


SHINGLE COVERAGE										
SHINGLES  NO.1	LENGTH OF NO. 1 SHINGLES	APPROXIMATE COVERAGE IN SQ. FT. (m ²) OF ONE SQUARE (4 BUNDLES) OF SHINGLES BASED ON FOLLOWING WEATHER EXPOSURES								
		3 1/2" (89 mm)	4" (102 mm)	4 1/2" (115 mm)	5" (127 mm)	5 1/2" (140 mm)	6" (152 mm)	6 1/2" (165 mm)	7" (178 mm)	7 1/2" (191 mm)
		16" (410 mm)	70 (6.5)	80 (7.4)	90 (8.4)	100* (9.3)	—	—	—	—
18" (460 mm)	—	72.5 (6.7)	81.5 (7.6)	90.5 (8.4)	100* (9.34)	—	—	—	—	
24" (610 mm)	—	—	—	—	73.5 (6.8)	80 (7.4)	86.5 (8.0)	93 (8.6)	100* (9.3)	
* MAXIMUM EXPOSURE RECOMMENDED FOR ROOFS										

Table 4: Shingle coverage and exposure table

3.5 Starter Courses and Architectural Patterns

Wood shakes and wood shingles use a starter course on the downslope (eave) edge of a roof area in a single or double layer to satisfy the requirement for double or triple coverage in the roof's field. The first full course is generally set even with the starter course edge, and the architectural pattern of the field is built with succeeding courses. Before the first course of wood shakes or wood shingles is installed, a starter course is applied directly over the underlayment or ice dam protection membrane along the eave of the roof system.

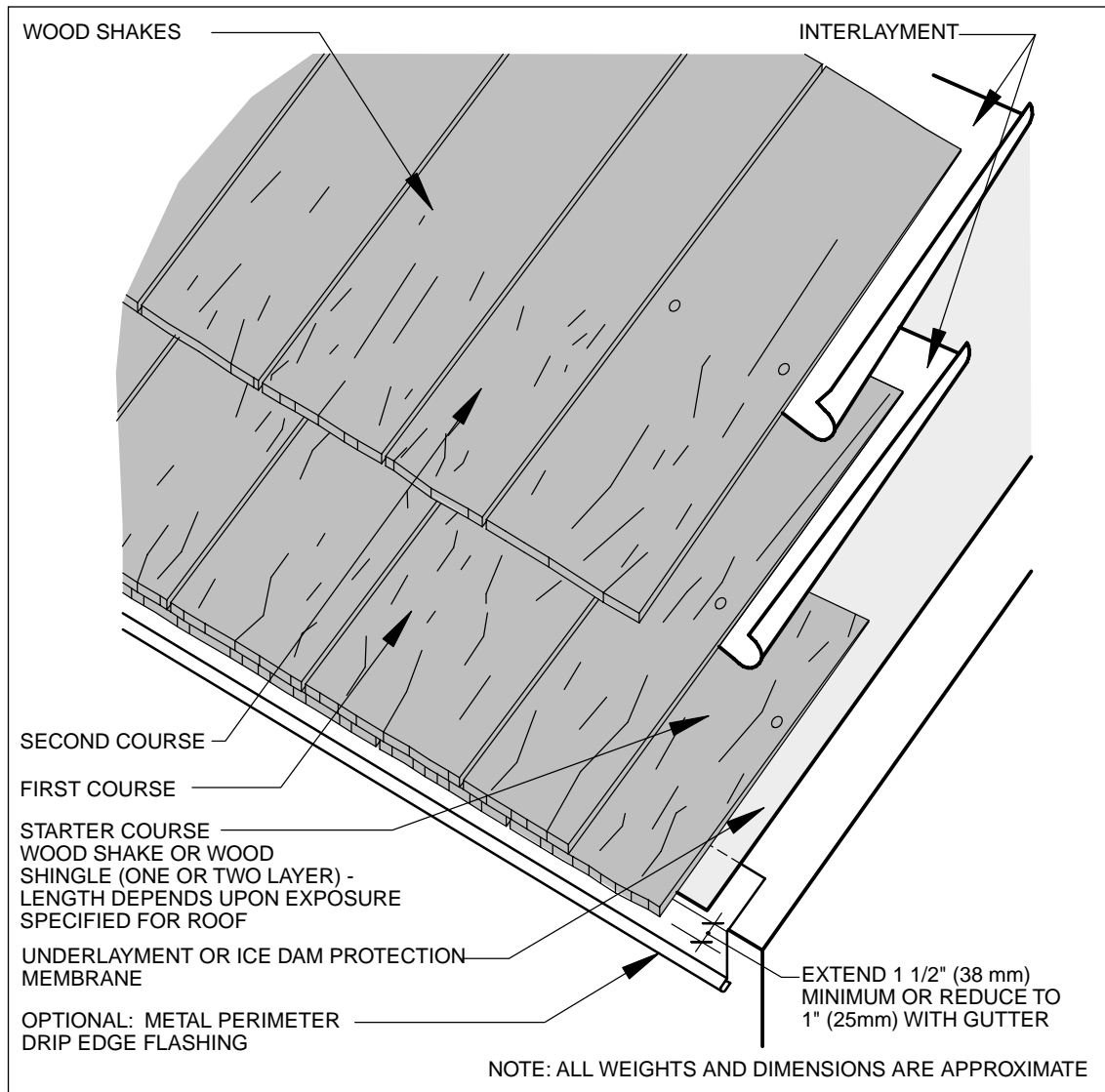
3.5.1 Starter Courses for Wood Shakes

In order for a shake roof system to be two or three layers thick (whichever is specified) at all locations, including the downslope portion of the roof, a starter course is necessary. Generally, if the length of the shakes and the exposure specified will provide for a two-layer-thick wood roof, then the starter course may contain only one layer. If the length of the shakes and the exposure specified will provide for a three-layer-thick wood roof, then the starter course should contain two layers. The starter course is applied directly over the underlayment or ice-dam protection membrane along the downslope edge of the roof. In addition to providing longevity to the finished roof, the primary purpose of the starter course is to shed water that may migrate through the gaps or joints between the shakes in the overlying first course.

Generally, the starter course consists of 15 to 24 inch (380 to 610 mm) wood shakes or shingles as the exposure specified for the project allows. The shakes in the starter course should be laid so that the butt ends extend a minimum of 1½ inches (38 mm) beyond the finished fascia board or outer sheathing board edge (if there is no fascia). When gutters or eave troughs are used, the overhang may be reduced to approximately 1 inch (25 mm). Shakes should be laid to extend a minimum of 1 inch (25 mm) beyond the rake or gable edge.

Space the individual starter units approximately ¼ to ½ inch (6 to 13 mm) apart, and fasten each unit with two fasteners. Place the nails approximately 1½ inches (38 mm) above the exposure and approximately ¾ to 1 inch (19 to 25 mm) from the sides. If the starter course consists of two layers, offset the joints between neighboring shakes in the adjacent courses a minimum of 1½ inches (38 mm).

Figure 4A: Example of a one-layer starter course for wood shakes



3.5.2 Starter Courses for Wood Shingles

In order for the shingle roof system to be three layers thick at all locations, including the downslope portion of the roof, a double-layer starter course should be used. If the length of the shingles and the exposure specified will provide for a three-layer-thick wood roof, then the starter course should contain two layers. However, in many areas of the country it is common to use only a single-layer starter course. The starter course is applied directly over the underlayment or ice dam protection membrane along the downslope edge of the roof. In addition to providing longevity to the finished roof, the primary purpose of the starter course is to shed water that may migrate through the gaps or joints between the shingles in the overlying first course.

Generally, the starter course may consist of 15 to 18 inch (380 to 457 mm) wood shingles as the exposure specified for the project allows. The shingles in the starter course should be laid so that the butt ends extend a minimum of 1½ inches (38 mm) beyond the finished fascia board or outer sheathing board edge (if there is no fascia). When gutters or eaves troughs are used, the overhang may be reduced to approximately 1 inch (25 mm). Wood shingles should be laid to extend a minimum of 1 inch (25 mm) beyond the rake or gable edge.

Space the individual starter units approximately ¼ to ⅝ inch (6 to 9 mm) apart, and fasten each unit with two fasteners. Place the nails approximately ¾ to 1 inch (19 to 25 mm) from the sides. The starter course consists of two layers, offset the joints between neighboring shingles in the adjacent courses a minimum of 1½ inches (38 mm).

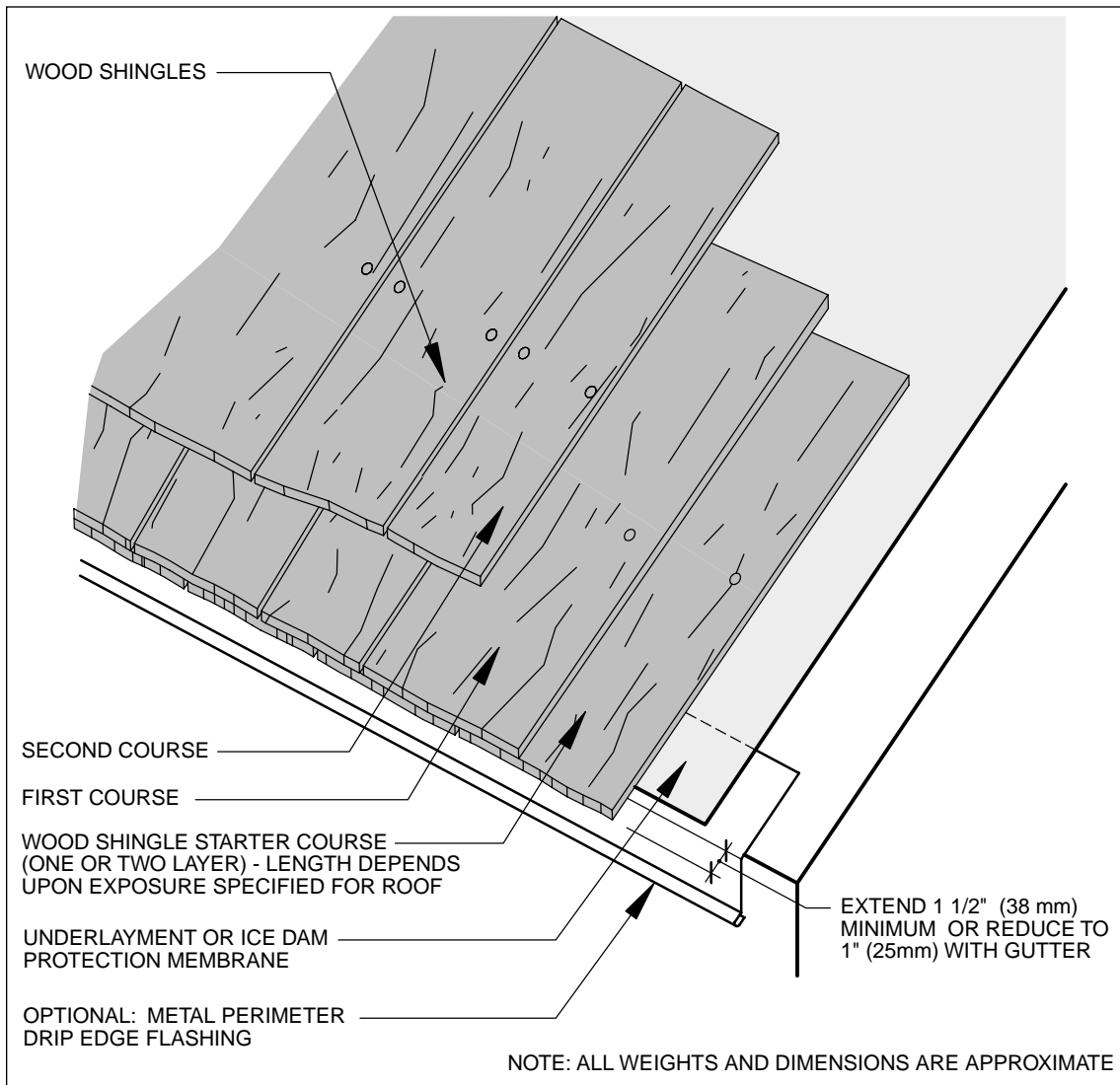


Figure 4B: Example of a starter course for wood shingles.

3.5.3 Architectural Patterns

Wood roofing can be applied in a variety of patterns. The most common pattern of wood roofing application is a single straight-line course method. With a straight-line course application, the butt ends of the shakes or shingles are generally in straight alignment across any course in the field of the roof.

Other unique architectural patterns that are capable with wood roofing include:

- random pattern — the butt ends of adjacent shingles or shakes are installed offset, or staggered
- ribbon coursing — certain courses of shingles or shakes are double- or triple-layered to create strong horizontal lines in specified locations
- wave pattern — the courses, exposures and butts ends of the wood shingles are varied to create a wave pattern

3.6 Fasteners

Wood roofing may be attached to a roof deck with noncorroding, galvanized steel or stainless steel nails or noncorroding metal staples. A minimum of two fasteners should be used to attach each shake or shingle. See Figures 5 and 6.

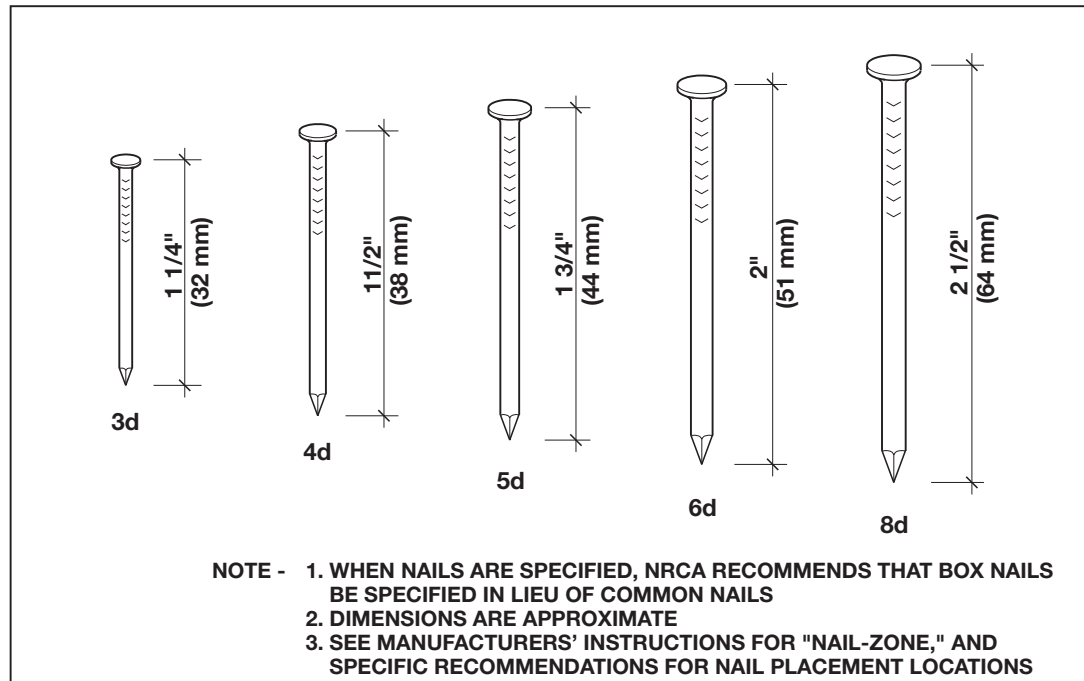
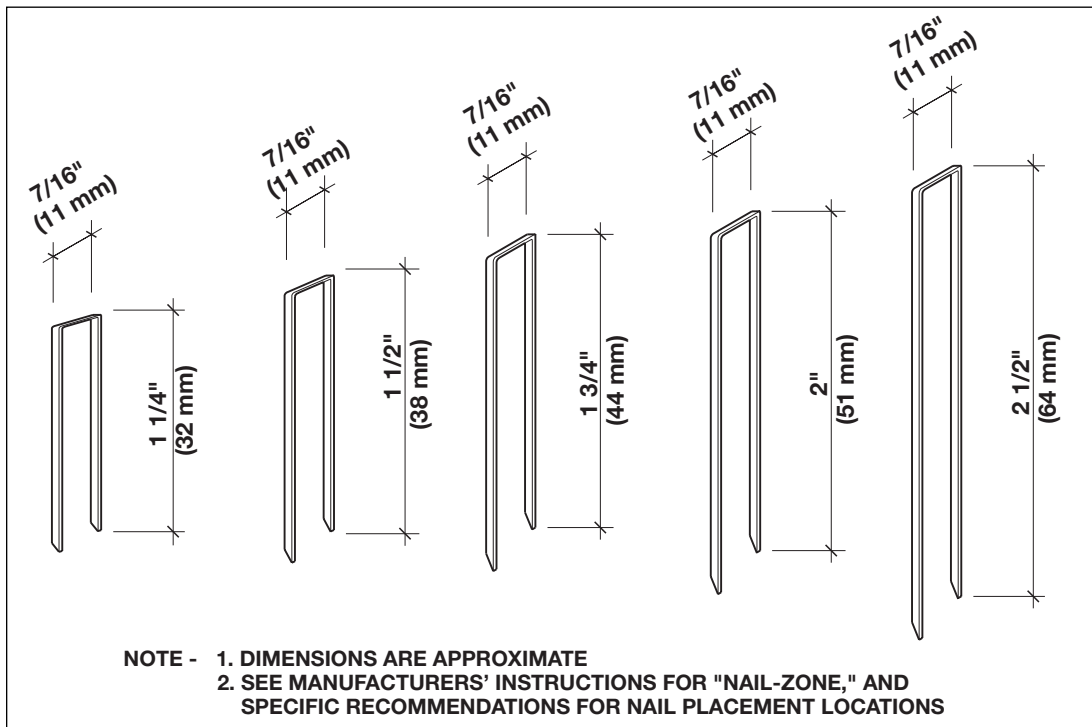


Figure 5: Examples of nails used with wood roofing

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Corrosion-resistant staples are considered acceptable by NRCA for attaching wood roofing, as the varied grain structure of the wood and the

Figure 6: Example of staples used with wood roofing

manner in which it affects staple shank deformation generally provides for good withdrawal resistance of the staple. For decay resistant, preservative-

treated, and/or fire-resistant-treated wood roofing, the manufacturer should be consulted for recommendations regarding acceptable fasteners.

In all wood shake and wood shingle applications, fasteners should be long enough to penetrate through all layers of roofing materials and achieve secure anchorage into the roof deck. Fasteners should extend through the underside of plywood or other acceptable wood panel decks, and penetrate at least $\frac{3}{4}$ inches (19 mm) into wood board or plank decks. The required length for fasteners, therefore, will vary according to the thicknesses and exposures of shakes or shingles. Longer fasteners are required when shakes and shingles are installed with reduced exposures and for hip and ridge shingles. The fastener length is determined by the thickness of the combined wood roofing materials, the type and thickness of the roof deck, and the thickness of any existing roofing materials.

Either hand-nailed or pneumatically actuated fastener applications are acceptable.

3.7 Flashings

Because steep-slope roof systems are frequently interrupted by the intersection of adjoining roof sections, adjacent walls or penetrations such as chimneys and plumbing soil-pipe stacks, all of which create opportunities for leakage, special provisions for weather protection must be made at these locations. These components used to control water entry are commonly called flashings. Careful attention to flashing details is essential to successful long-term roof system performance, regardless of the type of roof construction.

Flashings in this section are divided into four categories:

- perimeter edge metal
- penetration flashings
- valley flashings
- vertical surfaces

3.7.1 Perimeter Edge Metal

Depending upon the severity of the climate, anticipated rainfall and freeze-thaw cycling, using perimeter edge metal should be considered. Where climate and/or roof edge construction dictates the need for perimeter edge metal, NRCA recommends corrosion resistant metal be specified for perimeter edge metal.