

# THROUGH BOLTS - TECHNICAL DATA



Product Information	Material	Typical Applications					
<p>High performance torque controlled expansion anchor suitable for concrete (non cracked concrete) &amp; some natural stone</p> <p>Tests were carried out by <b>Imperial College Consultants</b> in accordance with the tests procedure given in Annex A: ETAG 001,1997</p>	<p>Bolt: 5.8 Grade steel (C1035)</p> <p>Nuts DIN 934 Washers DIN 125</p> <p>Plating. Available with: 1. Zinc &amp; Clear passivation 2. Hot Dipped Galvanized.</p>	<p>Structural steel Storage systems Barriers &amp; Balustrades Racking systems Hand rails</p>					
Mechanical Properties of TIMCO Through Bolt - Zinc & Hot Dipped Galvanized							
Anchor Properties	Anchor Size						
	M6	M8	M10	M12	M16	M20	M24
$f_{uk}$ [N/mm <sup>2</sup> ] Nominal tensile Strength	550	550	550	550	550	550	550
$f_{yk}$ [N/mm <sup>2</sup> ] Yield Strength	400	400	400	400	400	400	400
$A_s$ [mm <sup>2</sup> ] Stress Crossed Section	20.1	36.6	58	84.3	157	244.9	353
$W_{el}$ [mm <sup>3</sup> ] Effective moment resistance	12.5	31.3	62.2	109.2	277.6	540.7	935.4
$V_R$ [kN] Shear resistance	7.0	13.1	20.7	30.1	56.1	87.6	126.2
$M_d$ [Nm] Design bending moment	6.7	16.5	32.9	57.6	146.5	285.5	475.7
$M_d = 1.2 W_{el} f_{uk} / Y_{ms}$				$Y_{ms} = 1.25$			

RANGE DATA									
Properties				Standard Embedment			Deeper Embedment		
Size	Hole Size Diameter mm	Anchor Length	Head Code	Drill Hole Depth mm	Max Fixture Thickness	Effective Embedment Depth mm	Drill Hole Depth mm	Max Fixture Thickness	Effective Embedment Depth mm
6x45	6	45	<b>A</b>	35	5	25	~	~	~
6x55	6	55	<b>B</b>	35	15	25	45	5	35
6x85	6	85	<b>E</b>	35	45	25	45	35	35
8x50	8	50	<b>B</b>	40	5	30*	~	~	~
8x65	8	65	<b>C</b>	45	10	35	55	2	45
8x80	8	80	<b>E</b>	45	25	35	55	15	45
8x100	8	100	<b>G</b>	45	45	35	55	35	45
8x130	8	130	<b>J</b>	45	75	35	55	65	45
10x65	10	65	<b>C</b>	50	5	40*	~	~	~
10x75	10	75	<b>D</b>	55	10	45	60	5	50*
10x100	10	90	<b>G</b>	55	35	45	70	20	60
10x120	10	120	<b>I</b>	55	55	45	70	40	60
12x80	12	80	<b>E</b>	65	5	50	~	~	~
12x100	12	100	<b>G</b>	65	25	50	85	5	70
12x120	12	120	<b>I</b>	65	45	50	85	25	70
12x140	12	140	<b>K</b>	65	65	50	85	45	70
12x180	12	180	<b>O</b>	65	105	50	85	85	70
16x105	16	105	<b>G</b>	80	5	60*	~	~	~
16x125	16	125	<b>I</b>	85	20	65	100	5	80*
16x150	16	150	<b>L</b>	85	45	65	105	25	85
16x175	16	180	<b>N</b>	85	70	65	105	50	85
20x130	20	130	<b>J</b>	105	5	75*	~	~	~
20x160	20	160	<b>M</b>	105	30	80	125	10	100
20x215	20	215	<b>R</b>	105	85	80	125	65	100
24x180	24	180	<b>O</b>	125	30	95	145	5	120
24x260	24	260	<b>W</b>	125	110	95	145	85	120

\* NB reduced embedment

# THROUGH BOLTS - Performance Data (Standard Embedment)

## PERFORMANCE DATA

Size	Clearance hole	Performance at Standard Embedment C20/25 concrete *						Normal Centre Spacing	Normal Edge Distance [see tables]	Drive Type	Rec Torque
		Average Ultimate Loads kN		Characteristic Load kN		Recommended Loads kN					
mm		Tensile	Shear	Tensile	Shear	Tensile	Shear	mm	mm	AF Socket	Nm
		Standard Embedment									
M6	7	~	~	~	~	1.3	1.9	75	40 / 50	10	7
M8	9	18.43	13.91	13.22	11.89	4.2	4.7	105	55 / 70	13	15
M10	12	19.32	20.05	14.52	16.84	4.4	6.7	135	70 / 90	17	30
M12	14	29.76	30.94	20.02	27.84	6.6	11.1	150	75 / 100	19	45
M16	18	52.02	64.74	40.75	58.72	13.5	23.4	195	100 / 130	24	100
M20	22	53.84	74.78	47.98	66.36	15.0	26.5	240	120 / 160	30	160
M24	26	60.47	113.97	54.43	102.09	18.1	40.8	285	150 / 190	36	340

\* figures for the reduced embedment not included

### CENTRE TO CENTRE SPACING: For Tensile and Shear loads

Through bolt: Standard embedment: Axial spacing Tension & Shear

	M6	M8	M10	M12	M16	M20	M24
<b>Axial mm</b>							
35	0.73	0.67					
45	0.80	0.71	0.67				
50	0.83	0.74	0.69	0.67			
65	0.93	0.81	0.74	0.72	0.67		
75	1.00	0.86	0.78	0.75	0.69		
80		0.88	0.80	0.77	0.67	0.67	
95		0.95	0.85	0.82	0.74	0.70	0.67
105		1.00	0.89	0.85	0.77	0.72	0.68
135			1.00	0.95	0.85	0.78	0.74
150				1.00	0.88	0.81	0.76
195					1.00	0.91	0.84
240						1.00	0.92
285							1.00
Smin	35	35	45	50	65	80	95
S <sub>cr,N</sub>	75	105	135	150	195	240	285
H min	90	100	100	100	125	160	190
hef	25	35	45	50	65	80	95

### Notes

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### EDGE DISTANCE: Tensile loads and Shear loads away from edge

Through bolt: Standard embedment: Edge Distance / Tension

	M6	M8	M10	M12	M16	M20	M24
<b>Edge mm</b>							
35	0.85						
40	1.00	0.80					
50		0.95	0.79				
55		1.00	0.85	0.79			
65			0.95	0.88			
70			1.00	0.93	0.78		
75				1.00	0.81		
85					0.89	0.77	
100					1.00	0.77	0.77
110						0.92	0.82
120						1.00	0.87
145							1.00
Cmin	35	40	50	55	70	85	100
C <sub>cr,N</sub>	40	55	70	75	100	120	145
H min	90	100	100	100	125	160	200
hef	25	30	45	50	65	80	95

### EDGE DISTANCE: Shear loads towards edge

Through bolt: Standard embedment: Edge Distance / Shear

	M6	M8	M10	M12	M16	M20	M24
<b>Edge mm</b>							
35	0.68						
40	0.78	0.68					
45	0.88	0.73					
50	1.00	0.79	0.67				
55		0.84	0.71	0.67			
70		1.00	0.83	0.78	0.66		
85			0.96	0.89	0.74	0.65	
90			1.00	0.92	0.77	0.68	
100				1.00	0.83	0.72	0.65
110					0.88	0.77	0.69
120					0.94	0.81	0.73
130					1.00	0.86	0.77
160						1.00	0.88
190							1.00
Cmin	35	40	50	55	70	85	100
C <sub>cr,V</sub>	50	70	90	100	130	160	190
H min	90	100	100	100	125	160	200
hef	25	35	45	50	65	80	95

# THROUGH BOLTS - Performance Data (Deeper Embedment)

## PERFORMANCE DATA

Size	Clearance hole	Performance at Deeper Embedment C20/25 concrete *						Normal Centre Spacing	Normal Edge Distance [see tables]	Drive Type	Rec Torque
		Average Ultimate Loads kN		Characteristic Load kN		Recommended Loads kN					
mm		Tensile	Shear	Tensile	Shear	Tensile	Shear	mm	mm	AF Socket	Nm
M6	7	~	~	~	~	1.9	1.9	105	55 / 70	10	7
M8	9	20.69	13.91	14.39	11.89	4.8	4.7	135	70 / 90	13	15
M10	12	29.72	20.05	19.55	16.84	6.5	6.7	180	95 / 120	17	30
M12	14	44.58	30.94	39.16	27.84	13.0	11.1	210	110 / 140	19	45
M16	18	53.02	64.74	46.61	58.72	16.1	23.4	255	130 / 170	24	100
M20	22	68.01	74.78	48.38	66.36	17.0	26.5	300	155 / 200	30	160
M24	26	87.07	113.97	70.10	102.09	23.4	40.8	360	185 / 240	36	340

\* figures for the reduced embedment not included

### CENTRE TO CENTRE SPACING: For Tensile and Shear loads

#### Through bolt: Deeper embedment: Axial spacing Tension & Shear

	M6	M8	M10	M12	M16	M20	M24
<b>Axial mm</b>							
40	0.69						
45	0.71	0.67					
60	0.79	0.72	0.67				
70	0.83	0.76	0.69	0.67			
85	0.90	0.81	0.74	0.70	0.67		
105	1.00	0.89	0.79	0.75	0.71	0.68	
120		0.94	0.83	0.79	0.74	0.70	0.67
135		1.00	0.88	0.82	0.76	0.73	0.69
180			1.00	0.93	0.85	0.80	0.75
210				1.00	0.91	0.85	0.79
255					1.00	0.93	0.85
300						1.00	0.92
360							1.00
<b>Smin</b>	40	45	60	70	85	105	120
<b>S<sub>cr,N</sub></b>	105	135	180	210	255	300	360
<b>H min</b>	90	100	100	140	190	200	240
<b>hef</b>	35	45	60	70	85	100	120

### Notes

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### EDGE DISTANCE: Tensile loads and Shear loads away from edge

#### Through bolt: Deeper embedment: Edge Distance / Tension

	M6	M8	M10	M12	M16	M20	M24
<b>Edge mm</b>							
45	0.88						
50	0.95	0.79					
55	1.00	0.85					
65		0.95	0.78				
70		1.00	0.82				
75			0.86	0.77			
90			0.98	0.88	0.77		
95			1.00	0.91	0.80		
105				0.98	0.85	0.76	
110				1.00	0.88	0.79	
130					1.00	0.88	0.78
155						1.00	0.88
185							1.00
<b>Cmin</b>	45	50	65	75	90	105	130
<b>C<sub>cr,V</sub></b>	55	70	95	110	130	155	185
<b>H min</b>	90	100	100	140	190	200	240
<b>hef</b>	35	45	60	70	85	100	120

### EDGE DISTANCE: Shear loads towards edge

#### Through bolt: Deeper embedment: Edge Distance / Shear

	M6	M8	M10	M12	M16	M20	M24
<b>Edge</b>							
45	0.67						
50	0.71	0.67					
65	0.92	0.79	0.66				
70	1.00	0.83	0.69				
75		0.88	0.72	0.66			
90		1.00	0.81	0.73	0.65		
110			0.94	0.84	0.74	0.67	
120			1.00	0.89	0.78	0.70	
140				1.00	0.87	0.78	0.69
170					1.00	0.89	0.78
200						1.00	0.88
240							1.00
<b>Cmin</b>	45	50	65	75	90	110	140
<b>C<sub>cr,V</sub></b>	70	90	120	140	170	200	240
<b>H min</b>	90	100	100	140	190	200	240
<b>hef</b>	35	45	60	70	85	100	120