

# FIXINGS RATIONALISED

**Fixings are the Achilles heel of timber buildings. Wind and other damaging hazards find the weakest link in the building, and failure will start there. This is almost always the fixings.**

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**D**esigners will, with some incentive, use selection tables to arrive at suitable sizes for most principal members. Fixings, however, are ignored or left to the builder. Downwards gravity loads are fairly self-evident to the person on the job, but uplift due to wind loads is not particularly intuitive.

For these reasons, NZS 3604 has tables of fixings covering different situations. After several revisions, these were fragmented in NZS 3604:1999 and inconsistent through the document.

Table 2.2 has it all

NZS 3604:2011 has rationalised all of the fixings used throughout the standard into Table 2.2 (see Table 1). A type E fixing, for example, is always 2 skew nails plus 2 wire dogs in the configuration shown in Figure 1, wherever it is used.

The first two columns give the fixing type and description (which is consistent throughout the standard). The third column gives the capacity of the fixing (which must be equalled or exceeded by any alternative), and the last column lists the tables where the fixing is used. Fixings within each grouping by colour shading are the same configuration, but in increasing order of capacity.

## Fixing type ≠ fastener

Note that a fixing type is not the same as the fastener used to construct the fixing. Each



Figure 1: Type E fixing used in NZS 3604:2011 is always 2 skew nails plus 2 wire dogs in this configuration.

fixing type has a unique capacity depending on its configuration, load direction and in-service environment. For example, 2/M12 bolts are used in fixing types I and O. Fixing type I is used to connect a ridge beam to its supporting studs in a dry internal environment, whereas type O is used to connect a veranda beam to a post

that may be exposed to the weather and uses reduced properties appropriate for timber with a moisture content greater than 18%.

The basis of the fixing capacities and the way they were derived will be updated in the BRANZ report *The engineering basis of NZS 3604*, which will be published shortly. ◀

**Table 1: Fixing type and capacity reference guide (Table 2.2 from NZS 3604:2011 Timber-framed buildings, reproduced with permission from Standards New Zealand).**

Fixing type	Description	Alternative fixing capacity (kN)	See table
A	2/90 × 3.15 end nails	0.7	8.18
B	2/90 × 3.15 end nails + 2 wire dogs	4.7	
C	2/90 × 3.15 end nails + strap fixing (see Figure 8.12)	8.5	
D	4/90 × 3.15 end nails + 2 strap fixing (double stud)	16.0	
E	2/90 × 3.15 skew nails + 2 wire dogs	4.7	10.1, A10.1, 10.7, A10.7, 10.11, A10.11 10.14, 10.15, 15.6, A15.6, 15.10, A15.10
F	2/90 × 3.15 skew nails + strap fixing (see Figure 10.6)	7.0	
G	10/90 × 3.15 nails (5 each side)	4.7	10.2, A10.2, 15.7, A15.7
H	1/M12 bolt	8.5	
I	2/M12 bolts	16.0	
J	2/M16 bolts	24.0	
K	6/90 × 3.15 nails	3.0	10.5, A10.5
L	2/M12 bolts	9.8	
M	2/M16 bolts	13.0	
N	6/100 × 4.0 HDG nails (hand driven)	4.7	10.8, A10.8, 15.8, A15.8
O	2/M12 bolts (see Figure 9.3 (C))	6.8	
P	2 HDG 'flat' straps (see Figure 9.3 (B))	13.7	
Q	2 HDG 'tee' straps (see Figure 9.3 (A))	25.5	
R	1/90 × 3.15 nail	0.55	10.10, A10.10, 10.12, A10.12, 15.9, A15.9
S	2/90 × 3.15 nails	0.8	
T	1/10 g self-drilling screw, 80 mm long	2.4	
U	1/14 g self-drilling type 17 screw, 100 mm long	5.5	

Note: Capacities are associated with fixing type, not fasteners. See individual selection tables for the appropriate fixing type for the application.