# 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 ⅜-inch-diameter (9.5 mm) head, of a length to penetrate through the roofing materials and not less than ¾ inch (19.1 mm) into the roof sheathing. Where the roof sheathing is less than ¾ 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 ⅜ 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 ¾ of an inch into a roof deck; if a roof deck is less than ¾ of an inch, nails should be long enough to penetrate and extend at least ⅛ 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 ⅜-inch to 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 ⅛ of an inch through the underside of plywood or other acceptable wood panel decks less than ¾ of an inch thick. For wood plank or wood board roof decks, nails should penetrate at least ¾ 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

## Construction workers have concerns regarding wearables data

As the use of job-site construction wearables (such as personal devices that monitor heart rates, sensors that track worker locations and detect falls, and hard hat inserts that check for fatigue) increases, workers are concerned about privacy, according to www.constructiondive.com.

There currently are no standards to govern how data collected from wearables is used and protected, but that could change. At its annual meeting in November, the International Safety Equipment Association plans to discuss developing privacy and use standards—or at least guidance—for the data collected from wearables. The association also will explore how workers can view the information and in what ways the data can be analyzed to predict trends and patterns.

Michelle Schaap, an attorney with West Orange, N.J.-based law firm Chiesa Shahinian & Giantomasi PC, identified several areas of concern the International Safety Equipment Association may want to discuss, including questions regarding a wearable's alert and the employee's response; what to do if a wearable or wearable app is hijacked and the worker's data is accessed or altered; and whether the information will be used to decide whether to retain workers, among other questions.

Anthony Colonna, senior vice president of innovative construction solutions for Parsippany, N.J.-based Skanska USA, says wearable technology standards could increase workers' comfort levels regarding the devices.

"When standards are developed that anonymize data to address those privacy concerns, I believe people will become more receptive," Colonna says. "At the same time, if employees can truly trust that there's a personal value added by sharing certain data—like when it improves their personal health and safety, for example—then they will likely be more than willing to share their personal information."

However, Matthew Ramage, business area director for labor, equipment and materials at Sunnyvale, Calif.-based technology provider Trimble, says the standards must be developed in a way that won't hinder productivity but will be "credibly perceived" as a method to ensure the data collection regarding employee activity will improve working conditions and help employers manage risk.

"The simple way to do this is to either offer visibility of the improvements from collation of this data via digital signage—or reporting on things like reduction in dangerous incidents—or offer each employee details of what, why and how data is going to be collected and used prior to implementation," Ramage says.

To read about the top construction wearables in 2019, go to www.professionalroofing.net.

Lydia Baugh, director of external affairs for the International Safety Equipment Association, says the development of a broad standard likely will take up to three years.

## Contractor receives waiver to fly drones

Hensel Phelps, a Greeley, Colo.-based general contractor, is the first construction company to receive a waiver from the Federal Aviation Administration to fly parachute-equipped drones over populated construction sites.

Part 107 of FAA regulations typically prohibits operators from flying drones over people without a waiver from the agency. Hensel Phelps says it worked with the FAA for more than a year to ensure its drones equipped with ParaZero's SafeAir Parachute System meet the agency's safety concerns regarding operations over populated areas. This is the first time the FAA has collaborated with the construction industry to develop a public standard and then used that standard to issue a waiver under Part 107.

The FAA did not certify or approve a specific parachute system but says the ParaZero system is scalable and can be used by other applicants. However, any company applying for a waiver still must provide testing data, documentation and a statement of compliance listed in ASTM F3322-18, "Standard Specification for Small Unmanned Aircraft System (sUAS) Parachutes," even if the company is using the same drone and parachute combination.

Many contractors could find it useful to fly drones over populated job sites, enhancing their ability to make observations regarding the work in progress. Richard Lopez, virtual design and construction manager for Hensel Phelps, told Commercial UAV News that even though the company secured a waiver, it will avoid flying over people when possible and cited the company's extensive safety protocols as a contributing factor toward winning FAA approval.

When the FAA issued Part 107 regulations for drones in 2016, it stated operators could apply for exemptions to the rules. At the time, Nancy Egan, general counsel for Mountain View, Calif.-based drone delivery company Wing and formerly of Berkeley, Calif.-based 3D Robotics Inc., said the initial rules likely would undergo revisions as industry applications of drones and new technologies expanded their possibilities. Egan predicted drone operation over people would be one of the most sought-after waivers.

Other restrictions at that time regarding the operations of drones weighing less than 55 pounds that also have been subject to potential waivers included:

- An operator must keep a drone in his or her line of sight.
- A visual observer can be responsible for no more than one drone at a time.
- Drone operations are allowed in daylight hours only, including 30 minutes before official sunrise and 30 minutes after official sunset.
- Maximum drone speed is 100 mph.
- The maximum allowable altitude is 400 feet above the ground and higher if the drone remains within 400 feet of a structure.