



# HOW TO MINIMIZE BUCKLING OF ASPHALT COMPOSITION SHINGLES

Of all the residential roofs in the United States, 95 percent are sheathed with wood structural panels. This is because the panels are easy to install and form an excellent substrate for finished roofing such as organic and fiberglass/asphalt shingles. Proper installation is important, however, if you want to ensure optimum performance of the shingle roofing and reduce roof callbacks and complaints.

Roof coverings such as asphalt composition shingles may buckle when moisture conditions cause the roof covering or deck substrate to move. To prevent buckling, follow these simple guidelines:

**1. Ventilate Attics.** Energy-efficient building designs call for construction features that prevent moisture buildup in attics. Significant amounts of moisture vapor introduced into living spaces (e.g., showers, dishwashers, humidifiers, clothes dryers, etc.) must not be allowed to collect and condense in attics.

The most effective attic ventilation system is a combination of both eave and ridge vents. Model building codes require that the minimum net free ventilation area be 1/300th of the ceiling area, provided there is either a vapor retarder in the ceiling, or at least half of the ventilating area is in the upper part of the attic with the balance provided by eave or soffit vents. If neither of these conditions exists, the net free ventilating area shall be not less than 1/150th of the ceiling

area. These requirements were established 35 years ago. With today's super-insulated and sealed homes, more ventilation may be necessary. NOTE: *A word of caution on ventilating area: The "net free ventilating area" is a fraction of the overall size of a vent. Depending on ventilator design, it may be one-third to one-half of the gross area. Make sure the ventilator is sized on a net free area basis.*

Vent bath and kitchen exhaust fans through the roof to outside air.

**2. Install a Vapor Retarder.** A vapor retarder on the warm side of the ceiling minimizes the amount of water vapor entering the attic and reduces the ventilation requirements as noted above. Openings in the ceiling created for electrical fixtures and plumbing stacks should be sealed so there is no air leakage between the living area and the attic space. A vapor retarder should also be used on the ground in crawl-space houses.

**3. Store Panels on Stringers or Supports.** It is good practice to acclimate panels *prior* to installation, whenever possible. The sheathing should be protected against direct exposure to inclement weather.

Panel bundles should be stored on level 4x4 stringers or other supports, so they are not in direct contact with the ground. At least three stringers should be used to support 8-foot panels – one centered and the other two approximately 12 to 16 inches from the ends.

Even though the weather will not affect the structural integrity of APA Rated Sheathing, it should be covered when stored outside to keep it clean and to prevent uneven accumulation of moisture. Cut banding on panel bundles to prevent edge damage.

If plastic sheets or tarps are used, keep them open and provide ample space on top and all sides to assure good air circulation around the panels.

**4. Space Panels 1/8 Inch.** Due to the manufacturing process, sheathing may be very low in moisture content when produced. Because panels will increase in length and width as they pick up moisture from humid air or from rain, panels should be spaced at least 1/8 inch at ends and sides when they are fastened to framing.

Fasten panels to framing with 8d common nails. Space nails 6 inches o.c.\* along panel ends, 12 inches o.c.\* along intermediate framing. Staples may be used in accordance with code approvals for size and spacing.

There are other factors that can contribute to appearance problems. If roof framing is warped or twisted, the surface of sheathing panels will not align at the panel ends. This could result in telegraphing the panel end joints through to the roof shingles. To minimize these

\*6" when spans are 48" or greater.

effects, it's important that framing be properly aligned and warp removed by blocking or by other means so that panels will be smooth and flush at joints.

### 5. Stand Over Rafters or Truss Chords When Installing Panels.

Standing between supports may bend a panel noticeably. Fastening it while bent can "lock" the bent shape into the panel. Although the roof is not harmed structurally, these depressions between the supports can telegraph through the finish roofing and cause callbacks when noticed.

### 6. Store Shingles in 4-foot Stacks.

As a general rule, store shingle bundles in a cool, dry place in stacks not more than 4 feet high. If higher stacking is necessary, use a tiered structure that prevents the weight of the bundles on the upper tier from bearing on those in the lower tiers.

Store roll materials upright. If several tiers must be stored on top of one another, place structural panels between the tiers to prevent damage to the ends of the rolls and to stabilize the stacks.

If storing asphalt roofing products outdoors, place the materials on a raised platform or pallet so that they are not in contact with the ground. In addition, cover the roofing materials with plastic sheets or tarpaulins to protect them from rain or snow. Ventilate the protective covering to allow air to circulate. Never store shingles in the hot sun.

### 7. Install Shingle Underlayment Properly.

Use a minimum of one layer of No. 15 asphalt-saturated shingle underlayment felt conforming to ASTM D 226 or ASTM D 4869 for best results. Follow shingle manufacturer's recommendations for shingle underlayment (roofing felt). The felt should be installed as soon as practical to avoid direct rain on the

panels. Panels that get wet should be allowed to dry before applying felt. The felt should be installed smooth and any wrinkles that develop should be removed prior to application of the shingles. If the felt is wrinkled, the shingles may not lay flat and this could, in turn, cause appearance problems.

### 8. Considerations for Asphalt Composition Shingles.

Shingles vary considerably in their weight, surface texture and composition. Over the past few years, the minimum shingle weight has decreased and, in addition, asphalt fiberglass shingles have become popular as a replacement for organic mat shingles. The Western States Roofing Contractors Association recommends that asphalt fiberglass shingles meeting ASTM D 3462 standards should be specified when that type of shingle is to be used.

Minor surface imperfections in the substrate are more likely to telegraph through thin, lightweight untextured shingles. For example, if edge clips are used at unsupported edges of sheathing panels, and are deformed or otherwise improperly installed, a bump could telegraph through the shingles and cause an appearance problem. Similar problems can occur if flashing is deformed or uneven around chimneys, plumbing vent stacks or attic ventilators. For better appearance, heavier-weight shingles, including those that are laminated or textured, should be considered in order to mask imperfections in the substrate.

Postpone application of shingles as long as practical in order to give the roof sheathing time to acclimate.\* The time required is dependent on conditions at the job-site. Sustained high humidity will cause panels to equalize more rapidly than lower humidity.

\*Consult shingle manufacturer's recommendations.

### 9. Suggestions for Repair of Roof Shingle Buckling.

Various techniques have been used to correct the problem of buckled shingles.

Where the problem is not severe, it may be possible to lift the shingle tabs and flatten the distorted shingles with additional fasteners of recommended types. When that is not feasible, it may be necessary to remove the distorted shingles and trim them 1/8 to 1/4 inch in length, or as required to flatten, then refasten and reseal with roof-shingle cement.

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