



High Wind and Hail
Bronze Level

A GUIDE TO

Roofing the Right Way

RE-ROOFING THE RIGHT WAY FOR SHINGLE ROOFS
IN HIGH WIND AND HAIL-PRONE AREAS



When it's time to replace your roof, due to weather-related damage or simply age, follow the advice in this guide to improve the long-term performance of your new roof in high winds and hail storms. When you're ready to get started, find a qualified licensed or bonded roofing contractor. Proper installation directly impacts a roof's long-term performance. Take the time to check the contractor's references and their insurance coverage for general liability insurance or professional liability insurance, and talk to the contractor about your expectations.



STEPS TO RE-ROOFING THE RIGHT WAY

Remove tree branches that overhang the roof

1. To prevent damage from rubbing or falling on the roof, remove branches that overhang the roof and trim branches back away from the roof.

Remove existing roof cover

2. Remove the existing roof cover and underlying building paper or underlayment to expose the roof deck. This allows strengthening of the connections between the roof deck and roof structure. It also provides a solid, smooth surface needed to help ensure the new roof cover achieves its full strength.

Inspect for damage

3. Look at the roof deck for rotting, delaminating, warping or other signs it may be structurally unsound. If any of these signs exist, replace damaged sections with similar materials of the same thickness.

Re-nail the roof deck

4. Install additional fasteners as needed to provide a more wind-resistant connection of the roof deck to the roof framing.

Anchor gable end outlookers

5. Outlookers are roof framing members that are sometimes used to support the roof overhang at the gable end of a house. They start at the second truss or rafter back from the gable end wall and extend out over the gable end wall framing to support the edge of the roof. Improve the anchorage by connecting outlookers to the roof framing with metal brackets or straps.

Seal the roof deck against water intrusion

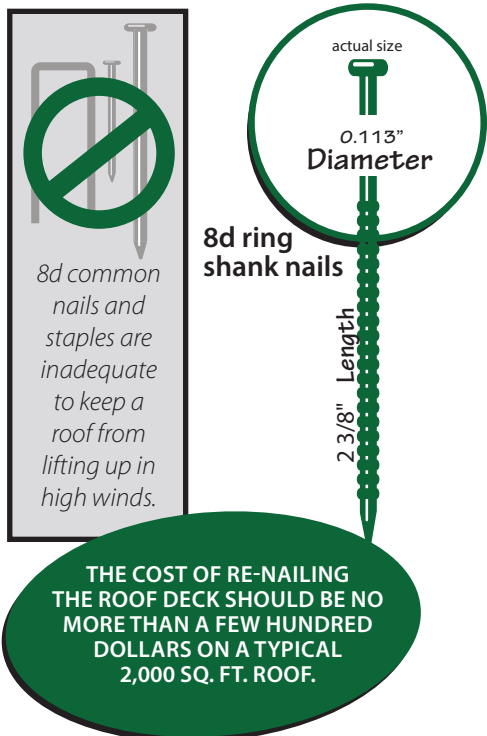
6. This will help keep water out of the house if the roof cover blows off. Large amounts of wind-driven rain can pour into the attic through unsealed gaps between pieces of roof sheathing.

Install flashing

7. Proper flashing is important to the performance of your roof. Flashing is necessary at all penetrations, including pipes and vents that create openings in the roof deck; where the roof intersects with vertical surfaces, such as walls of an upper story or chimneys; in valleys and at any location where the roof changes slope. At eaves and gable rakes, the flashing is called a drip edge. Valley areas without flashing are especially vulnerable to leakage.
8. Installation of a 36 inches wide self adhered polymer-modified bitumen membrane underlayment or metal flashing centered on the valley is critical.
9. At intersections of the roof with vertical surfaces, such as walls and chimneys, the flashing should extend up the vertical surface, be covered with wall cladding and lapped in shingle fashion.
10. A corrosion-resistant drip edge should be provided at eaves and gables of shingle roofs.
11. The overlap between sections of drip edge metal should be at least 3 inches and drip edges should extend ½ inch below the sheathing and extend back on the roof a minimum of 2 inches.
12. Drip edge should be fastened to the roof deck at 12 inches on center.

Roof cover

13. Apply an approved high-wind and impact-resistant roof cover. Follow the manufacturer's installation instructions for high-wind areas or local code requirements, if they are more restrictive.



Re-Nailing the Roof Deck

IBHS research has found that the use of staples and minimum size nails allowed in older building codes, regardless of the spacing, are inadequate to keep a roof from lifting up in high winds. This is particularly true along trusses and rafters in the middle of the roof sheathing panels, where it has been common practice to space fasteners 12 inches apart. When an old roof cover and underlayment is torn off, it's easy to inspect the existing fasteners and to install additional nails to strengthen the roof deck attachment. IBHS recommends installing ring shank nails, if additional nails are required to strengthen the roof deck attachment.

- Generally, if nails fastening the roof deck to the roof framing below are smaller than 8d common nails or if staples were used, 8d ring shank nails should be added at 6 inches on center.
- If the size of the existing nails is at least 8d commons, the distance between nail spacing should not exceed 6 inches on center. If it does, 8d ring shank nails should be added to reduce the nail spacing so that the distance between the existing nails and the additional nails is no more than 6 inches.

Sealing the Roof Deck

Sealing your roof deck provides an added layer of protection against water damage. Options for sealing the roof deck during new construction or when re-roofing include:

New Roof / Re-Roofing

1. Cover the entire roof deck with a self-adhering polymer modified bitumen membrane meeting ASTM D1970. ASTM is an internationally recognized organization that publishes technical standards for evaluating the performance of a wide range of materials and products, including materials used in roofing your home. Most manufacturers warn that attic ventilation must be adequate if a self-adhering membrane is used, because moisture in the attic cannot evaporate through such membranes. Roofers are finding that shingles can bond with many of these membranes. To prevent the "peel and stick" membrane from adhering to the shingles, it should be covered with a "bond break," such as #15 ASTM D226, Type I-compliant underlayment. This "bond break" underlayment only needs to be fastened sufficiently to keep it on the roof surface and provide safety to the roofers until shingles or other coverings are applied.
2. Install a 4-inch to 6-inch-wide "peel and stick" tape over all plywood/OSB roof panel seams and then cover the deck with an ASTM D226 Type II or ASTM D4869 Type IV (#30) underlayment. **
 - Apply the "peel and stick" tape directly to the roof deck to seal the horizontal and vertical joints between roof sheathing panels. Next, apply ASTM D226 Type II or ASTM D4869 Type IV (#30) underlayment over the entire roof deck. Attach the underlayment using annular ring or deformed shank roofing fasteners with minimum 1-inch-diameter caps at no more than 6 inches on center spacing along all laps (horizontal and vertical) and at 12 inches on center in the field.
3. Apply two (2) layers of ASTM D226 Type II (#30) or ASTM D4869 Type IV (#30) felt paper, lapped 19 inches on horizontal seams (36-inch-wide roll), and 6 inches on vertical seams. Secure underlayment using annular ring or deformed shank nails with

1-inch-diameter caps (button cap nails). Fasten underlayment at approximately 6 inches on center along the laps and at approximately 12 inches on center in the field of the sheet between the side laps.

4. Install a reinforced, high tear strength synthetic underlayment with all vertical and horizontal seams taped. **
 - This underlayment should have an International Code Council (ICC) approval, as an alternate to ASTM D226 Type II underlayment. The synthetic underlayment must have minimum tear strength of 20 lb per ASTM D1970 or ASTM D4533.

Sealing without Re-Roofing

5. Apply a closed-cell polyurethane spray foam to the underside of the roof sheathing at the joints between the sheathing panels and along all intersections between roof sheathing and all roof framing members.

The minimum requirements for the closed-cell polyurethane spray foam are:

- Two-component spray polyurethane foam system with a minimum core density of 1.5 - 3.0 pcf in accordance with ASTM D1622, Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- Spray polyurethane foam adhesive system should be installed by a properly trained and qualified applicator in accordance with the manufacturer's installation guidelines.

*Check with the local building department for any restrictions or additional underlayment requirements.

**Note for options 2 and 3: In cold weather areas with a history of ice dams, an ice barrier that consists of at least two layers of underlayment cemented together or a self-adhering polymer-modified bitumen sheet should be installed in lieu of normal underlayment from the lowest edges of all roof surfaces to a point at least 24 inches inside the exterior wall line of the building.

Choosing and Installing High-Wind and Impact-Rated Shingles

SELECTING ASPHALT SHINGLES

For optimal protection from high-wind, choose shingles that meet either ASTM D3161 Class F or ASTM D7158 Class G or H high-wind rated shingles. For improved hail protection select a product that also has a UL 2218 Class 4 impact rating. Note: If you live in a wildfire-prone area, make sure the shingles also include a UL or ASTM Class A fire rating. Asphalt shingles, along with tile and metal roof coverings, are widely available with a Class A fire rating.

SHINGLE WIND RATINGS

The ASTM shingle testing standards and classification system, not the advertised warranty period and warranty wind speed for the shingles, will determine which shingles are best suited for the wind speeds in your area.

INSTALLING SHINGLES

Shingles should be installed in accordance with the manufacturer's instructions for high-wind installation, using the number of nails in the locations required by the manufacturer for high-wind fastening. In areas where the local building code requires more fasteners than are required by the manufacturer, fasteners must comply with the local building code.

OTHER TYPES OF ROOF COVERS

Select products rated for the design and wind speed at your location, and make sure they are installed using the manufacturer's installation requirements for this wind speed or a higher speed.

Hiring a Contractor

Quality installation is a core part of the roofing equation. IBHS and the National Roofing Contractors Association (NRCA) recommend these steps for choosing the right roofing professional:

- Check for a permanent place of business, telephone number, tax I.D. number and, where required, a business license.
- Request verification of professional liability insurance.
- Look for a company with a proven track record; ask for and check client references and request a list of completed projects.
- Verify whether the contractor is properly licensed or bonded.
- Insist on a written proposal. The proposal should include complete descriptions of the work and specifications, including approximate start and completion dates and payment procedures.
- Check to see if the contractor is a member of any regional or national industry associations, such as NRCA.
- Call your local Better Business Bureau to check for any complaints that have been filed.
- Have the contractor explain his project supervision and quality control procedures.
- Carefully read and make sure you understand any roofing warranty offered; watch for provisions that would void the warranty. Remember, price is only one criteria for selecting a roofing contractor. Professionalism and quality workmanship also should weigh heavily on your decision.

Further instruction on properly re-roofing is available at DisasterSafety.org

While this guide focuses on a few critical elements of correctly re-roofing a shingle roof in high wind and hail prone regions, information about re-roofing for all roof types of roofing materials as well as the topics listed below is available at www.DisasterSafety.org:

- Hiring a Roofing Professional
- Re-nailing the Roof Deck
- Strengthening Existing Connections
- Sealing the Roof Deck: installing a wind and water resistant underlayment
- Choosing and Installing a High-Wind and Hail-Resistant Roof Covering

