

INFORMATION SHEET

STRUCTURAL CONNECTIONS

BOLTS, COACH BOLTS, COACH SCREWS AND DOWELS STANDARD LENGTHS AND SIZES

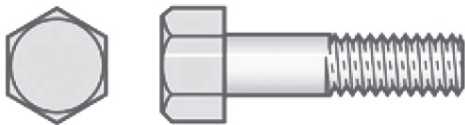
The information provided below has been taken from the New Zealand Timber Design Guide 2007, published by the Timber Industry Federation and edited by Professor A H Buchanan. To purchase a copy of the Timber Design Guide, visit www.nztif.co.nz

BOLTS AND COACH BOLTS

Bolts are manufactured with shank diameters from 8 mm to 30 mm, and lengths up to 400 mm, as shown in table 1. Coach bolt sizes are shown in table 2.

If particularly long bolts are required, it can be more economical to use dowels or threaded rod than to have bolts specially made.

Table 1: Summary of selected available sizes of hexagonal head bolts (mm)



Bolt diameter							
M8	M10	M12	M14	M16	M20	M24	M30
X 35	X 40	X 40	X 50	X 50	X 55	X 70	X 80
X 40	X 45	X 45	X 60	X 55	X 60	X 80	X 90
X 45	X 50	X 50	X 70	X 60	X 65	X 90	X 100
X 50	X 55	X 55	X 80	X 65	X 70	X 100	X 110
X 55	X 60	X 60	X 90	X 75	X 75	X 110	X 120
X 60	X 65	X 65	X 100	X 80	X 80	X 120	X 140
X 65	X 70	X 70	X 120	X 90	X 90	X 130	X 180
X 70	X 75	X 75	X 140	X 100	X 100	X 140	
X 75	X 80	X 80	X 150	X 110	X 110	X 150	
X 80	X 90	X 90		X 120	X 120	X 160	
X 90	X 100	X 100		X 130	X 130	X 170	
X 95	X 110	X 110		X 140	X 140	X 180	
X 100	X 120	X 120		X 150	X 150	X 200	
X 110	X 130	X 130		X 160	X 160	X 220	
X 120	X 140	X 140		X 170	X 170	X 240	
X 130	X 150	X 150		X 180	X 180		
X 140	X 160	X 160		X 190	X 200		
X 150	X 170	X 170		X 200	X 220		
X 160	X 180	X 180		X 220	X 230		

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Bolt diameter							
M8	M10	M12	M14	M16	M20	M24	M30
X 170	X 200	X 190		X 230	X 240		
X 180	X 210	X 200		X 240	X 250		
X 200	X 220	X 220		X 250	X 260		
X 220	X 240	X 240		X 260	X 270		
		X 250		X 270	X 280		
		X 260		X 280	X 290		
		X 280		X 290	X 300		
		X 300		X 300			
		X 350		X 350			
		X 400					

Table 2: Summary of available sizes of coach bolts (mm)



Coach bolt diameter			
M8	M10	M12	M16
X 20	X 30	X 60	X 180
X 25	X 40	X 70	X 200
X 30	X 50	X 80	X 220
X 40	X 60	X 100	X 240
X 50	X 70	X 110	X 260
X 60	X 80	X 120	X 300
X 80	X 90	X 130	X 360
	X 100	X 140	
	X 110	X 150	
	X 120	X 160	
		X 170	
		X 180	
		X 200	
		X 220	
		X 240	
		X 260	
		X 280	
		X 300	
		X 360	
		X 400	

Washers

Washers are normally used in bolted joints but cannot be used under the heads of coach bolts.

Washers improve joint strength rather than joint stiffness, because they provide an axial load capacity that comes into play at large joint deformations.

The recommended size of washers is a side length (or diameter) of about 3d and a thickness of 0.3d, where d is the bolt diameter.

Table 3 lists recommended washer dimensions for common bolt sizes; only those with dimensions listed in bold italic are currently available.

Circular washers should have a thickness or area not less than that specified for square washers.

Some authorities believe the New Zealand standard washers are too small and recommend washer sizes from the Australian Timber Structures Standard AS 1720.

Table 3: Washer dimensions for common bolt sizes (from NZS 3603)

		Without tension loads							
Bolt shank diameter (mm)		8	10	12	16	20	24	30	36
Washer dimension (mm)	Square	20x20x1.5	<i>50x50x3</i>		<i>50x50x6</i>			65x65x5	
	Round	Ø 25 x 1.5	Ø 40 x 3		Ø 60 x 4			Ø 75 x 5	

		Without tension loads							
Bolt shank diameter (mm)		8	10	12	16	20	24	30	36
Washer dimension (mm)	Square	30x30x2	<i>50x50x5</i>		<i>65x65x6</i>			85x85x7	
	Round	Ø 30 x 2	Ø 55 x 4		Ø 75 x 6			Ø 100 x 7	

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Bolts loaded in axial tension may need larger sizes of washers, as shown in table 3.

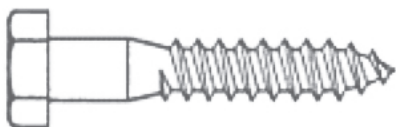
The range of bolt sizes, from 8 mm to 30 mm, is much wider than for washers, so when bolts do not have corresponding washers available, they can be specially made or the nearest size used.

When washers are used in tension, crushing of the timber under the washer needs to be checked.

COACH SCREWS

Coach screws are available in New Zealand in a wide range of sizes, as listed in table 4. Coach screws usually have galvanised surface protection.

Table 4: Available sizes of coach screws in New Zealand



Length (mm) of coach screw				
Shank diameter	6 mm	8 mm	10 mm	12 mm
	X 40	X 40	X 40	X 40
	X 50	X 50	X 50	X 50
	X 65	X 65	X 65	X 65
	X 75	X 75	X 75	X 75
	X 90	X 90	X 90	X 90
	X 100	X 100	X 100	X 100
	X 120		X 120	X 120
	X 130		X 130	X 130
	X 150		X 150	X 150
	X 180		X 180	X 180
	X 200			X 200