RETROFIT Improvements

Making Homes Safer & More Resilient in Disaster-Prone Areas

Sealed Roof Deck

SCOPE

This document provides homeowners with an overview of sealed roof deck strategies to consider when replacing roofing of existing homes in high-wind areas.

PURPOSE

A sealed roof deck can help to minimize the risk of water intrusion due to wind driven rain and damaged roofing such as damaged or missing asphalt shingles or metal panels.

BENEFITS

- Protects against water damage to roof sheathing, interior finishes, and contents of the house
- May reduce insurance cost

RETROFIT OPPORTUNITY

Can be installed during a roof replacement.

A roof replacement is also an opportunity to enhance roof deck attachment, roof framing connections, and shingle attachment, as needed.

Wind Region Terminology

Hurricane-Prone Regions*: Areas along the Atlantic and Gulf coasts where V>115mph, and Hawaii, Puerto Rico, Guam, Virgin Islands, and American Samoa.*

High-Wind Areas *(not code defined): Generally where V>115mph including portions of Alaska.*

HAZARD AND RISK

During a hurricane or other extreme storm, rainwater can be driven underneath the roof covering and cause water damage. During particularly strong wind events, shingles or other roof coverings can be blown off the roof or damaged by windborne debris, leaving the underlayment as the only protection against rainwater. A damaged roof can allow rainwater to enter the building that could saturate attic insulation and damage roof sheathing, ceilings, walls, interior finishes, and household contents. Severe water damage can occur if the exposed underlayment is compromised.

SOLUTION

Sealed roof decks can greatly reduce the risk of water infiltration through the primary roof covering or when the roof covering is lost or damaged. A sealed roof deck uses an enhanced layer of underlayment between the roof covering (e.g., shingles) and roof deck (typically OSB panels) that is designed to better resist wind and rain. Enhancements can include underlayment type, application, and attachment. Replacing the roof is a prime opportunity to upgrade the underlayment to meet new standards and building codes, as well as to decide if selecting an above-code strategy for an added level of protection is the right choice for the project.

Does my home need a sealed roof deck? Building codes generally do not require a sealed roof deck, for new homes or roof replacements, but do require enhanced underlayment where the ultimate design wind speed V ≥140mph (see Figure 1). A sealed roof deck is beneficial in any area and is particularly recommended in Hurricane-Prone Regions. Ask the local building department if your house is in a region that requires enhanced underlayment or if local requirements exceed those of the national code or limit the use of any specific products.

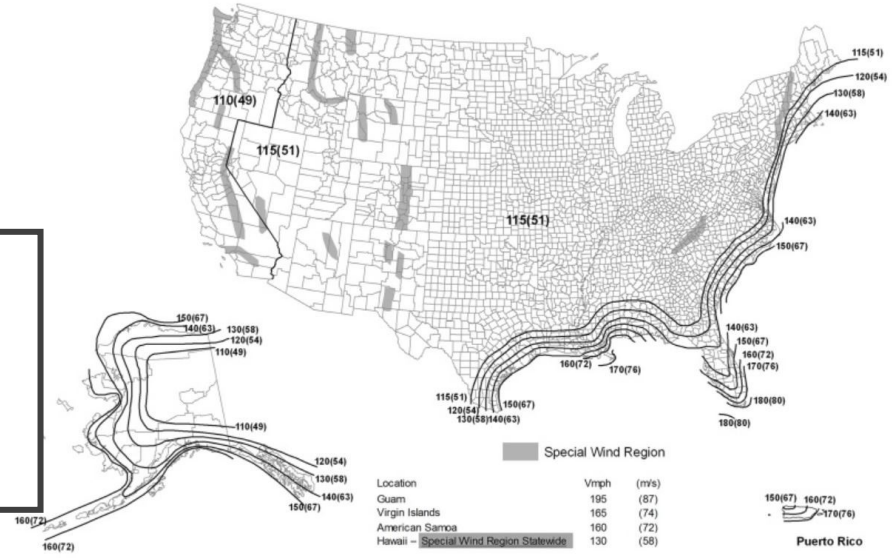

FIGURE 1. Wind Regions. *Source: Figure R301.2(5)A Excerpted from the 2018 International Residential Code; Copyright 2017; Washington, D.C.: International Code Council. Reproduced with permission. All rights reserved. www.ICCSAFE.org*

TIPS

- A sealed roof deck should be installed by a professional roofing contractor during a roof replacement.
- Remove all existing roofing (shingles and underlayment) and replace any damaged wood sheathing.
- Inspect the roof deck attachment fasteners and re-nail as required to meet current requirements for nail type, size, and spacing.
- Install drip edges at eaves/rakes and proper flashing at roof penetrations and roof/wall intersections.
- Ridge, soffit and gable vents must be properly secured and flashed – the loss of these can expose large openings susceptible to wind and water infiltration.

COST

The cost of a sealed roof deck will vary considerably depending on method and local labor rates. Below are estimated installed cost ranges to compare common underlayment options during a re-roofing effort, based on an example 2,400 SF single-story home with a 2,900 SF roof:

- #15 felt, 1 layer: $440-560
- #30 felt, 1 layer: $650-780
- Synthetic, 1 layer: $810-940
- Self-adhered: $3,600-4,000
- Taped sheathing seams + 30# felt: $2,050-2,430

Code Considerations. The International Residential Code (IRC) mandates that roofing underlayment be rated and labeled in accordance with ASTM D 4869 or ASTM D 226 (Type I #15 asphalt felt or Type II #30 felt), ASTM D 6757 (inorganic fiber-reinforced organic felt, and inorganic fiber-based felt commonly referred to as synthetic underlayment), or ASTM D 1970 (self-adhering). The IRC also specifies attachment (nail type, size, and spacing) and application (underlayment type & layering). Note that some local jurisdictions may not permit all underlayment alternatives shown in Table 1.

TABLE 1. IRC Underlayment Application Requirements and Permitted Alternatives for Roofs with Asphalt Shingles and Slopes 4:12 or Greater

Key Criteria	Underlayment
V<140mph	Single layer, #15 felt or synthetic equivalent
V≥140mph	Single layer, #30 felt or synthetic equivalent
Alternative 1	Self-adhering membrane (peel-and-stick underlayment)
Alternative 2	Minimum 4-inch wide self-adhering membrane (flashing tape) at roof sheathing panel seams and covered with #15 felt or equivalent
Alternative 3	Two layers of #30 felt

Best Practices. The IBHS FORTIFIED Roof™ program has three options for sealed roof decks that are similar to the IRC alternatives above except it requires #30 felt or equivalent over the flashing tape for Alternative 2. FEMA provides similar options for sealed roof decks (Figure 2). Note that the IRC requires underlayment installed above drip edges at eaves, as shown in Figure 2, but IBHS recommends installing drip edges above the underlayment to improve wind performance of the roof edges. Also note that self-adhered membranes are generally not recommended in northern climates due to potential for condensation and moisture damage to roof sheathing.

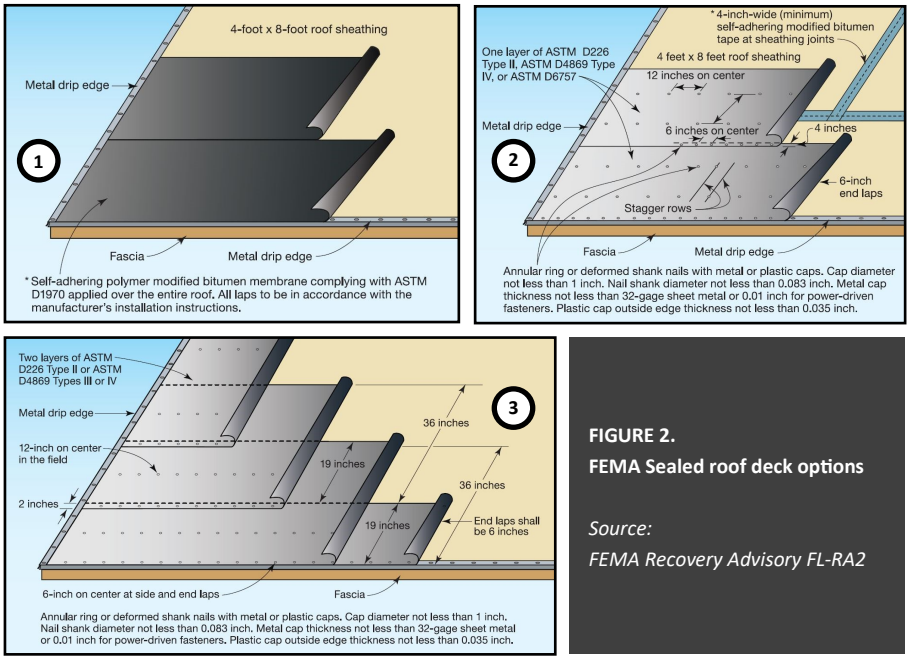

FIGURE 2.
FEMA Sealed roof deck options

Source:
FEMA Recovery Advisory FL-RA2

ADDITIONAL RESOURCES

1. Federal Emergency Management Agency (FEMA), best practices: https://www.fema.gov/media-library-data/1560174739479-8856110e0c3fa30e750370dc5129348a/MichaelRA2_060719_508_FNALforposting.pdf
2. FEMA, mitigation triggers for roof repair: https://www.fema.gov/media-library-data/1526499959474-4000375f0d0d408cc778f648706f1ba8/FL_Irma_RA3_MitigationTriggersForRoofRepairAndReplacement_508.pdf
3. FEMA, coastal construction: https://www.fema.gov/media-library-data/20130726-1538-20490-2983/fema499web_2.pdf
4. Insurance Institute for Business & Home Safety® (IBHS) FORTIFIED Home™: https://fortifiedhome.org/
5. IBHS FORTIFIED Roof™ Re-Roofing Checklist: http://fortifiedhome.org/wp-content/uploads/2019/08/re-roofing-checklist_hurricane.pdf