SOLFIX 500

Pure Epoxy Resin Grout

Solfix 500 is a two component chemical anchoring injection system, designed for diamond drilled holes, with rebar, and in areas of high chemical exposure.

- **Solvent free odourless resin, no shrinkage**
- **Ideal for use with diamond drilled holes**
- **Ideal for rebar usage with large diameters and embedment**
- **High durability**
- **Used in wet holes and underwater**
- **Longer working times**

Colour	Product Code	Container Size
Grey	SOLFIX500	385ml

SOLCEM - Building Chemicals & Admixtures

last Issue Date 02.08.16

Product Description

Solfix 500 is a two component chemical anchoring injection system, in 3:1 ratio. A formulation derived from pure epoxy with very high bond strength, developed principally to anchor threaded rods and rebar into concrete. Used for high performance structural applications.

Typical Uses

Solfix 500 is for diamond drilled holes, with rebar, and in areas of high chemical exposure eg. Seasalt and swimming pools.

Storage & Shelf Life

- This product should be stored between +5°C & +25°C
- Avoid Direct sunlight
- The shelf life of this product is 24 months from date of maufacture.

Features & Benefits

- Suitable for high loads featuring large diameters and deep embedment
- Longer working times make it suitable for large holes, and high temperatures
- No shrinkage, good for large diameter fixings
- Use in wet or flooded environments and fixing holes, or underwater
- High durability, resistance to chemicals
- Used for diamond drilled holes
- Solvent free resin
- Fire approved
- Fixings in concrete, wood, or other high strength materials.

Note: Not for use in Hollow Wall applications

Technical Data - Gelling & Curing Times					
Base Material Temperature	40	35	25	15	5
Typical Gel Time (mins)	10	16	25	60	120
Min. Load Time (mins)	150	240	480	1200	3000

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Product Description

Solfix 500 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.

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

Specific Benefits

- Long working times
- High loads possible
- High chemical resistance
- Use with potable water
- Fixing studs in wood
- 24 Month shelf life
- Diamond drilled holes
- Zero shrinkage
- European approved
- Fire approved
- Studs and rebar
- A+ Rating VOC content

Approvals

- ETA Option 1 ETAG 001 for cracked concrete with studs and rebar TR029
- ETA Option 1 ETAG 001 for rebar TR023 : **Approved for Seismic Loads C2**
- F120 Fire Test report • ICC-ES Approval ESR 3853
- BS6920 for use with potable water **WRAS Approved 1309522**
- ETA approved in flooded holes, wet and dry concrete
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).

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

Stud Ø (mm)	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)	Nominal Embedment (mm)	Hole Diameter concrete (mm)	Hole Diameter fixture (mm)	Max Torque (Nm)
	Tension N_{rk}	Shear V_{rk}	Tension N_{rd}	Shear V_{rd}	Tension N_{rec}	Shear V_{rec}	Edge $C_{cr,N}$	Spacing $S_{cr,N}$	Edge $C_{cr,V}$	C_{min}, S_{min}				
M8	19.00		12.70		9.07						60			
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40	80	10	9	10
	19.00		12.70		9.07						160			
M10	28.27		15.71		11.22						60			
	30.20	15.00	20.10	12.00	14.36	8.57	100	200	90	50	90	12	12	20
	30.20		20.10		14.36						200			
M12	39.58		21.99		15.71						70			
	43.80	21.00	29.20	16.80	20.86	12.00	120	240	110	60	110	14	14	40
	43.80		29.20		20.86						240			
M16	56.30		31.28		22.34						80			
	81.60	39.00	54.40	31.20	38.86	22.29	160	320	125	80	125	18	18	80
	81.60		54.40		38.86						320			
M20	73.51		35.01		25.00						90			
	127.40	61.00	84.90	48.80	60.64	34.86	200	400	180	100	170	24	22	120
	127.40		84.90		60.64						400			
M24	90.48		43.08		30.77						100			
	183.60	88.00	122.40	70.40	87.43	50.29	240	480	220	120	210	28	26	160
	183.60		122.40		87.43						480			
M27	111.97		53.32		38.08						110			
	238.00	115.00	159.10	92.00	109.52	65.71	270	540	240	135	240	32	30	180
	238.00		159.10		109.52						540			
M30	135.72		64.63		46.16						120			
	292.00	142.50	194.50	114.00	133.33	81.43	300	600	280	150	280	35	32	200
	292.00		194.50		133.33						600			
M33	148.25		70.60		50.43						130			
	342.12	173.50	162.91	138.80	116.36	99.14	330	660	310	165	300	37	36	250
	360.00		240.60		165.20						660			
M36	174.74		83.21		59.43						150			
	396.07	212.50	188.60	170.00	134.72	121.43	360	720	330	180	340	40	38	300
	425.00		283.33		202.38						720			

= steel failure

Table notes : see back page

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Design Resistance used with various stud strengths, material and rebar.

5.8 Grade Steel Studding

Stud Diameter	Hole 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

Stud Diameter	Hole 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	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		

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Design Resistance used with various stud strengths, material and rebar.

10.9 Grade Steel Studding

Stud Diameter	Hole 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	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

Stud Diameter	Hole 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	13.7																			65	13.7
10	12	15.7	18.3	20.9	21.7																	83	21.7
12	14		22.0	25.1	28.3	31.6																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

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Design Resistance used with various stud strengths, material and rebar.

A4-80 Stainless Steel Studding

Stud Diameter	Hole 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	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										171	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		

High bond reinforcing bars Fyk=500N/mm2

Rebar Diameter	Hole Diameter	Embedment depth hef																				h_{ef} failure	$F_{d,s}$ yield load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800	(mm)	(kN)
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	15		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	20			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	25			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
25	30					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
28	35						39.2	42.7	46.3	49.9	57.0	71.2	85.5	99.7	113.9	142.4	178.0	199.4				752	267.8
32	40								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
36	44									60.3	68.9	86.2	103.4	120.7	137.9	172.4	215.5	241.3	275.8	310.3		1029	443.5
40	50										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		

*1 = Tensile strength 500N/mm2

*2 = Tensile strength 700N/mm2

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Design Resistance used with various stud strengths, material and rebar.

High bond reinforcing bars Fyk=420N/mm2

Rebar Diameter	Hole Diameter	Embedment depth hef																				h_{ef} failure	$F_{d,s}$ yield load
(mm)	(mm)	60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800	(mm)	(kN)
8	10	9.2	10.8	12.3	13.8	15.4	16.9	18.4														120	18.4
10	12	11.5	13.4	15.4	17.3	19.2	21.1	23.0	25.0	26.9	28.7											149	28.7
12	15		14.7	16.8	18.9	20.9	23.0	25.1	27.2	29.3	33.5	41.3										197	41.3
16	20			21.2	23.9	26.5	29.2	31.8	34.5	37.1	42.5	53.1	73.4									277	73.4
20	25			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						426	114.8
25	30					33.7	37.0	40.4	43.8	47.1	53.9	67.3	80.8	94.3	107.7	134.7	168.3					490	165.1
28	35						39.2	42.7	46.3	49.9	57.0	71.2	85.5	99.7	113.9	142.4	178.0	199.4				632	225.0
32	40								52.9	57.0	65.1	81.4	97.7	113.9	130.2	162.8	203.5	227.9	260.5			722	293.7
36	44									60.3	68.9	86.2	103.4	120.7	137.9	172.4	215.5	241.3	275.8	310.3		865	372.5
40	50										76.6	95.8	114.9	134.1	153.2	191.5	239.4	268.1	306.4	344.7	383.0	959	458.9
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 Ø (mm)	Non Cracked Concrete						Cracked Concrete						Nominal Embed-ment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		
	Tension N_{rk}	Shear V_{rk}	Tension N_{rd}	Shear V_{rd}	Tension N_{rec}	Shear V_{rec}	Tension N_{rk}	Shear V_{rk}	Tension N_{rd}	Shear V_{rd}	Tension N_{rec}	Shear V_{rec}	
M8	22.62	9.00	12.57	7.20	8.98	5.14	Not Applicable		Not Applicable		Not Applicable		60
	30.16		16.76		11.97								**80**
	60.32		33.51		23.94								160
M10	28.27	15.00	15.71	12.00	11.22	8.57							60
	42.41		23.56		16.83								**90**
	94.25		52.36		37.40								200
M12	39.58	21.00	21.99	16.80	15.71	12.00	19.79	21.00	11.00	16.80	7.85	12.00	70
	62.20		34.56		24.68		31.10		17.28		12.34		**110**
	135.72		75.40		53.86		67.86		37.70		26.93		240
M16	56.30	39.00	31.28	31.20	22.34	22.29	26.14	39.00	14.52	31.20	10.37	22.29	80
	87.96		48.87		34.91		42.22		23.46		16.75		**125**
	225.19		125.11		89.36		104.55		58.08		41.49		320
M20	73.51	61.00	35.01	48.80	25.00	34.86	33.93	61.00	16.16	48.80	11.54	34.86	90
	138.86		66.12		47.23		63.90		30.41		21.72		**170**
	326.73		155.58		111.13		150.80		71.81		51.29		400
M24	90.48	88.00	43.08	70.40	30.77	50.29	41.47	88.00	19.75	70.40	14.11	50.29	100
	190.00		90.48		64.63		85.50		40.71		29.10		**210**
	434.29		206.81		147.72		199.05		94.79		67.70		480
M27	111.97	115.00	53.32	92.00	38.08	65.71	51.32	115.00	24.44	92.00	17.46	65.71	110
	244.29		116.33		83.09		107.49		51.18		36.56		**240**
	549.65		261.74		186.96		251.92		119.96		85.69		540
M30	135.72	142.50	64.63	114.00	46.16	81.43	62.20	142.50	29.62	114.00	21.16	81.43	120
	316.67		150.80		107.71		133.00		63.33		45.24		**280**
	678.59		323.14		230.81		311.02		148.10		105.79		600
M33	148.25	173.50	70.60	138.80	50.43	99.14	67.39	173.50	32.09	138.80	22.92	99.14	130
	342.12		162.91		116.37		140.27		66.80		47.71		**300**
	752.66		358.41		256.01		342.12		162.91		116.37		660
M36	174.74	212.50	83.21	170.00	59.43	121.43	76.34	212.50	36.35	170.00	25.97	121.43	150
	396.07		188.60		134.72		154.47		73.56		52.54		**340**
	838.73		399.40		285.28		366.44		174.49		124.64		720

Table notes : see back page

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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	0.65	0.60	0.57	0.55
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	0.44
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

Table notes : see back page

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Characteristic and Design Load resistances for REBAR based on characteristic bond strengths for hef 4d (min embedment) to 20d

	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embed-ment
Rebar	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	(mm)
Ø (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							**80**
	44.23		24.57		17.55								160
	20.73		11.52		8.23		Not Applicable		Not Applicable		Not Applicable		60
10	31.10	21.45	17.28	14.30	12.34	10.21							**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		47.87		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

Table notes : see back page

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Bond Strength Factors - REBAR

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
Concrete Strength N/mm2 (MPa)	C55/67	C60/75	C70/85	C80/96	C90/105	-	-	-
fc =	1.10	1.12	1.13	1.14	1.15	-	-	-

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
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

		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
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 I 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

Table notes : see back page

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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	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$	$N_{rk,\,s}$	$N_{rd,\,s}$
(mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
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	
Stud Diameter	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$
(mm)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
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	
Rebar Diameter	$N_{rk,\,s}$	$N_{rd,\,s}$	$V_{rk,\,s}$	$V_{rd,\,s}$
(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

Table notes : see back page

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Post installed rebar connections

Minimum anchorage length [1] and lap splice length for C20/25 and maximum installation length (l_{max})

Rebar		$l_{b,min}$ (mm)	$l_{0,min}$ (mm)	$l_{max,min}$ (mm)
Ø d_s	$f_{y,k}$ (N/mm^2)			
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/mm^2 = MPa

1) According to EN 1992-1-1:2004 $l_{b,min}$ (8.6) and $l_{0,min}$ (8.11) for good bond conditions and a_δ = 1,0 with maximum yield stress for rebar B500 B and γ_M = 1,15

Design values of the ultimate bond resistance f_{bd} [1] in N/mm^2 for all drilling methods for good conditions

Rebar Ø	Concrete Class								
Ø d_s	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/60	C50/60
8mm to 25mm	1.6	2	2.3	2.7	3	3.4	3.7	4	4.3

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.

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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: $V = 1.2 \cdot (d^2_0 - d^2_d) \cdot \prod \cdot l_b / 4$

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Post installed rebar schematics

Application examples of post-installed rebar

Figure 1: Overlap joints in slabs and beams.

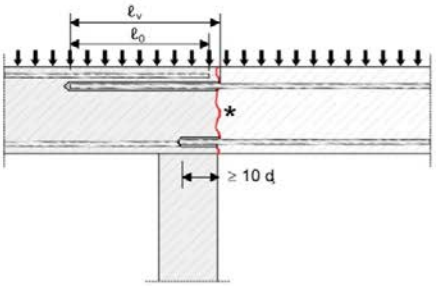


Figure 2: Overlap joint in foundation of a column or wall where the rebars are stressed in tension.

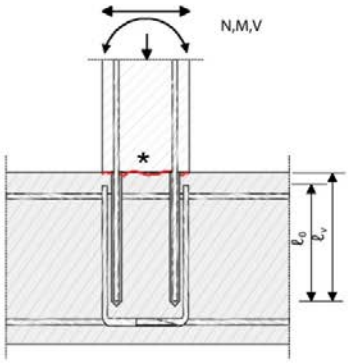


Figure 3: End anchoring of slabs or beams, designed as simply supported.

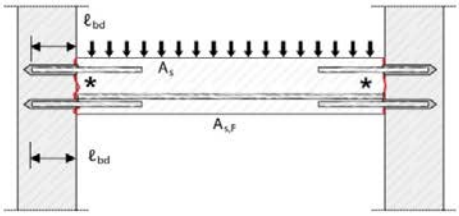


Figure 4: Rebar connection of components stressed primarily in compression. The rebar are stressed in compression.

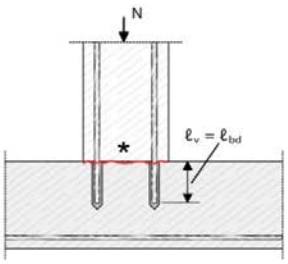
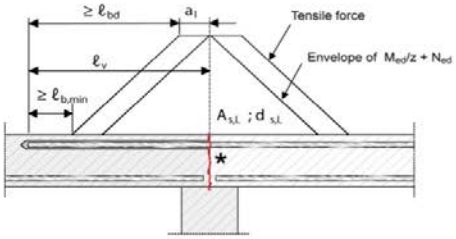


Figure 5: Anchoring of reinforcement to cover the line of acting tensile force.



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**

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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

SOLFIX 500

Pure Epoxy Resin Grout

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	x 2
15°C	60 min	1200 min	x 2
25°C	25 min	480 min	x 2
35°C	16 min	240 min	x 2
40°C	10 min	150 min	x 2

- 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 the anchor.

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)	Test Method
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/dm^3	-
Shrinkage	< 0.4%	-
VOC Content	A+ Rating	

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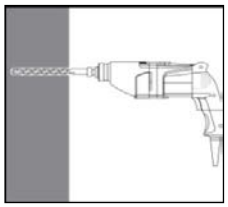
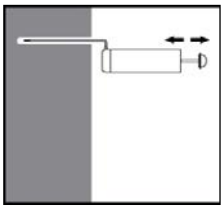
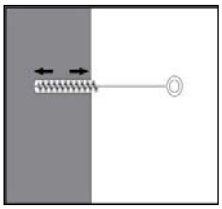
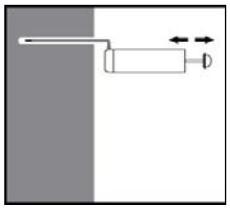
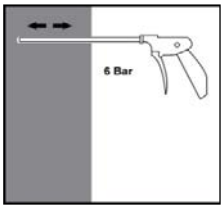
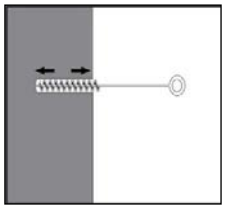
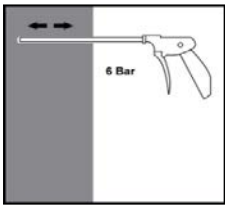
Installation parameters: drilling hole cleaning and installation

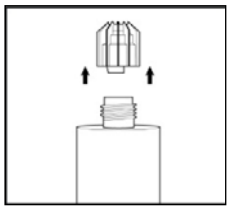
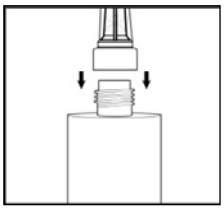
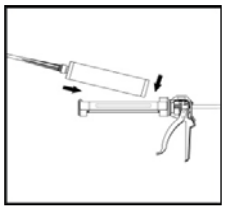
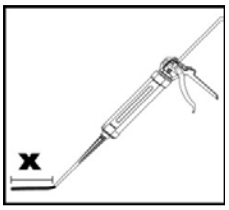
Drill hole in the substrate to the required embedment depth using the appropriately sized carbide drill bit. Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris. The manual pump shall be used for blowing out bore holes up to diameters do ≤ 24mm and embedment 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

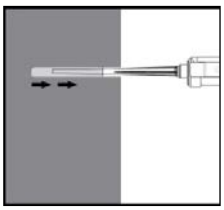
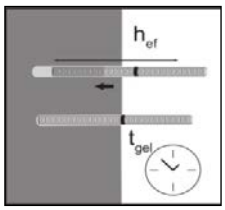


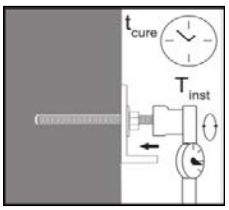



Blow 2 times from the back of the hole (if needed with a nozzle extension) over the whole length with oil-free compressed air (min. 6 bar at 6 m³/h). Brush 2 times with the specified brush size (see Table 6) by inserting the steel brush to the back of the hole (if needed with an extension) in a twisting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

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Notes

PAGE 2 :

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

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

h_{ef} range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm^2 (25MPa)

5.8 grade stud

Temperature range i maximum long term / short term temperature +24/40^{o}C

PAGE 3 :

Design Resistance with various stud strengths, material and rebar.

Note 1 for stainless steel tensile strength is 500N/mm^2 (500MPa)

Note 2 for stainless steel tensile strength is 700N/mm^2 (500MPa)

Data shown below the minimum embedment depth is for reference only. Please refer to manufacturer for advice.

PAGE 4 and 6 :

Characteristic and Design Load resistances based on characteristic bond strengths for hef 4d (minimum embedment) to 20d

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

h_{ef} range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm^2 (25MPa)

Temperature range i maximum long term / short term temperature +24/40^{o}C

PAGE 5 & 7 :

Bond Strength Factors

Select concrete strength and environmental condition and apply to bond strength table on page 4

PAGE 8 :

Material Properties for grades of other threaded rod and rebar

All grades shown for information

M30 studding is 8.8 grade instead of 5.8 grade

M30 for A4-70 tensile strength of 500N/mm^2, (500MPa) instead of 700N/mm^2 (700MPa)

Safety factor is 1.5 tension and 1.25 shear for all carbon steel

Safety factor is 1.56 for stainless steel, up to M24, M30 and M36 is 2.0

Safety factor is 1.4 tension and 1.5 shear for BSt 500 rebar

Partial Safety Factors Pages 2,3,4,5,6,7:

1.8 for 8mm-16mm rebar and studs

2.1 for 16mm and above rebar and studs