	26.39		14.66		10.47		14.51		8.06		5.76		70
12	41.47	31.05	23.04	20.70	16.46	14.79	22.81	31.05	12.67	20.70	9.05	14.79	110
	90.48		50.27		35.90		49.76		27.65		19.75		240
	38.20		21.22		15.16		18.10		10.05		7.18		80
16	59.69	55.50	33.16	37.00	23.69	26.43	28.05	55.50	15.58	37.00	11.13	26.43	125
	152.81		84.89		60.64		72.38		40.21		28.72		320
	50.89		24.24		17.31		22.62		10.77		7.69		90
20	96.13	86.55	45.78	57.70	32.70	41.21	42.30	86.55	20.14	57.70	14.39	41.21	170
	226.20		107.71		76.94		100.53		17.87		34.19		400
	70.69		33.66		24.04		27.49		13.09		9.35		100
25	148.44	135.00	70.69	90.00	50.49	64.29	63.83	135.00	30.40	90.00	21.71	64.29	210
	353.43		168.30		120.21		137.45		65.45		46.75		500
	83.74		39.88		28.48		34.48		16.42		11.73		112
28	209.36	168.75	99.69	112.50	71.21	80.36	87.93	168.75	41.87	112.50	29.90	80.36	280
	418.71		199.39		142.42		172.41		82.10		58.64		560
	109.38		52.08		37.20		45.04		21.45		15.32		128
32	273.44	220.95	130.21	147.30	93.01	105.21	112.11	220.95	53.39	147.30	38.13	105.21	320
	546.89		260.42		186.02		225.19		107.23		76.60		640

BOND STRENGTH FACTORS

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm2 (Mpa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
fc =	0.98	1.00	1.02	1.04	1.06	1.08	1.09	1.10

Influence of concrete strength on combined pull out and concrete cone resistance

		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Flooded	1.00	0.94	0.90	0.85	0.80	0.71	0.65	0.63
Temp II 60°C / 43°C	Dry and Wet	0.67	0.65	0.63	0.62	0.61	0.60	0.60	0.59
	Flooded	0.65	0.64	0.61	0.59	0.58	0.56	0.55	0.47
Temp III 72°C / 43°C	Dry and Wet	0.60	0.58	0.57	0.56	0.56	0.55	0.54	0.53
	Flooded	0.58	0.56	0.53	0.50	0.47	0.45	0.43	0.41

Influence of environmental conditions in cracked concrete

		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø28	Ø32
Temp I 40°C / 24°C	Dry and Wet	n/a	n/a	0.55	0.47	0.44	0.43	0.42	0.41
	Flooded	n/a	n/a	0.55	0.42	0.40	0.38	0.36	0.35
Temp II 60°C / 43°C	Dry and Wet	n/a	n/a	0.30	0.28	0.26	0.24	0.23	0.23
	Flooded	n/a	n/a	0.30	0.27	0.25	0.23	0.22	0.22
Temp III 72°C / 43°C	Dry and Wet	n/a	n/a	0.30	0.26	0.25	0.24	0.23	0.22
	Flooded	n/a	n/a	0.30	0.26	0.24	0.23	0.23	0.22

Material Properties for grades of other threaded rod and rebar

	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
Stud Diameter	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$
M8	29.2	19.5	38.1	27.2	25.6	13.7	29.2	15.6
M10	46.4	30.9	60.3	43.1	40.6	21.7	46.4	24.8
M12	67.4	44.9	87.7	62.6	59.0	31.6	67.4	36.0
M16	125.6	83.7	163.0	116.4	109.9	58.8	125.7	67.2
M20	196.1	130.7	255.0	182.1	171.5	91.7	196.0	104.8
M24	282.5	188.3	367.0	262.1	247.1	132.1	293.0	132.1
M27	367.0	244.7	477.4	341.0	229.4	80.2	229.4	80.2
M30	448.8	299.2	583.0	416.4	280.6	98.1	280.6	98.1
M33	555.2	370.1	721.8	515.5	347.0	121.3	347.0	121.3
M36	653.6	435.7	849.7	606.9	408.4	142.8	408.4	142.8

	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$	$Nr_{k,s}$	$N_{rd,s}$
M8	14.6	11.7	19.0	15.2	12.8	8.2	14.6	9.4
M10	23.2	18.6	30.2	24.1	20.3	13.0	23.2	14.9
M12	33.7	27.0	43.8	35.1	29.5	18.9	33.7	21.6
M16	62.8	50.2	81.6	65.3	55.0	35.2	62.8	40.3
M20	98.0	78.4	127.4	101.9	85.8	55.0	98.0	62.8
M24	141.2	113.0	183.6	146.8	123.6	79.2	141.2	90.5
M27	183.5	146.8	238.7	191.0	114.7	48.4	114.7	48.4
M30	224.4	179.5	291.5	215.9	140.3	89.9	140.3	89.9
M33	277.6	222.1	360.9	288.7	173.5	111.2	173.5	111.2
M36	326.8	261.4	424.8	283.2	204.2	130.9	204.2	130.9

	Rebar BSt 500 to DIN 488		Rebar BSt 500 to DIN 488	
	$N_{rk,s}$	$N_{rd,s}$	$V_{rk,s}$	$V_{rd,s}$
(mm)	(kN)	(kN)	(kN)	(kN)
8	28.0	20.0	14.0	9.3
10	43.0	30.7	21.5	14.3
12	62.0	44.3	31.0	20.7
14	85.0	60.7	42.5	28.3
16	111.0	79.3	55.5	37.0
18	140.0	100.0	70.0	46.7
20	173.0	123.6	86.5	57.7
22	209.0	149.3	104.5	69.7
25	270.0	192.9	135.0	90.0
28	339.0	242.1	169.0	112.7
32	442	315.7	221	147.3
36	563.2	443.5	281.6	187.7
40	693.8	546.3	346.9	231.3

Post installed rebar connections
Minimum anchorage length 1) and lap splice length for C20/25 and maximum installation length (lmax)

Rebar		$l_{b,min}$ (mm)	$l_{0,min}$ (mm)	$l_{max,min}$ (mm)
Ø d_s	$f_{y,k}$ (N/mm²)			
8mm	500	113	200	1000
10mm	500	142	200	1000
12mm	500	170	200	1200
14mm	500	198	210	1400
16mm	500	227	240	1600
20mm	500	284	300	2000
22mm	500	312	330	2000
24mm	500	340	360	2000
25mm	500	354	375	2000

N/mm2 = MPa

1) According to EN 1992-1-1:2004 lb,min (8.6) and l0,min (8.11) for good bond conditions and a = 1,0 with maximum yield stress for rebar B500 B and ㆍM = 1,15

Design values of the ultimate bond resistance fbd1) in N/mm2 for all drilling methods for good conditions

Rebar Ø	Concrete Class								
Ø d_s	C12/15	C12/15	C12/15	C12/15	C12/15	C12/15	C12/15	C12/15	C12/15
8mm to 25mm	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6

1) Tabulated values for fbd are valid for good bond condition according to EN1992-1-1:2004. For all other bond conditions multiply the values for fbd by 0.7.

Post installed rebar connections
Values for pre-calculation of anchoring

Rebar - Ø ds	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1.0$			α_2 or $\alpha_5=0.7$; $\alpha_1=\alpha_3=\alpha_4=1.0$		
	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume
(mm)	(mm)	(kN)	(ml)	(mm)	(kN)	(ml)
	113*	6.53	9	113*	9.33	9
	180	10.4	14	150	12.39	11
	250	14.45	19	190	15.69	14
8	378	21.85	29	265	21.88	20
	142*	10.26	13	142*	14.66	13
	220	15.9	20	190	19.61	17
	310	22.4	28	240	24.77	22
	390	28.18	35	280	28.9	25
10	473	34.18	43	331	34.17	30
	170*	14.74	18	170*	21.06	18
	270	23.41	29	230	28.49	24
	370	32.08	39	280	34.68	30
	470	40.75	50	340	42.12	36
12	567	49.16	60	397	49.18	42
	198*	20.03	24	198*	28.61	24
	310	31.36	37	260	37.57	31
	430	43.5	52	330	47.69	40
	550	55.64	66	400	57.81	48
14	662	66.97	80	463	66.91	56
	227*	26.24	31	227*	37.49	31
	360	41.62	49	300	49.55	41
	490	56.65	67	380	62.76	52
	620	71.68	84	450	74.32	61
16	756	87.4	103	529	87.37	72
	284*	41.04	60	284*	58.63	60
	450	65.03	95	380	78.45	81
	610	88.15	129	470	91.03	100
	780	112.72	165	570	117.68	121
20	945	136.57	200	662	136.67	140
	312*	49.6	88	312*	70.85	88
	490	77.89	139	420	95.38	119
	680	108.1	192	520	118.09	147
	860	136.71	243	620	140.8	175
22	1040	165.32	294	728	165.32	206
	340*	58.96	144	340*	84.23	144
	540	93.64	228	450	111.8	190
	740	128.33	312	570	141.21	241
	940	163.01	397	680	168.46	287
24	1134	196.65	479	794	196.7	335
	354*	63.95	133	354*	91.35	133
	560	101.16	211	470	121.29	177
	770	139.09	290	590	152.26	222
	970	175.22	365	710	183.22	267
25	1181	213.34	444	827	213.42	311

Example For:
C20/25;
good bond condition;
Rebar Yield Strength
500 N/mm2 (500 MPa)

* Minimum anchorage length. The design value is valid for "good bond conditions" according to EN 1992-1-1.
All other condition: multiply value by 0.7. Mortar volume based on equation: $V = 1.2 \cdot (d_0^2 - d_d^2) \cdot \pi \cdot l_b / 4$

Post installed rebar connections
Values for pre-calculation of overlap joints

Rebar - Ø ds	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1.0$			α_2 or $\alpha_5=0.7$; $\alpha_1=\alpha_3=\alpha_4=1.0$		
	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume
(mm)	(mm)	(kN)	(ml)	(mm)	(kN)	(ml)
	200	11.56	15	200	16.52	15
	240	13.87	18	220	18.17	17
	290	16.76	22	230	18.99	17
8	378	21.85	29	265	21.88	20
	200	14.45	18	200	20.64	18
	270	19.51	24	230	23.74	21
	340	24.57	31	270	27.87	24
	400	28.9	36	300	30.97	27
10	473	34.18	43	331	34.17	30
	200	17.34	21	200	24.77	21
	290	25.15	31	250	30.97	26
	380	32.95	40	300	37.16	32
	480	41.62	51	350	43.35	37
12	567	49.16	60	397	49.18	42
	210	21.24	25	210	30.35	25
	320	32.37	39	270	39.02	33
	440	44.51	53	340	49.13	41
	550	55.64	66	400	57.81	48
14	662	66.97	80	463	66.91	56
	240	27.75	33	240	39.64	33
	370	42.78	50	310	51.2	42
	500	57.81	68	380	62.76	52
	630	72.83	86	460	75.97	62
16	756	87.4	103	529	87.37	72
	300	43.35	64	300	61.93	64
	460	66.48	98	390	80.51	83
	620	89.6	131	480	99.09	102
	780	112.72	165	570	117.68	121
20	945	136.57	200	662	136.67	140
	330	52.46	93	330	74.94	93
	510	81.07	144	430	97.65	122
	680	108.1	192	530	120.36	150
	860	136.71	243	630	143.07	178
22	1040	165.32	294	728	165.32	206
	360	62.43	152	360	89.19	152
	550	95.38	232	470	116.44	198
	750	130.06	317	580	143.69	245
	940	163.01	397	690	170.94	291
24	1134	196.65	479	794	196.7	335
	375	67.74	141	375	96.77	141
	580	104.77	218	490	126.45	184
	780	140.9	293	600	154.84	226
	980	177.03	369	710	183.22	267
25	1181	213.34	444	827	213.42	311

Example For:
C20/25;
good bond condition;
Rebar Yield Strength
500 N/mm2 (500 MPa)

* Minimum anchorage length. The design value is valid for "good bond conditions" according to EN 1992-1-1.
All other condition: multiply value by 0.7. Mortar volume based on equation: $V = 1.2 \cdot (d_0^2 - d_d^2) \cdot \pi \cdot l_b / 4$

Post installed rebar schematics

Application examples of post-installed rebar

Figure 1: Overlap joints in slabs and beams.

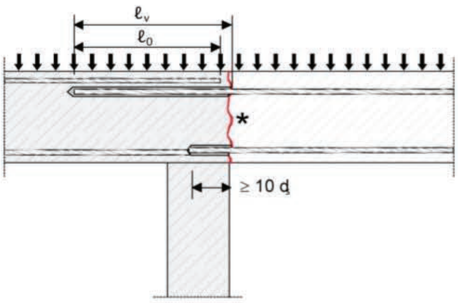


Figure 2: Overlap joint in foundation of a column or wall where the rebars are stressed in tension.

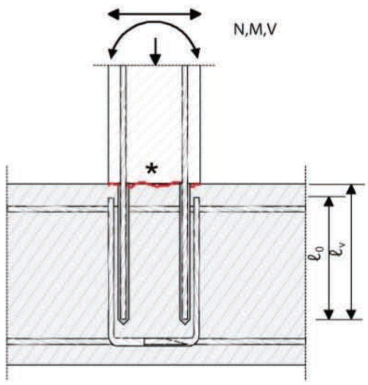


Figure 3: End anchoring of slabs or beams, designed as simply supported.

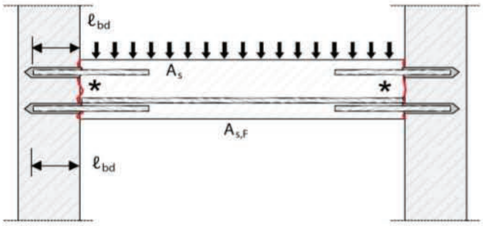


Figure 4: Rebar connection of components stressed primarily in compression. The rebar are stressed in compression.

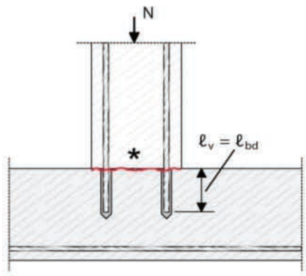
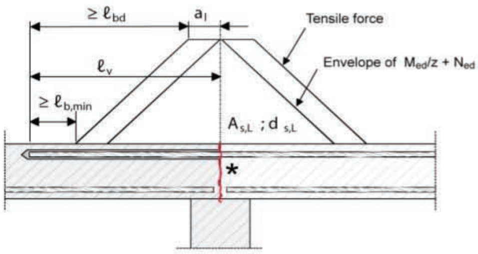


Figure 5: Anchoring of reinforcement to cover the line of acting tensile force.



Note to figure 1 to 5 :
In the figures no transverse reinforcement is plotted, the transverse reinforcement as required by EC 2 shall be present.
The shear transfer between old and new concrete shall be designed according to EC2. Description of the bonded-in rebars and overlap joints see Annex 4 and 5.

*** Roughened joint**

Effect of Anchor Spacing - Tension

Anchor Spacing	Stud / Rebar Diameter										
(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.64										
50	0.67	0.63									
60	0.70	0.65	0.63								
70	0.73	0.67	0.64								
80	0.76	0.69	0.66	0.63							
90	0.79	0.72	0.68	0.64							
100	0.82	0.74	0.70	0.65	0.63						
120	0.87	0.79	0.74	0.68	0.65	0.63	0.63				
150	0.96	0.86	0.80	0.73	0.68	0.65	0.64	0.63			
160	1.00	0.88	0.82	0.74	0.70	0.66	0.65	0.63	0.63	0.63	0.63
175		0.92	0.85	0.76	0.71	0.67	0.66	0.64	0.63	0.63	0.63
200		1.00	0.90	0.80	0.74	0.69	0.69	0.66	0.65	0.65	0.65
225			0.95	0.84	0.77	0.72	0.71	0.68	0.67	0.67	0.66
240			1.00	0.86	0.79	0.73	0.72	0.69	0.68	0.68	0.67
250				0.87	0.80	0.74	0.73	0.70	0.69	0.68	0.68
275				0.91	0.83	0.76	0.75	0.72	0.71	0.70	0.69
280				0.92	0.84	0.77	0.76	0.73	0.71	0.70	0.69
300				0.95	0.86	0.79	0.78	0.74	0.73	0.72	0.71
320				1.00	0.88	0.81	0.80	0.76	0.74	0.73	0.72
350					0.92	0.83	0.82	0.78	0.77	0.75	0.73
400					1.00	0.88	0.87	0.82	0.80	0.78	0.76
440						0.92	0.91	0.85	0.83	0.81	0.79
480						1.00	0.94	0.88	0.86	0.84	0.81
540							1.00	0.93	0.91	0.88	0.84
600								1.00	0.96	0.92	0.88
660									1.00	0.96	0.91
720										1.00	0.95
800											1.00

Effect of Edge Distance - Tension

Edge Distance	Stud / Rebar Diameter										
(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.64										
50	0.73	0.63									
60	0.82	0.70	0.63								
70	0.90	0.77	0.68								
80	1.00	0.84	0.74	0.63							
90		0.91	0.80	0.67							
100		1.00	0.86	0.71	0.63						
110			0.92	0.76	0.66						
120			1.00	0.80	0.70	0.64					
140				0.89	0.77	0.67	0.63	0.63			
160				1.00	0.84	0.72	0.70	0.65	0.63	0.67	
180					0.91	0.78	0.75	0.70	0.66	0.71	0.68
200					1.00	0.84	0.81	0.76	0.71	0.74	0.71
220						0.89	0.86	0.81	0.75	0.78	0.75
240						1.00	0.92	0.86	0.80	0.82	0.78
270							1.00	0.94	0.87	0.87	0.83
300								1.00	0.94	0.93	0.88
330									1.00	0.98	0.93
360										1.00	0.98
400											1.00

Effect of Edge Distance - Shear

Edge	Stud / Rebar Diameter										
(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.25										
50	0.44	0.30									
60	0.63	0.48	0.30								
70	0.81	0.65	0.44								
80	1.00	0.83	0.58	0.40							
90		1.00	0.72	0.53							
100			0.86	0.67	0.35						
110			1.00	0.80	0.44						
125				1.00	0.58	0.35					
140					0.72	0.46	0.35	0.30			
160					0.91	0.62	0.51	0.35	0.32	0.33	
180					1.00	0.77	0.63	0.46	0.37	0.43	
200						0.92	0.75	0.57	0.46	0.50	0.32
220						1.00	0.88	0.68	0.56	0.56	0.53
240							1.00	0.78	0.65	0.63	0.59
280								1.00	0.84	0.77	0.72
310									1.00	1.00	0.82
330										1.00	0.89
400											1.00

MINIMUM CURING TIME

Concrete Temperature	Gel - Working Time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
5°C	120 min	3000 min	x2
15°C	60 min	1200 min	x2
25°C	25 min	480 min	x2
35°C	16 min	240 min	x2
40°C	10 min	150 min	x2

- Full cure 24 hours
- All specifications based on supplied mixer

TEMPERATURE RANGES

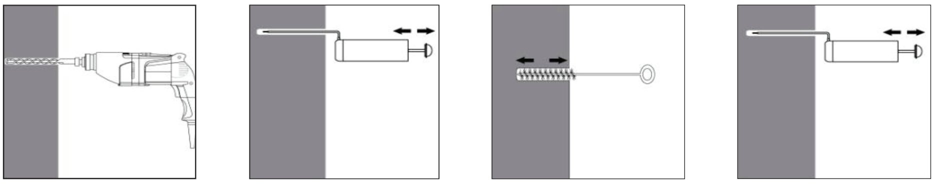
Temperature Range	Concrete Service Temperature	Maximum Long Term Concrete Temp	Maximum Short Term Concrete Temp
Range I	-40°C to +40°C	+24°C	+40°C
Range II	-40°C to +60°C	+43°C	+60°C
Range III	-40°C to +72°C	+43°C	+72°C

Service temperature range: Range of ambient temperatures after installation and during the lifetime of theanchor.
Short term temperature: Temperatures within the service temperature range which vary over short intervals, e.g. day/night cycles and freeze/thaw cycles.
Long term temperature: Temperature, within the service temperature range, which will be approximately constant over significant periods of time.
Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

PHYSICAL PROPERTIES

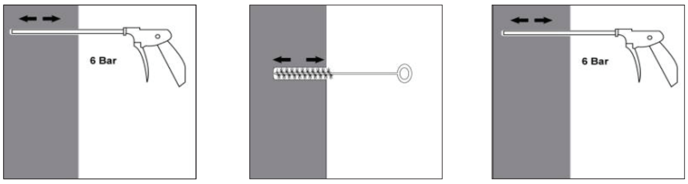
	N/mm² (MPa)	N/mm² (MPa)
Compressive Strength	120	EN 196 Part 1
Flexural Strength	39	EN 196 Part 1
E Modulus	3420	EN 196 Part 1
Density	1.42 kg/dm³	-
Shrinkage	<0.4%	-
VOC Content	A+ Rating	

Installation parameters: drilling hole cleaning and installation

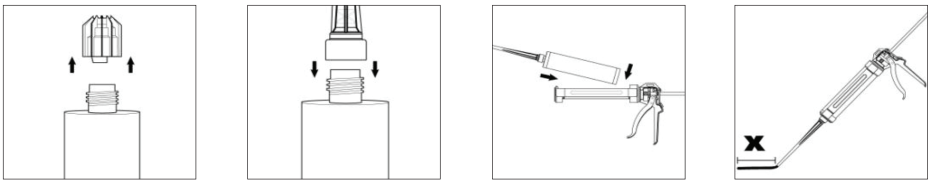


Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters do ≤ 24mm and embedment depths up to hef ≤ 10d. Blow out at least 4 times from the back of the bore hole, using an extension if needed. Brush 4 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. Blow out again with manual pump at least 4 times.

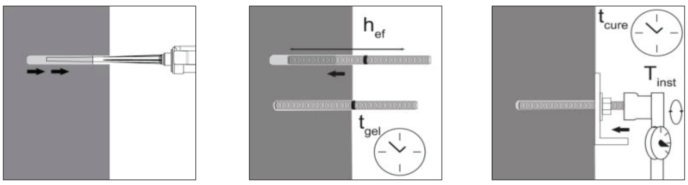
Compressed air cleaning (CAC) for all bore hole diameters do and all bore hole depths



Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it.X 2 Blow out again with compressed air at least 2 times.



Remove the threaded cap from the cartridge. Tightly attach the mixing nozzle. Do not modify the mixer in any way. Made sure the mixing element is inside the mixer. Use only the supplied mixer. Insert the cartridge into the dispenser gun. Discard the initial trigger pulls of adhesive. Discard the first 10ml of resin.



Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull. Fill holes approximately 2/3 full, to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment depth. Before use, verify that the threaded rod is dry and free of contaminants. Install the threaded rod to the required embedment depth during the open gel time tgel has elapsed. The working time tgel is given in Table 7. The anchor can be loaded after the required curing time tcure (see Table 7). The applied torque shall not exceed the values Tmax given in Table 1.

Shelf Life and Storage

- This product should be stored between +5˚C & +25˚C.
- The Shelf life of the product is 24 months from the manufacture date.

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