

technical information

cartridge and stud data

Thread diameter : mm (d)	Standard stud length : mm (l)	Standard embedment : mm (b <sub>o</sub> )	Hole diameter concrete : mm (d <sub>o</sub> )	Substrate thickness min : mm (h <sub>min</sub> )	Hole diameter in fixture : mm (d)	Recommended torque : Nm (T <sub>inst</sub> )	No of fixings per cartridge : (approx)
M8	110	80	10	110	9	11	72
M10	130	90	12	120	11	22	54
M12	160	110	14	140	13	38	36
M16	190	125	18	165	17	95	20
M20	260	170	24	220	22	170	6
M24	300	210	28	270	26	260	5
M30	380	280	35	340	33	480	2

Embedment depths are typical when using standard anchor studs and are for guidance only, deeper embedment depths may be adopted to suit the application and the length of anchor used.

performance data

In C20/25 - 30Nmm<sup>2</sup> concrete using standard embedment depths and 5.8Gr steel anchor studs in clean blown and brushed drill holes.

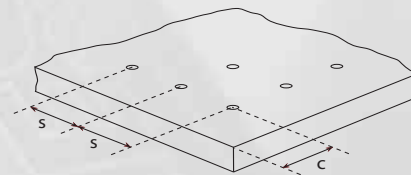
Size	Characteristic resistance : kN		Design resistance : kN		Recommended load kN	
	Tension : (N <sub>Rk</sub> )	Shear : (V <sub>Rk</sub> )	Tension : (N <sub>Ed</sub> )	Shear : (V <sub>Ed</sub> )	Tension : (N <sub>rec</sub> )	Shear : (V <sub>rec</sub> )
M8	19.98	10.10	7.99	8.08	5.71	5.77
M10	32.94	15.60	13.18	12.48	9.41	8.91
M12	47.98	23.10	19.19	18.48	13.71	13.20
M16	71.10	41.80	28.44	33.44	20.31	23.89
M20	101.30	66.80	40.52	53.44	28.94	38.17
M24	129.77	95.70	51.91	76.56	37.08	54.69
M30	201.60	153.00	80.64	122.40	57.60	87.43

All load data calculated using the Partial Safety Factor concept and to Eurocode 1 standard. For engineers preferring to use the Global Safety Factor approach the Characteristic Resistance loads are 95% of the Ultimate load values and Recommended Loads remain constant for both methods.

edge distance and spacings

In C20/25 - 30Nmm<sup>2</sup> concrete

Size	Characteristic edge distance : mm (C)		Characteristic spacing : mm (S)
	Tension : (C <sub>cr,N</sub> )	Shear : (C <sub>cr,V</sub> )	Tension and shear : (S <sub>cr</sub> )
M8	80	100	100
M10	90	130	130
M12	110	150	140
M16	130	170	170
M20	150	190	210
M24	190	240	240
M30	300	350	350



Edge and anchor centre spacings quoted are the minimum distances required either between anchors or an anchors distance from the substrates free edge to achieve the load values detailed above in concrete

## reduction factors

Where characteristic edge and spacing distances are not achievable and closer spacings are required, the appropriate reduction factor from the following tables must be applied to the Design Resistance or Recommended Load.

To use the tables select the required bolt diameter across the top of the table and the actual edge or spacing distance from the left column. The figure at the intersecting point is the Reduction Factor and should be multiplied by the Design Resistance or the Recommended Load to give the correct load data for the required spacing.

## edge distance

In C20/25 - 30Nmm<sup>2</sup> concrete

Edge distance - remote from a free edge : mm	Tensile load : edge reduction factors						Shear load : edge reduction factors					
	M8	M10	M12	M16	M20	M24	M8	M10	M12	M16	M20	M24
50	0.77						0.50					
60	0.85	0.80					0.60	0.50				
70	0.92	0.87	0.78				0.70	0.58	0.50			
80	1.00	0.93	0.84				0.80	0.66	0.57			
90		1.00	0.89	0.82			0.90	0.75	0.64	0.56		
100			0.95	0.86	0.80		1.00	0.83	0.71	0.62	0.56	
110			1.00	0.91	0.84	0.77		0.92	0.78	0.69	0.61	0.50
130				1.00	0.92	0.83		1.00	0.92	0.81	0.72	0.59
150					1.00	0.90			1.00	0.94	0.83	0.68
170						0.97				1.00	0.94	0.77
190						1.00					1.00	0.86
210												0.95
240												1.00

## centre spacing

In C20/25 - 30Nmm<sup>2</sup> concrete

Spacing distances : mm	Tensile and Shear load reduction factors					
	M8	M10	M12	M16	M20	M24
50	0.80					
60	0.84	0.80				
70	0.88	0.83	0.80			
80	0.92	0.87	0.83			
90	0.96	0.90	0.86	0.81		
100	1.00	0.93	0.88	0.84	0.80	
110		0.97	0.91	0.86	0.82	0.79
130		1.00	0.97	0.91	0.86	0.82
150			1.00	0.95	0.90	0.85
170				1.00	0.94	0.88
190					0.98	0.92
210					1.00	0.95
240						1.00

## curing times

Substrate temperature : °C	Gel Time : mins	Minimum load time : mins
25	3	30
15	6	35
5	12	50
-5	50	90

Full cure achieved after 6 - 24 hours dependant on site conditions, however fixtures may be installed after the minimum load time has elapsed

## handling and storage

Store in dry conditions in original packaging in a well ventilated area +5°C to +25°C.

Do not expose to direct sunlight, storage at higher temperatures may reduce the product shelf life.

## ultimate physical properties

compressive strength ASTM 695	-	58.4 N/mm <sup>2</sup>
tensile strength ASTM 638	-	14.5 N/mm <sup>2</sup>
flexural strength ASTM 790	-	26.5 N/mm <sup>2</sup>
elastic modulus	-	4941 N/mm <sup>2</sup>
flexural modulus	-	4472 N/mm <sup>2</sup>
mixed density	-	1.65 g/cm <sup>3</sup>