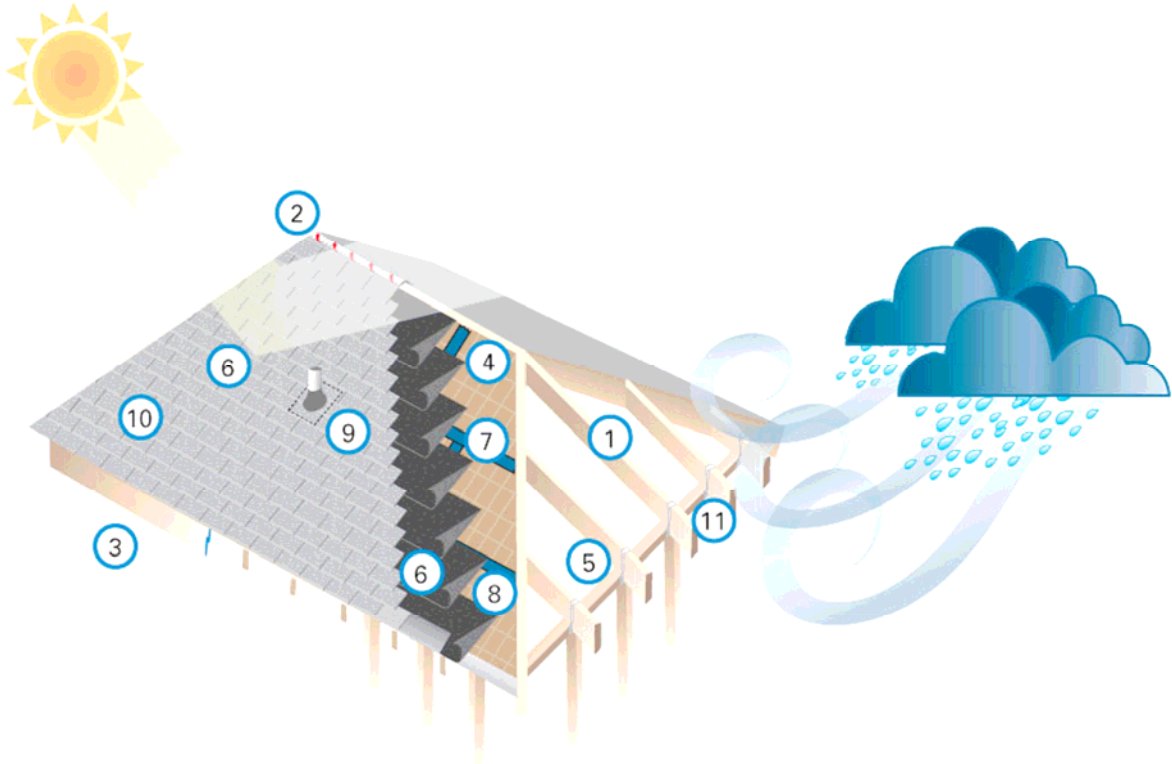




TECH SETS

Tech Set 5: Storm Resistant Roofing

Storm resistant roofs act like an umbrella for the home, keeping it safe beyond the drip line without folding when the wind gusts. When used together, these technologies will improve the durability of the roof and the building envelope; increase the safety of the home; and reduce the costs of maintenance and repair work.



1. **Moderately pitched** (4/12 to 6/12) hips rather than gables
2. **Baffled ridge and soffit vents** minimize the number of roof penetrations
3. **Extend fascia board** so it terminates below the underside of the soffit
4. **Grid-marked sheathing**
5. **OVE structural members** for roof truss components and **engineered wood girders**
6. Tape OSB seams with a **self-adhering bitumen tape**
7. **Light-colored wind and impact resistant roof shingles**
8. **Valley, junction, and pipe penetration flashing**
9. **Proper underlayment**
10. **Proper fastener/nailing schedules**
11. **Hurricane straps** tied to load bearing components

Design Features

Moderately pitched (4/12 to 6/12) hips rather than gables in areas where high winds are likely.

Flatter roofs withstand strong winds better than steep roofs. Strong winds are less likely to catch the corner of a hipped roof than a gabled roof. In fact, winds will typically force hip roofs down into the house—a force that the roof is built to withstand, while exerting a much more damaging upward force on a gabled roof.

Use baffled ridge and soffit vents to minimize the number of roof penetrations.

Through-the-roof penetrations, like attic vents, can blow off in high winds, providing a hole for water entry. Baffled ridge vents are preferred over other types of vents because they prevent airflow and wind driven rain from entering the attic through the ridge vent.

If added daylighting is required, specify tubular skylights with polycarbonate domes. Their compact profile will minimize through-the-roof penetration size compared to skylights.

Extend fascia board to terminate below the underside of the soffit.

An improved overhang design extends the fascia board below the underside of the soffit by increasing the size from a 2×4 to a 2×6. This creates a drip edge so that buffeting winds do not drive the rain across the soffit surface and into the eaves.

Limit vent perforations to the outer edge of the soffit, reducing the area where moisture can enter.

If rain does penetrate, it should be stopped by plastic baffles installed between the trusses at the top of the wall that extend up the rafter about 18 inches. The baffles hold the attic insulation away from the vented soffit and roof decking, while providing a barrier and drainage plane for water that might enter during severe conditions.

Material Selection

Grid-marked sheathing

Grid-marked sheathing in 4' x 8' sheets is installed like any other roof sheathing; perpendicular to the framing components, gapped, and supported with "H" clips at mid-span between trusses spaced at 24" on center. The grid marks facilitate cutting the sheets, using the correct fastening schedule, and the layout of shingle underlayment. See The APA's *Builder Tips: [Proper Installation of APA Rated Sheathing for Roof Applications](#)*, to foster quality applications for more information.

Advanced framing structural members for roof truss components and engineered wood girders

Advanced framing roof trusses are engineered structural components that save lumber resources because they are typically spaced on 24" centers and fabricated with small dimension lumber – 2 x 4 and 2 x 6. What's more, the shape is more conducive than solid sawn lumber rafters to accept continuous insulation for building envelope energy efficiency.

Light-colored wind and impact resistant roof shingles in storm track zones

In warm climates, consider the solar reflectance of the roof cladding and select light colors. The higher the reflectance factor, the less heat absorbed by the roof from the sun. Refer to the [ENERGY STAR® website](#) for the reflectance rating of roof products. Cladding products that carry reflectance ratings can be researched at the website for reflective roof products.

Installation Features

Tape OSB seams with a self-adhering bitumen tape

Roof coverings and underlayment can blow off in high winds, in which case the OSB sheathing can act as a water and wind barrier if the seams have been taped with a self-adhering asphalt/rubber (modified bitumen) tape.

Proper underlayment

Install underlayment per manufacturers' specifications with approved fasteners. Roofs with a slope of less than 4/12 require two layers of approved 15# felt underlayment or a continuous ice and water barrier underlayment. Underlayment rows should overlap at least 4".

Valley, junction, and pipe penetration flashing

Flashing should be installed wherever there is a change in surface plane or cladding material. It serves the dual purpose of channeling water runoff during storm events and providing a second level of water intrusion protection.

Roof edges should be flashed with a shingle starter strip or a self-adhering ice and water barrier. A drip edge should be applied to all roof edges (including rake). Asphalt and fiberglass shingles should overlap the drip edge strip by at least 1/2" to 3/4". Meticulously follow building code and roof cladding manufacturers instructions.

Proper fastener/nailing schedules

These tend to change with product and wind zone, so pay specific attention to this detail. Ensure that fasteners are installed to the proper embedment depth into framing members or sheathing, so be aware of the depth that you set your automatic tools. Follow manufacturers specifications. Increasing the frequency of fasteners from four to six per shingle should increase the wind rating.

Hurricane straps tied to load bearing components

Hurricane straps installed on non-load bearing lumber are not an effective disaster-mitigation method. Also note and install all permanent lateral bracing, gable end bracing, and tie-down hardware using correctly sized lumber and fasteners.

Code Considerations:

Prescriptive specifications for structural member connections based on regionalized wind speeds are contained in the [International Residential Code](#) (IRC). Both the IRC and roofing product manufacturers prescribe minimum fastener specifications.

Underlayment

Underlayment should be tested to [American Society for Testing and Materials](#) (ASTM) D-226, D-2626, D-4869, or D-1970 and installed per manufacturer's specifications. In climates where the average daily temperature is 25°F or less in January, a 24" modified bitumen sheet (self-adhering ice and water barrier) is required around the roof perimeter to preclude water infiltration from melting ice dams.

The IRC is very specific about flashing size, material, and location.

The IRC prescribes tests that asphalt, tile (clay and concrete), wood, and metal shingles, and mineral-surface rolled roofing should conform to assure weatherization durability, as well as appropriate roof pitches for the product types.

Certain coastal tiers of [Texas](#) and [Florida](#) have specific, prescriptive codes covering products and installation in high wind areas. In Texas, asphalt shingles must conform to ASTM D-3161 testing. Florida maintains lists of approved roofing materials.

For information on the technologies in the image above, visit the PATH Technology Inventory at www.pathnet.org.