

# ROOFING APPLICATION STANDARD (RAS) No. 115

## STANDARD PROCEDURES FOR ASPHALTIC SHINGLE INSTALLATION

### 1. Scope

- 1.1 This roofing application standard has been developed to provide a responsive method of complying with the requirements of Chapters 15 and 16 (High-Velocity Hurricane Zones) of the *Florida Building Code, Building* while providing a prescriptive method of installing asphaltic shingles.

### 2. Definitions

- 2.1 For definitions of terms used in this application standard, refer to ASTM D 1079 and the *Florida Building Code, Building*.

### 3. General

- 3.1 Asphaltic shingles shall not be installed on roof mean heights greater than 33 feet, unless specifically specified in the roof assembly's Product Approval. Roof slope criteria shall be in accordance with Table 1515.2.
- 3.2 Where asphaltic shingles are to be installed over insulated roof deck, a suitable nailable substrate, in accordance with Section 1520.5.7 must be installed over the insulation prior to the installation of approved underlayment and shingles.
- 3.3 Asphaltic shingles shall be installed in compliance with the Product Approval installation specifications, but in no case with less than six approved roofing nails (12 ga. by 1<sup>1</sup>/<sub>4</sub> in. corrosion-resistant annular ring shank roofing nails) or approved fastening devices which penetrate through the sheathing or wood plank a minimum of <sup>3</sup>/<sub>16</sub> in. or penetrate a 1 in. or greater thickness of lumber a minimum of 1 in. except where architectural appearance is to be preserved, in which case a minimum of <sup>3</sup>/<sub>4</sub> in. nail may be used.

### 4. Underlayment

- 4.1 Minimum prescriptive underlayments shall be one of the following, unless otherwise specifically noted in roofing assembly Product Approval:
- A double layer of an ASTM D 226, Type I, with a 19-inch headlap; or
  - A single layer of an ASTM D 226, type II with a 4-inch headlap; or
  - A single layer of an ASTM D 2626 coated base sheet with a 4-inch headlap.
- All endlaps shall be a minimum of 6 inches.
- All valleys shall be woven.
- 4.2 All underlayments shall be fastened with approved minimum 12 gage by 1<sup>1</sup>/<sub>4</sub> in. corrosion-resistant annular ring shank roofing nails fastened through minimum 32 gage by 15/8 in. diameter approved tin caps. Maximum fastener spacing shall be 6 in. o.c. at the laps with two additional rows in the field at a maximum spacing of 12 in. o.c. Nails shall be of sufficient length to penetrate through the sheathing or wood plank a minimum of <sup>3</sup>/<sub>16</sub> in. or penetrate 1 inch (25 mm) or greater thickness of lumber a minimum of 1 in., except where architectural appearance is to be preserved, in which case a minimum of <sup>3</sup>/<sub>4</sub> in. nail may be used.
- 4.3 If the underlayment is a self-adhering membrane, the membrane shall be applied over a mechanically attached anchor/base sheet attached in compliance with this section above.

### 5. Metal Accessories

- 5.1 All metal accessories shall be in compliance with Section 1517.6 of the *Florida Building Code, Building* and RAS 111.
- 5.2 Eave and gable drip metal vertical face shall be a minimum of 1<sup>1</sup>/<sub>2</sub> inches and shall extend down not less than <sup>1</sup>/<sub>2</sub> inch below the sheathing or other member immediately

contiguous thereto. In all cases, the deck flange shall be not less than 2 inches in width. Where required, a continuous clip (hook strip) shall be installed in compliance with RAS 111.

- 5.3 Eave and gable drip metal shall be joined by a lapped of a minimum of 4 in. and the entire interior of the joints shall be coated with approved flashing cement. Eave and gable drip metal shall be fastened with minimum 12 gauge annular ring shank nails at a maximum spacing of 4 in. o.c. The nails shall be manufactured from similar and compatible material to the termination profile. All composite materials shall be fastened with nonferrous nails. All metal profiles shall be installed in compliance with RAS 111.
- 5.4 Valley metal shall be a minimum 16 in. wide rolled or preformed material of thickness in compliance with Section 1517.6 of the *Florida Building Code, Building*. Valley metal shall be set over the underlayment, or over an optional 18 in. sweat sheet. Fasten valley metal with minimum 12 gage by 1 1/4 in. annular ring shank roofing nails of similar materials 12 in. o.c. 1 in. in from each exterior edge, except where architectural appearance is to be preserved, in which case a min 3/4 in. nail may be used. The entire edge of the flange shall be sealed, covering all nail penetrations with flashing cement and membrane. All horizontal laps shall be a minimum of 6 in. and shall be fully embedded with approved flashing cement. No nails shall be permitted in the center of the valley.

**6. Shingle Installation**

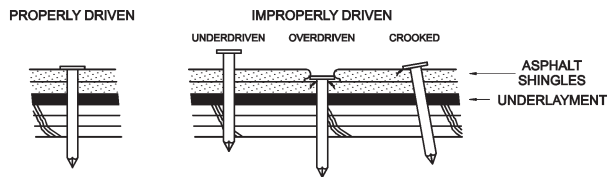
- 6.1 At all intersections, eaves, rakes, valleys, and gable ends the shingles and starter strips shall be set in a minimum 8-in. wide strip of approved flashing cement. Maximum thickness of flashing cement shall be 1/8 in. as excessive use of the cement may cause blistering, or bleed through. Shingles shall not extend more than 1/4 in. beyond the eave drip.
- 6.2 The starter strip may be either a row of nonlaminated shingles trimmed to the shingle manufacturer's recommendations

or a strip of mineral-surfaced roll roofing not less than 7 in.wide.

- 6.3 If self-sealing shingles are used for the starter strip, remove the tab portion of each shingle and position the remaining strip with the factory-applied adhesive face up along the eaves. Trim material from the end of the first shingle in the starter strip according to manufacturer's specifications to ensure that the cutouts of the first course of shingles are not placed over the starter strip joints. Fasten starter strips parallel to the eaves along a line above the eave line according to manufacturer's specifications. Position fasteners to insure they will not be exposed under the cutouts in the first course.
- 6.4 For shingles without a self-sealing strip the tabs shall be removed and approved flashing cement shall be applied in spots approximately the size of a quarter at the corner of each tab of the first course. Starter shingles shall be nailed along a line not greater than 4 in. above the eave line nailing not greater than 6 in. o.c. Ensure that the cutouts of the first course are not placed over the starter strip joints.
- 6.5 If roll roofing is used for the starter strip, nail along a line not greater than 4 inches above the eave line nailing not greater than 12 inches o.c. Approved flashing cement shall be applied as noted above for nonsealing shingle starter. If more than one piece of roll roofing must be used, the end joint shall be butted. Joints shall be staggered with succeeding shingle joints, and the number of starter joints shall be kept to a minimum.
- 6.6 First course shall be laid straight, checking it regularly during application against a horizontal chalk line. A few vertical chalk lines aligned with the ends of shingles in the first course will ensure proper alignment of cutouts. A shingle hatchet is an acceptable alternative to the use of succeeding chalk lines. The first course starts with a full shingle, while succeeding courses shall be installed in strict compliance with the shingle manufacturers' Product Approval course layout detail.

6.7 Valley courses shall be terminated with shingles not less than 12 in. in length. Rake courses shall terminate with shingles not less than 6 in. length. To obtain the correct exposure for square-tab strip shingles, align the butts with the top of the cutouts in the course below. Install no-cutout shingles and those with variable butt lines according to the manufacturer's directions to obtain correct exposure.

NOTE: Follow manufacturer's instructions concerning shingle alignment. See "Exposure, Course Layout, and Fastening Detail" in shingle manufacturer's Product Approval.



DETAIL A

7. Fastening

7.1 Use six approved nails per shingle. Place the fasteners in strict compliance with shingle manufacturers Product Approval course layout, fastening details.

7.2 Align the shingles properly to avoid exposing fasteners in the course below. Drive the fasteners straight and do not break the shingle surface with the fastener head. Do not drive fasteners into knot holes or cracks in the roof deck. Repair faulty fastening immediately. If fastener is improperly driven or exposed, remove the fastener and repair the hole in the shingle with approved flashing cement or replace the entire shingle.



7.3 Shingle nails shall be located in accordance with the manufacturer's product approval. Ensure no cutout or end joint is less than 2 inches from a nail in an underlying course. Start nailing from the end nearest the shingle just laid and proceed across. Do not attempt to realign a shingle by shifting the free end after two nails are in place. Drive nails straight so that the edge of the nail head does not cut into the shingle. Nail heads should be driven flush with the shingle surface. Fasteners shall not be improperly driven (see Detail A).

8. Valleys

8.1 Valleys may be applied in open, closed or woven fashion. Valley metal shall be in compliance with Section 5.4.

8.2 Open valley: Snap two chalk lines, one on each side of the valley centerline over the full length of the valley flashing. Locate the upper ends of the chalk lines 6 in. apart in the center of valley at the ridge (i.e., three inches to either side of the valley centerline). The lower ends should diverge from each other a minimum of 1/8 in. per linear foot of valley length, (i. e., for an eight foot long valley the chalk lines shall be 7 inches apart at the eaves).

As shingles are applied toward the valley, trim the last shingle in each course to fit on the chalk line. Never use a shingle trimmed to less than 12 inches in length to finish a course running into a valley. If necessary, trim a tab off the adjacent shingle in the same course to allow a longer portion to be used, trim 1 inch on a 45-degree angle from the upper corner to direct water into the valley and prevent it from penetrating between the courses. Finally, to form a tight seal, cement the shingle to the valley lining with a minimum eight-inch width of asphalt flashing cement. There should be no exposed nails along the valley flashing.

8.3 Closed cut valley: With valley flashings already in place, apply the first course of shingles along the eaves of one of the intersecting roof planes and across the valley. For proper flow of water over the trimmed shingle, always start applying

the shingles on the roof plane that has the lower slope or lesser height. Extend the end shingle at least twelve inches onto the adjoining roof. Do not make a joint in the valley. If a shingle falls short, add in one or two tab sections so that joint occurs outside the line of the valley. Apply succeeding courses in the same manner, extending them across the valley and onto the adjoining roof. Press shingle tightly into the valley. Use normal shingle fastening methods except that no nails should be within six inches of the valley centerline and two nails shall be placed at the end of each shingle crossing the valley. Snap a chalk line two inches from the centerline of the valley on the under-shingled side. Then apply shingles on the under shingled side. Trim the shingles as they are being installed to the chalk lines to ensure a neat installation. Trim one inch on a 45-degree angle from the upper corner of each shingle upon installation. This will direct water into the valley. Finally embed each end shingle in a 3-inch (76 mm) wide strip of flashing cement.

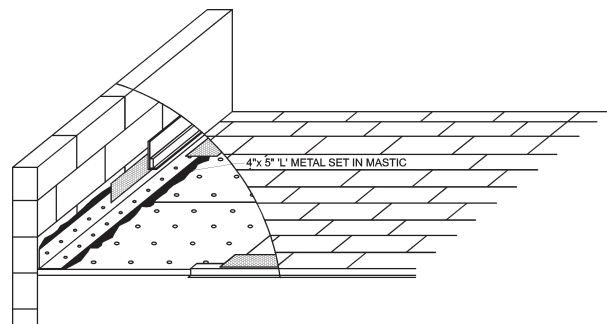
- 8.4 Woven valley: The valley flashing should already be in place as described earlier. Shingles on the intersecting roof surfaces may be applied toward the valley from both roof areas simultaneously or each roof area may be worked separately up to a point about three feet from the center of the valley and the gap closed later. Regardless of which procedure is followed, apply the first course along the eaves of one roof area up to and over the valley with the last shingle extending at least 12 inches onto the intersecting roof. Then apply the first course of the intersecting roof along the eaves and extend it across the valley over the top of the shingle already crossing the valley and at least 12 inches onto the other surface. Apply successive courses alternately from the adjoining areas, weaving the valley shingle over the other. Press each shingle tightly into the valley. Use normal shingle fastening methods except that no nails should be within six inches of the valley centerline and two nails shall be placed at the end of each shingle crossing the valley.

## 9. Flashing

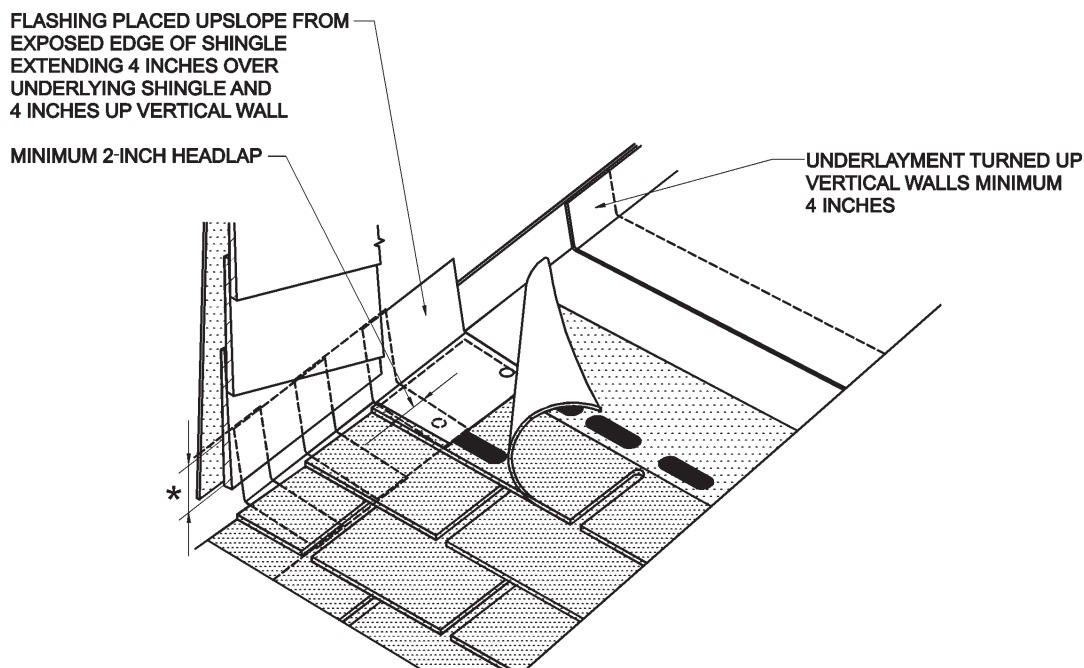
- 9.1 All shingles that butt against wall flashings shall be step bulled with approved

flashing cement a minimum of eight inches, and all roof planes that butt against vertical walls shall be flashed in one of the following manners:

- 9.2 Option A: All wall abutments shall be flashed with a minimum of 4 in. by 5 in. "L" metal flashings of materials and thickness in accordance with Section 1517.6 of the *Florida Building Code, Building*. The metal "L" flashing shall be set in approved flashing cement and set flush to base of wall and over underlayment (see Detail B). Both horizontal and vertical metal flanges shall be fastened 6 inches o.c. with approved fasteners. Fastening shall be in accordance with RAS 111. All laps shall be a minimum of 4 inches fully sealed in approved flashing cement. Flashing shall start at the lower portion of the roof to ensure water-shedding capabilities of all metal laps. The entire edge of the metal flashing shall be sealed covering all nail penetrations with approved flashing cement and membrane. The metal "L" flashing shall be counter flashed. All metal counter flashing shall be installed in accordance with RAS 111.
- 9.3 Option B: Roof planes that butt against vertical walls shall be step flashed with 10 in. long metal shingles which are 2 in. wider than the exposed face of the roofing shingles (see Detail C). Place the first flashing unit over the end of the starter strip and position it so that the tab of the end shingle in the first course covers it



DETAIL B



DETAIL C

completely. Secure the horizontal arm to the roof with two approved roofing nails. Do not nail flashing to the wall; settling of the roof could damage the seal. Apply the first course of shingles up to the wall. Position the second step flashing strip over the end shingle in the first course 5 inches up from the butt so that the tab of the end shingle in the second course covers it completely. Fasten the horizontal arm to the roof. The second course of shingles follows, the end is flashed as in the preceding courses and so on to the top of the intersection. Bring siding or other wall treatment down over the vertical sections of the step flashing to serve as cap flashing. Wall treatment or cap flashing shall terminate a minimum of 1 in. above the roofline. All metal counter flashing shall be installed in accordance with RAS 111.

- 9.4 Head/apron flashing at all vertical end walls: Apply shingles up the roof until a course must be trimmed to fit at the base of the vertical wall. Adjust the exposure slightly in the previous two courses so that the last course is at least 8 inches wide. Apply a continuous piece of metal flashing over the last course of shingles by embedding it in approved flashing cement

and nailing it to the roof. The metal flashing strip shall be bent to extend at least 5 inches up the vertical wall and at least 4 inches onto the last shingle course. Do not nail the strip to the wall. Apply an additional row of shingles over the metal flashing strip, trimmed to the width of the strip. Bring siding down over the vertical flashing to serve as cap flashing. Wall treatment or cap flashing shall terminate a minimum of 1 in. above the roofline. Do not nail siding into the vertical flashing. If the vertical front wall meets a side wall, as in dormer construction cut flashing so that it extends at least 7 inches around the corner. Continue up the side wall with step flashing as detailed above.

## 10. Soil Stacks and Vent Pipes

- 10.1 Apply shingles up to the vent pipe. Cut a hole in a shingle to go over the pipe and set the shingle in ASTM D 4586 flashing cement. A preformed flashing flange that fits snugly over the pipe is then placed over the shingle and vent pipe and set in approved flashing cement. Place the

flange over the pipe to lay flat on the shingle below. After the flashing is in place, resume shingle application. Cut shingles in successive courses to fit around the pipe and embed them in approved flashing cement where they overlap the flange. Avoid excessive use of cement as it may cause blistering. Do not drive fasteners close to the pipe. The lower part of the flange shall overlap the lower shingles and the side and upper shingles shall overlap the flange.

10.2 For ventilator and exhaust stacks located at the ridge, follow the same procedure, but bring the shingles up to the pipe from both sides and bend the flange over the ridge to lie in both roof planes, overlapping the roof shingles at all points. Ridge shingles are then positioned to cover the flange. Embed the ridge shingles in approved flashing cement where they overlap the flange. Roof ventilators and ridge vents shall be installed and flashed in accordance with their Product Approval.

**11. Chimneys**

11.1 Chimneys shall be flashed with a two-piece base and cap flashing to allow for differential movement. Apply shingles up to the front edge of the chimney before any flashings are installed. Apply a coat of ASTM D 41 asphalt primer if the chimney is constructed of masonry or metal to seal the surface and to provide good adhesion to all points where flashing cement will later be applied.

11.2 Install flashing in accordance with Section 9 above. Apply the base flashing to the low side of the chimney first. Bend the base flashing so that the lower section extends at a minimum of 4 inches over the shingles and the upper section extends a minimum of 12 inches up the vertical face of the chimney. Work the flashing firmly and smoothly into the joint between the shingles and chimney. Set both the roof and chimney overlaps in approved flashing cement placed over the shingles and on the chimney face. The flashing shall be secured in accordance with RAS 111. Use metal step flashing for the sides of the chimney, positioning the units in the same manner as flashing on a vertical side wall,

in accordance with Details A and B herein. Secure each flashing unit to the masonry with approved flashing cement and to the deck with approved nails. Embed the end shingles in each course that overlap the flashing in an 8" bed of approved flashing cement. Place the rear base flashing over the cricket and the high side of the chimney. Chimney crickets shall be waterproofed in compliance with the shingle manufacturers published literature. All chimney flashings shall be counter flashed. Metal counter flashing shall be in accordance with RAS 111.

**12. Hips and Ridges**

12.1 Apply premanufactured hip and ridge shingle components or cut hip and ridge shingles from manufacturer's strip shingles. Lay hip and ridge away from prevailing wind. Insure all fasteners are covered. Exposure shall not exceed 5 inches. Taper the lap portion of each cap shingle slightly so that it is narrower than the exposed portion.