Southwest
New Brunswick
Service Commission

Standard wood-frame construction requires a lot of nails. Here are the nailing requirements for most timber-frame construction, along with a few other items worth knowing.

Construction Detail	Minimum Length of Nail		Minimum Number or Maximum Spacing of Nails
	mm	Inches	
Floor joist or blocking perpendicular to sill plate or top wall plate below – toe nail	82	3.23	2 per floor joist or blocking
sill plate or top wall plate – toe nail	82	3.23	150 mm (o.c.)
Wood or metal strapping to underside of floor joists	57	2.24	2
Cross bridging to joists	57	2.24	2 at each end
Double header or trimmer joists	76	2.99	300 mm (o.c.)
Floor joist to stud (balloon construction)	76	2.99	2
Ledger strip to wood beam	82	3.23	2 per joist
Joist to joist splice (see also Table 9.23.14.8.)	76	2.99	2 at each end
Tail joist to adjacent header joist	82	3.23	5
(end nailed) around openings	101	3.98	3

Each header joist to adjacent trimmer joist	82	3.23	5
(end nailed) around openings	101	3.98	3
Stud to wall plate (each end) toe nail	63	2.48	4
or end nail	82	3.23	2
Doubled studs at openings, or studs at walls or wall intersections and corners	76	2.99	750 mm (o.c.)
Doubled top wall plates	76	2.99	600 mm (o.c.)
Bottom wall plate or sole plate to floor joists, rim joists or blocking (exterior walls)(1- see note below)	82	3.23	400 mm (o.c.)
Bottom wall plate or sole plate – in required braced wall panels – to floor joists, rim joists or blocking (exterior walls)(1- see note below)	82	3.23	150 mm (o.c.)
Interior walls to framing or subflooring	82	3.23	600 mm (o.c.)
Required braced wall panels – in interior walls – to framing above and below	82	3.23	150 mm (o.c.)
Horizontal member over openings in non-loadbearing walls – each end	82	3.23	2
Lintels to studs	82	3.23	2 at each end
Ceiling joist to plate – toe nail each end	82	3.23	2

Roof rafter, roof truss or roof joist to plate – toe nail	82	3.23	3
Rafter plate to each ceiling joist	101	3.98	2
Rafter to joist (with ridge supported)	76	2.99	3
Rafter to joist (with ridge unsupported)	76	2.99	See table 9.23.14.8 below
Gusset plate to each rafter at peak	57	2.24	4
Rafter to ridge board – toe nail – end nail	82	3.23	3
Collar tie to rafter – each end	76	2.99	3
Collar tie lateral support to each collar tie	57	2.24	2
Jack rafter to hip or valley rafter	82	3.23	2
Roof strut to rafter	76	2.99	3
Roof strut to loadbearing wall – toe nail	82	3.23	2
38 mm × 140 mm or less plank decking to support	82	3.23	2
Plank decking wider than 38 mm × 140 mm to support	82	3.23	3
38 mm edge laid plank decking to support (toe nail)	76	2.99	1
38 mm edge laid plank to each other	76	2.99	450 mm (o.c.)

(1) Where the bottom wall plate or sole plate of an exterior wall is not nailed to floor joists, rim joists or blocking in conformance with Table 9.23.3.4., the exterior wall is permitted to be fastened to the floor framing by

a) having plywood, OSB or waferboard sheathing extend down over floor framing and fastened to the floor framing by nails or staples conforming to Article 9.23.3.5., or
b) tying the wall framing to the floor framing by galvanized-metal strips

i) 50 mm wide,
ii) not less than 0.41 mm thick,
iii) spaced not more than 1.2 m apart, and
iv) fastened at each end with at least two 63 mm nails.

Length of nails:

It's important to note that "all nails shall be long enough so that not less than half their required length
penetrates into the second member." [9.23.3.2 (1)]

Rafter nailing:

Table 9.23.
Rafter-to-Joist Nailing (U
Forming Part of Sentences

Roof Slope	Rafter Spacing, mm	Minimum Numbe				
		Rafter Tied to every Joist				
		Building Width up to 8 m			*Building* Width up	
		Roof Snow Load, kPa			Roof Snow Loa	
		1.0 or less	1.5	2.0 or more	1.0 or less	1.5
1 in 3	400	4	5	6	5	7
	600	6	8	9	8	—
1 in 2.4	400	4	4	5	5	6
	600	5	7	8	7	9
1 in 2	400	4	4	4	4	4
	600	4	5	6	5	7
1 in 1.71	400	4	4	4	4	4
	600	4	4	5	5	6
1 in 1.33	400	4	4	4	4	4
	600	4	4	4	4	4
1 in 1	400	4	4	4	4	4
	600	4	4	4	4	4

Nailing information for rafters

Sheathing requirements:

Element	Minin	
	Common or Spiral Nails	
Board lumber 184 mm or less wide	51	
Board lumber more than 184 mm wide	51	
Fibreboard sheathing up to 13 mm thick	n/a	
Gypsum sheathing up to 13 mm thick	n/a	
Plywood, OSB or waferboard up to 10 mm thick	51	
Plywood, OSB or waferboard over 10 mm and up to 20 mm thick	51	
Plywood, OSB or waferboard over 20 mm and up to 25 mm thick	57	

Note: this table is applicable for most of New Brunswick. There may be other requirements in areas with high winds.

Nailing of beams:

Per 9.23.8.3(7), "where 38 mm members are laid on edge to form a built-up beam, individual members shall be nailed together with a double row of nails not less than 89 mm in length, spaced not more than 450 mm apart in each row with the end nails located 100 mm to 150 mm from the end of each piece."Bolts may also be used. See here for more on building and splicing beams.

Nailing of lintels:

Lintels shall be fastened together with not less than 82 mm nails in a double row, with nails not more than 450 mm apart in each row. [9.23.12.2(2)] For more on construction and framing of lintels, see here.

Other considerations

When to use screws:

For the most part, screws - especially deck screws - are not permitted for use in framing situations. The only screws that can be used are those that are specifically tested for the situation. These will bear a designation "ASME B18.6.1". Some other engineer-approved screws may be used in certain situations (such as specific brands of fasteners for decks.) If in doubt, use nails.

Doors/Hinges:

Hinges to wood doors attached with wood screws 25 mm long or more; and to wood frames “so that at least 2 screws per hinge penetrate not less than 30 mm into solid wood.” (9.7.5.2(6)(a).) It’s important to note that in this case, the hinge-side attachments must find purchase in an adjacent stud, not just into the wooden door frame material.

Strikeplates for deadbolts:

Strikeplates for deadbolts ... shall be fastened .”to wood frames with wood screws that penetrate not less than 30 mm into solid wood...” (9.7.5.2(7)(a))

Handrail fastening:

Attachments must be no more than 1.2 m apart, and be fastened into framing or blocking with screws that have at least 32 mm of purchase. (9.8.7.7(2)(c))