

Design Data

Concrete

Loads shown are for 30N/mm² (C20/25) concrete.
For other grades of concrete between 20 and 50N/mm² where 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.

Performance Data

SIZE	CONCRETE 30N/mm ² (C20/25)							
	SAFE WORKING LOAD (kN)		FAILURE LOAD (kN)		CHARACTERISTIC EDGE DISTANCE (mm)		CHARACTERISTIC SPACING (mm)	
	Tension	Shear	Tension	Shear	Tension	Shear	Tension & Shear	
M4.5	1.6	2.0	6.1	4.6	60	60	60	
M6	2.3	3.3	9.5	7.3	70	80	80	
M8	3.4	5.2	11.2	12.4	80	100	100	
M10	4.4	7.5	15.4	19.6	100	120	120	
M12	5.3	9.5	18.7	28.5	120	160	160	
M16	7.0	16.0	21.1	53.0	140	200	200	

Performance Data

SIZE	BRICKWORK 20.5N/mm ²				BLOCKWORK 14N/mm ²				BLOCKWORK 7N/mm ²			
	SAFE WORKING LOAD (kN)		FAILURE LOAD (kN)		SAFE WORKING LOAD (kN)		FAILURE LOAD (kN)		SAFE WORKING LOAD (kN)		FAILURE LOAD (kN)	
	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
M4.5	0.6	1.4	3.0	6.6	0.6	2.0	1.7	6.0	0.5	1.1	2.0	3.3
M6	0.9	1.5	4.3	7.1	1.6	2.8	5.4	7.5	0.8	1.2	3.2	3.5
M8	1.2	1.6	5.9	7.8	2.3	3.7	6.8	12.8	1.0	1.3	4.0	3.8
M10	1.6	1.7	7.6	8.5	3.0	4.5	8.7	14.0	1.4	1.4	5.6	4.2
M12	1.9	1.9	9.1	9.2	3.0	5.8	8.8	18.0	1.9	1.5	8.0	4.6

Sizes above M12 are not recommended in these base materials

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.

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).

Brickwork and Blockwork

Loads shown are for 20.5N/mm² brickwork, 7 and 14N/mm² blockwork. The anchor should be positioned 300mm from the vertical edge of the wall and 300mm down from the top of an unrestrained wall. Embedment should be limited to within 30mm of the remote face.

Mortar joints should be avoided.

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					
	M4.5	M6	M8	M10	M12	M16	M4.5	M6	M8	M10	M12	M16
40	0.75											
50	0.87	0.79					0.79	0.53				
60	1.0	0.89	0.81				1.0	0.69	0.50			
70		1.0	0.91	0.77				0.84	0.62	0.48		
80			1.0	0.85				1.0	0.75	0.58		
90				0.92	0.81				0.67	0.69	0.45	
100				1.0	0.87				1.0	0.79	0.53	
120					1.0	0.89			1.0	0.69	0.50	
140						1.0				0.84	0.62	
160										1.0	0.75	
180											0.87	
200												1.0

Spacing (Concrete)

SPACING (mm)	TENSILE & SHEAR REDUCTION FACTORS					
	M4.5	M6	M8	M10	M12	M16
40	0.80					
50	0.90	0.77				
60	1.0	0.85	0.76			
70		0.92	0.82	0.75		
80		1.0	0.88	0.80		
90			0.94	0.85	0.74	
100			1.0	0.90	0.77	
120				1.0	0.85	0.76
140					0.92	0.82
160					1.0	0.88
180						0.94
200						1.0