



Nailed it

There are several guidelines for fasteners used for asphalt shingle roof systems

by Mark S. Graham

Properly selecting and specifying shingle fasteners are important to ensure an asphalt shingle roof system's performance and longevity. Following is a brief discussion of code requirements, manufacturers' instructions and NRCA's guidelines for fasteners used to attach asphalt shingle products.

Code requirements

In the *International Building Code*,[®] 2018 Edition, the following minimum requirements are provided in Section 1507.2-Asphalt Shingles: "1507.2.5 Fasteners. Fasteners for asphalt shingles shall be galvanized, stainless steel, aluminum or copper roofing nails, minimum 12-gage [0.105 inch (2.67 mm)] shank with a minimum 3/8-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than 3/4 inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than 3/4 inch (19.1 mm) thick, the nails shall penetrate through the sheathing. Fasteners shall comply with ASTM F1667."

In the *International Residential Code*,[®] 2018 Edition, minimum requirements in Section R905.2-Asphalt Shingles are similar to those of IBC 2018.



Neither IBC 2018 nor IRC 2018 have specific requirements for the shingle nails' corrosion resistances.

Manufacturers' instructions

Review of asphalt shingle manufacturers' installation instructions reveals their fastener recommendations are generally consistent with those of IBC 2018 and IRC 2018. Some manufacturers do not recommend copper roofing nails, and some do not reference ASTM F1667, "Standard Specification for Driven Fasteners: Nails, Spikes, and Staples."

Guidelines from the Asphalt Roofing Manufacturers Association

generally are considered to be a consensus of ARMA-member asphalt shingle manufacturers. ARMA's *Residential Asphalt Roofing Manual: Design and Applications Method, 2014 Edition*, indicates roofing nails are the preferred nailing system for asphalt shingles. Nails should be made of galvanized steel, stainless steel or aluminum and have a nominal shank diameter of 12 gauge and a minimum head diameter of $\frac{3}{8}$ of an inch. Nails should have smooth shanks (except for "gripper marks" sometimes located just below the head) though ring-shank nails and nails with shank deformations such as "barbs" may be used.

Nails should be long enough to penetrate $\frac{3}{4}$ of an inch into a roof deck; if a roof deck is less than $\frac{3}{4}$ of an inch, nails should be long enough to penetrate and extend at least $\frac{1}{8}$ of an inch through the roof deck. When determining

nail length, consider the number of layers of shingles, shingle thickness(es), underlayment and flashings.

Note that when the bottom side of a roof deck is exposed to view, using nails of the recommended length may result in nail points penetrating through the deck and being exposed to view.

NRCA's guidelines for asphalt shingle fasteners are provided in The NRCA Roofing Manual: Steep-slope Roof Systems

NRCA's guidelines

NRCA's guidelines for asphalt shingle fasteners are provided in the Asphalt Shingles section of The NRCA Roofing Manual: Steep-slope Roof Systems.

NRCA recommends roofing nails be used to apply asphalt shingles to wood panel (plywood, oriented strand board) or wood plank or wood board substrates. NRCA does not recommend the use of staples for fastening asphalt shingles.

Roofing nails should be round-headed, sharp-pointed 11-gauge galvanized steel or the equivalent corrosion-resistant roofing nails. Nail head sizes recommended are $\frac{3}{8}$ -inch to $\frac{7}{16}$ -inch diameter. Nail heads should be low profile, smooth and flat. Nails should comply with ASTM F1667, Type I, Style 20. Nails complying with ASTM F1667, Type I, Style 20 have head dimensions or shank profiles that NRCA recommends for asphalt shingle application.

Nails should be long enough to penetrate all layers of roofing materials and achieve secure anchorage into a roof deck. Nails

should extend at least $\frac{1}{8}$ of an inch through the underside of plywood or other acceptable wood panel decks less than $\frac{3}{4}$ of an inch thick. For wood plank or wood board roof decks, nails should penetrate at least $\frac{3}{4}$ of an inch.

If pressure-preservative-treated lumber is encountered, hot-dipped galvanized, stainless-steel, silicon bronze or copper nails are recommended. Pressure-preservative treatments other than chromated copper arsenate necessitate the use of corrosion-resistant, hot-dipped galvanized fasteners complying with ASTM A153, "Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware," Class D or stainless-steel fasteners complying with Type 304 or Type 316.

Because NRCA's guidelines for asphalt shingle fasteners are more stringent than those of the codes or most asphalt shingle manufacturers, specifiers intending to incorporate NRCA's guidelines should specifically indicate their intent in construction documents.

Additional information regarding NRCA's guidelines for asphalt shingle roof systems is provided in the Asphalt Shingles section of The NRCA Roofing Manual: Steep-slope Roof Systems.

Information about recognized application tolerances for asphalt shingle roof systems is provided in NRCA/ARMA's *Quality Control Guidelines for the Application of Asphalt Shingle Roof Systems*. Both of these documents are available to NRCA members as free downloads, and nonmembers can purchase them in the NRCA Bookstore, shop.nrca.net. 📄📄

MARK S. GRAHAM is NRCA's vice president of technical services.

 @MarkGrahamNRCA