

# Specification Data

## Performance Data at Standard Embedment Depth

SIZE	CONCRETE, $f_{ck,cube} = 30N/mm^2$ (C20/25)									
	CHARACTERISTIC RESISTANCE (kN)		DESIGN RESISTANCE (Factored) (kN)		RECOMMENDED LOAD (Unfactored) (kN)		CHARACTERISTIC EDGE DISTANCE (mm)		CHARACTERISTIC SPACING (mm)	
	TENSION ( $N_{Rk}$ )	SHEAR ( $V_{Rk}$ )	TENSION ( $N_{Rd}$ )	SHEAR ( $V_{Rd}$ )	TENSION ( $N_{rec}$ )	SHEAR ( $V_{rec}$ )	TENSION ( $C_{cr,N}$ )	SHEAR ( $C_{cr,V}$ )	TENSION & SHEAR ( $S_{cr,N}$ )	TENSION & SHEAR ( $S_{cr,V}$ )
M8	9.5	9.9	4.1	7.9	2.9	5.7	60	80	80	80
M10	16.4	15.7	6.5	12.6	4.7	9.0	70	90	90	90
M12	25.7	22.9	9.7	18.3	6.9	13.1	80	110	110	110
M16	42.5	42.5	14.7	34.0	10.5	24.3	90	130	130	130
M20	52.0	66.8	17.6	53.4	12.6	38.2	110	150	150	150
M24	61.9	95.7	20.0	76.6	14.3	54.7	130	170	170	170

SIZE	RECOMMENDED LOAD (kN) (Unfactored) TENSION OR SHEAR ( $F_{rec}$ )			
	BRICKWORK 20.5N/mm <sup>2</sup>	BLOCKWORK 7N/mm <sup>2</sup>	BLOCKWORK 3.5N/mm <sup>2</sup>	BLOCKWORK 2.8N/mm <sup>2</sup>
M8	1.4	0.6	0.5	0.4
M10	2.9	1.3	0.9	0.7
M12	4.0	2.0	1.1	0.9
M16	5.0	3.0	SIZES ABOVE M12 ARE NOT RECOMMENDED	
M20	SIZES ABOVE M16 ARE NOT RECOMMENDED			
M24	SIZES ABOVE M16 ARE NOT RECOMMENDED			

For further explanations on calculations please see pages 10 and 11.

### Reduction Factors – Edge and Spacing Distances

The full characteristic edge and spacing distances shown in the table above are the minimum allowable for the quoted DESIGN RESISTANCE or RECOMMENDED LOAD, depending on your design method.

Where these dimensions are not achievable, the appropriate reduction factor/s from the tables below must be applied to the DESIGN RESISTANCE or RECOMMENDED LOAD. Choose the required bolt diameter across the top of

the appropriate table and read down the left hand column until actual edge or spacing distance is found. Read off the reduction factor where the two lines intersect (interpolate as required). Multiply this factor by the DESIGN RESISTANCE or RECOMMENDED LOAD quoted in the table. On the occasion that multiple close edge and/or spacing distances occur, the appropriate reduction factors must be applied.

### Edge Distance (Concrete)

EDGE (mm)	TENSILE : EDGE REDUCTION FACTORS						SHEAR : EDGE REDUCTION FACTORS					
	M8	M10	M12	M16	M20	M24	M8	M10	M12	M16	M20	M24
40	0.80						0.50					
50	0.90	0.83					0.62	0.56				
60	1.0	0.91	0.85				0.75	0.66	0.54			
70		1.0	0.92				0.87	0.78	0.64			
80			1.0	0.93			1.0	0.89	0.72	0.62		
90				1.0	0.89	0.85		1.0	0.82	0.69	0.60	
100					0.95	0.89			0.91	0.77	0.66	0.60
110					1.0	0.95			1.0	0.84	0.73	0.66
130						1.0				1.0	0.86	0.73
150											1.0	0.86
170												1.0

### Spacing (Concrete)

SPACING (mm)	TENSILE & SHEAR REDUCTION FACTORS						
	M8	M10	M12	M16	M20	M24	
40	0.80						
50	0.85	0.82					
60	0.90	0.87	0.82				
70	0.95	0.91	0.85				
80	1.0	0.95	0.89	0.85			
90		1.0	0.93	0.88	0.84		
100			0.96	0.91	0.87	0.84	
110				1.0	0.94	0.89	0.87
130					1.0	0.95	0.89
150						1.0	0.95
170							1.0

## Performance Data for Reinforcement Bars

If you are bonding rebar into reinforced concrete, where the size, position etc. of the reinforcing is known, then design principles contained within Eurocode 2 can be adopted instead of the design recommendations contained within this manual.

REBAR DIA. (mm)	HOLE DIA. (mm)	DESIGN RESISTANCE ( $F_d$ ) (kN)																					
		8	10	10.0	12.4	14.9	17.4	19.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	176
10	12		13.9	16.7	19.5	22.3	25.0	27.8	30.6	33.4	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	34.2	246		
12	15			18.3	21.3	24.4	27.4	30.5	33.5	36.6	39.6	42.7	45.7	48.8	49.2	49.2	49.2	49.2	49.2	49.2	323		
14	18				23.0	26.3	29.6	32.9	36.2	39.5	42.8	46.1	49.4	52.7	56.0	59.2	62.5	65.8	66.9	66.9	407		
16	20					28.1	31.7	35.2	38.7	42.2	45.7	49.3	52.8	56.3	59.8	63.3	66.9	70.4	73.9	77.4	497		
	DEPTH (mm)	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
20	25	39.3	44.3	49.2	54.1	59.0	68.8	78.7	88.5	98.3	108	118	128	137	137	137	137	137	137	137	137	137	694
25	32		53.0	58.3	63.6	74.2	84.8	95.4	106	117	127	138	148	170	191	212	214	214	214	214	214	214	1007
32	40			69.3	80.9	92.4	104	116	127	139	150	162	185	208	321	277	323	350	350	350	350	350	1514
40	50				99.3	112	124	137	149	161	174	199	224	248	298	348	397	447	497	546			2200
	DEPTH (mm)	200	225	250	275	300	350	400	450	500	550	600	650	700	800	900	1000	1200	1400	1600	1800	2000	2200

### Concrete Strength Class:

C20/25 (25N/mm<sup>2</sup> 150mm Cylinder; 30N/mm<sup>2</sup> 150mm Cube).

### Reinforcement Bar:

Minimum Yield Strength  $f_{yk}$  460N/mm<sup>2</sup>.

Note: Performance based on clean holes; blown and then brushed with a stiff nylon brush.

REBAR DIA. (mm)	HOLE DIA. (mm)	RECOMMENDED LOAD ( $F_{rec}$ ) (kN)																					
		8	10	6.7	8.3	9.9	11.6	13.3	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
10	12		9.3	11.1	13.0	14.9	16.7	18.5	20.4	22.3	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	22.8	246
12	15			12.2	14.2	16.3	18.3	20.3	22.3	24.4	26.4	28.5	30.5	32.5	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	323
14	18				15.3	17.5	19.7	21.9	24.1	26.3	28.5	30.7	32.9	35.1	37.3	39.5	41.7	43.9	44.6	44.6	44.6	44.6	407
16	20					18.7	21.1	23.5	25.8	28.1	30.5	32.9	35.2	37.5	39.9	42.2	44.6	46.9	49.3	51.6	53.9	56.3	497
	DEPTH (mm)	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500
20	25	26.2	29.5	32.8	36.1	39.3	45.9	52.5	59.0	65.5	72.1	78.7	85.3	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	91.1	694
25	32		35.3	38.9	42.4	49.5	56.5	63.6	70.7	78	85	92	99	113	127	141	142	142	142	142	142	142	1007
32	40			46.2	53.9	61.6	69.3	77	85	92	100	108	123	139	154	185	216	233	233	233	233	233	1514
40	50				66.2	74.5	83	91	99	108	116	132	149	166	199	232	265	298	331	364			2200
	DEPTH (mm)	200	225	250	275	300	350	400	450	500	550	600	650	700	800	900	1000	1200	1400	1600	1800	2000	2200