

Design Data

Concrete

Loads shown are for 30N/mm² (C20/25) concrete.

For other grades of concrete between 20 and 50N/mm² where the anchor is in tension the load can be calculated using the following empirical formula:

$$\text{Tensile SWL in } 30\text{N/mm}^2 \text{ Concrete} \times \sqrt{\frac{\text{Actual Concrete Strength}}{30}}$$

This calculation is not valid for shear.

Edge and Spacing Distances

The loads shown are applicable to characteristic edge and spacing distances. For reduced edge and spacing distances, reduction factors must be calculated from the appropriate tables below.

Combined Load (concrete only)

When selecting an anchor which will carry a combined load, ensure that the bolt size selected satisfies the following equation:

$$\frac{\text{Applied Tensile Load}}{\text{Safe Static Tensile Load}} + \frac{\text{Applied Shear Load}}{\text{Safe Static Shear Load}} \leq 1.2$$

(Edge and spacing reduction factors, if applicable, should be applied to the safe tensile and safe shear loads).

Performance Data at Standard Embedment Depth

SIZE	CONCRETE 30N/mm ² (C20/25)							BLOCKWORK 20.5N/mm ²	BLOCKWORK 7N/mm ²	BLOCKWORK 3.5N/mm ²	BLOCKWORK 2.8N/mm ²
	SAFE WORKING LOAD (kN)		FAILURE LOAD (kN)		CHARACTERISTIC EDGE DISTANCE (mm)		CHARACTERISTIC SPACING TENSION & SHEAR (mm)				
	TENSION	SHEAR	TENSION	SHEAR	TENSION	SHEAR					
M8	3.6	3.8	13.3	11.4	80	100	100	1.4	0.6	0.5	0.4
M10	6.2	6.0	25.2	18.1	90	130	130	2.9	1.3	0.9	0.7
M12	9.3	8.8	37.3	26.3	110	150	150	4.0	2.0	1.1	0.9
M16	12.6	16.3	55.0	49.0	130	170	170	5.0	3.0	Sizes above M12 are not recommended	
M20	15.1	22.7	70.5	76.2	150	190	210	Sizes above M16 are not recommended			
M24	22.5	36.6	87.1	109.8	190	240	240				

Reduction Factors - Edge and Spacing Distances

The characteristic edge and spacing distances quoted in the table above are the minimum allowable for the quoted safe loads to apply. Where the design dictates reduced edge and spacing distances, the appropriate reduction factor/s from the tables below must be applied to the safe working load. Choose the required bolt diameter across the top of the 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 safe working 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	
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	1.0	0.93	0.84				0.80	0.66	0.57				
90		1.0	0.89	0.82			0.90	0.75	0.64	0.56			
100			0.95	0.86	0.80		1.0	0.83	0.71	0.62	0.56		
110			1.0	0.91	0.84	0.77		0.92	0.78	0.69	0.61	0.50	
130				1.0	0.92	0.83		1.0	0.92	0.81	0.72	0.59	
150					1.0	0.90			1.0	0.94	0.83	0.68	
170						0.97				1.0	0.94	0.77	
190											1.0	0.86	
210												0.95	
240													1.0

Spacing (Concrete)

SPACING (mm)	TENSILE & SHEAR 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	1.0	0.93	0.88	0.84	0.80	
110		0.97	0.91	0.86	0.82	0.79
130		1.0	0.97	0.91	0.86	0.82
150			1.0	0.95	0.90	0.85
170				1.0	0.94	0.88
190					0.98	0.92
210					1.0	0.95
240						1.0