Application Guidelines - Slate
General Information

No Special Tools Required

- hand fastened or fastened with a pneumatic nail gun
- utility knife or a standard circular saw
- tape measure, pry bar, tin snips
- chalk line with blue chalk (do not use red chalk)

Storing the Product

For proper installation, the roof tiles need to be stored on the original pallet on a flat surface. Proper storage of the product at the jobsite is important. The roof tiles are cambered to ensure that maximum pressure is transferred to the leading edge of the roof tile during installation. **Do not double stack pallets.**

**Conditions:** Perform work when existing and forecasted weather permits. Work should be performed in a safe and professional manner and when ambient weather conditions are within the limits established by InSpire Roofing Products.

**Storage:** InSpire roof tiles should not be stored on roof decks in such a manner as to over-stress and/or damage the deck and supporting structure.

**Cold Weather Installation:** InSpire roofing tiles should be stored in original packaging in a storage facility where the temperature meets or exceeds 45°F. Use protective coverage over all pallets while being temporarily stored on-site. InSpire roof tiles must be conditioned at a temperature no lower than 45°F for twenty-four (24) hours prior to use. InSpire may be installed at temperatures as low as 32°F but must be hand fastened, the use of a pneumatic gun below 45°F will result in cracking and webbing in the fastened area. Be sure to follow the manufacturer's installation requirements for all underlayment and any other applications. Comply with any and all local building code requirements. **Note of Caution:** The roof tiles can be slippery under certain conditions and jobsite safety procedures should be enforced.
Product Description

The InSpire Roofing tiles are manufactured from multiple natural patterns. The roof tile measures nominally 18" in height and 12" in width.

<table>
<thead>
<tr>
<th>CLASS A / CLASS C</th>
<th>Pieces/Bundle</th>
<th>Pieces/Square</th>
<th>Lbs/Square</th>
<th>Bundles/Square</th>
<th>Squares/Pallet</th>
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<tr>
<td>7 1/2&quot; exposure</td>
<td>25</td>
<td>160</td>
<td>240</td>
<td>6.4</td>
<td>6.25</td>
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<tr>
<td>7&quot; exposure</td>
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<td>258</td>
<td>6.88</td>
<td>5.8</td>
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<tr>
<td>6 1/2&quot; exposure</td>
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<td>185</td>
<td>278</td>
<td>7.4</td>
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<tr>
<td>6&quot; exposure</td>
<td>25</td>
<td>200</td>
<td>300</td>
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InSpire Hip & Ridge Class A / Class C

<table>
<thead>
<tr>
<th>Lbs. per piece</th>
<th>1.5</th>
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<tbody>
<tr>
<td>Lbs. per bundle</td>
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<tr>
<td>Pieces per bundle</td>
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</tr>
<tr>
<td>Tiles per lineal foot</td>
<td>2 @ 6&quot; exposure</td>
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<tr>
<td>Lineal feet per bundle</td>
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InSpire Starter

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<th>Lbs. per piece</th>
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<td>Lbs. per bundle</td>
<td>25</td>
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<tr>
<td>Pieces per bundle</td>
<td>25</td>
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<tr>
<td>Tiles per lineal foot</td>
<td>1</td>
</tr>
<tr>
<td>Lineal feet per bundle</td>
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Accessory Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Original Snow Guard</td>
<td>100 per box, 40 lb per box</td>
</tr>
<tr>
<td>1½&quot; Stainless Steel Ring Shank Coil Nails</td>
<td>7,200 pcs. per box, 50 lb per box</td>
</tr>
<tr>
<td>1½&quot; Stainless Steel Ring Shank Hand Nails</td>
<td>3,475 pcs. per 25 lb box</td>
</tr>
<tr>
<td>Class A Roofing Underlayment</td>
<td>Layfast TU35 (2 square coverage roll)</td>
</tr>
</tbody>
</table>

Product Ratings and Certifications

- Hail Rating – Class IV
- Fire Rating – Class A or Class C
- Miami Dade TAS-100 (110 mph wind driven rain)
- ICC: ESR-2745
- Texas Department of Insurance #RC-155
- Florida Building Code PDM 5572

Exposure Requirements Class A / Class C

<table>
<thead>
<tr>
<th>Roof Slope</th>
<th>InSpire Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>5:12 and above</td>
<td>6&quot;, 6 1/2&quot;, 7, or 7 1/2&quot;</td>
</tr>
<tr>
<td>4:12</td>
<td>6&quot; or 6 1/2&quot;</td>
</tr>
</tbody>
</table>
Fastener Recommendations

Roof tiles and starters should be applied using two 2 ring shank stainless steel or copper fasteners with a minimum 3/8" diameter head and minimum length of 1 1/2". Corrosion resistant fasteners are always recom-mended, especially in coastal areas.

The length of the Hip & Ridge fastener should be a minimum length of 2" over field tiles and 3" over ridge vent.

Note: Caution should always be used to ensure against over/under penetration of the fastener. Do not over-drive the fastener. The fastener head should be contacting the tile within the center of the nailing target circle.

All roof tiles will be attached with two fasteners, as per these instructions.

Improper fastening can compromise the roof system and voids the manufacturer warranty.

Roof Decking Materials

• Minimum of 15/32" plywood decking
• Minimum 15/16" solid wood decking
• Minimum 7/16" oriented strand board (OSB)

Metals

Minimum recommendations for valleys, eave drip starter strips, gable edge strips and flashing material:

• 16 oz. Copper
• 26 gauge corrosion Resistant Metal (Stainless Steel, Color Clad Steel, Color Clad Aluminum)

Note: The choice of metals and fasteners should be consistent in material. Extended-life type materials should always be used for longevity of the roof system.

InSpire Roofing Products does not warranty metal components and accessories.
Roof Venting

Roof ventilation is necessary for the longevity of the roof system. Having a cool attic in the summer and a dry attic in the winter helps prevent damage to building materials, reduce energy consumption, and prevent ice damming. During hot months, an un-vented roof system will maintain a higher surface temperature, thus shortening the life of any roof system.

During winter months ventilation is a key factor to remove moisture from the attic. Warm moist air inside a building travels up toward the attic in winter months. Problems occur when water vapor comes in contact with cold building materials and condensates. The structural elements of the attic will absorb moisture and over time may lead to rotting wood and/or mold.

With a balanced ventilation system split between the ridge and soffit, 1 square foot of net free area is required for every 300 square feet of attic floors space.

It is required to have 1 square foot of ventilation for every 150 square feet of attic floor space if this balance cannot be achieved. Ventilation is necessary for extended life of the roof system. InSpire Roofing Products will not warranty an un-vented roof and/or improperly vented roof system.

Ventilation Requirements for a Balanced Ventilation System

1. Determine the square footage of the attic floor space; ex. Attic is 45'x100'=4,500 square feet.
2. If you will be able to equally balance your ventilation system, divide the attic floors pace by 300. (4500÷300=15.) The amount of Net Free Ventilation Area (NFVA) required in this example is 15 square feet.
3. Convert this to square inches by multiplying the NFVA by 144. (15 x 144=2,160 square inches NFVA.)
4. Divide the total NFVA by 2 to determine how much ventilation is required in the upper and lower portions of the attic (2,160÷2=1,080 square inches of NFVA.)
5. Now determine how many intake and exhaust units are required, for example soffit vent and ridge vent.

It is permitted to use the 1/300 ratio when at least 50 percent but not more than 80 percent of the ventilated area is located in the upper portion of the attic. If this ratio cannot be achieved, a ratio of 1 square foot NFVA for every 150 square feet of attic floor space must be used.
RidgeMaster Plus Installation Guidelines

We recommend RidgeMaster Plus 11” to meet your ventilation requirements. Make sure to follow the steps below when installing InSpire slate and RidgeMaster Plus.

1. Cut a 1” opening in the ridge of the roof, end all cuts 12” from outside walls, chimneys, ridge corners or hip joints.
2. Install tiles up to the opening.
3. Fold felt over last course of field tiles or install metal J channel to prevent the infiltration of fine powder snow between keyways.
4. Install RidgeMaster Plus using 3” roofing nails. RidgeMaster Plus should be installed 12” beyond the slot opening. For best appearance install RidgeMaster Plus along the entire length of the ridge.
5. Install InSpire Ridge Cap pieces over the RidgeMaster Plus, nailing in the designated RidgeMaster Plus nail target area. Use 3” long Stainless steel nails.
6. RidgeMaster Plus has an overlap and an underlap end that interlock when laid end to end in proper orientation. This unites the 4 foot sections into a single structural integrated, weather tight system. Always install RidgeMaster Plus with overlap end on outside terminal end of ridge. You should also complete your ridge vent with factory end on the opposite terminal end of the ridge.

RidgeMaster Plus will provide 12.228 square inches of NFVA per lineal foot.
Spacing Between the Slate Roof Tiles

1/4" spacer tabs are provided on every roof tile and starter tile to aid in maintaining consistent tile spacing. The spacers will allow for any movement of the roof deck and expansion/contraction of the roofing tile.

Laying Out 1/2 Roof Tiles or Cut Roof Tiles

When beginning or finishing with a cut piece of slate roof tile, the cut edge should be installed inward. The manufactured edge should be installed to the outside edge of the roof. This is to maintain an acceptable roof appearance along the gable edge of the roof.

The center mark of the roof tile can be used as a guide to cut half-slates. This can also be used as a guide to keep courses straight and to assist in maintaining the proper 1/4” spacing when aligning with intermittent vertical chalk lines. **DO NOT install tiles smaller than 3".** Should the use of a 3" tile become necessary, cut the previous tile back enough to allow a 3" piece to be used.

Roof Staging/Roof Brackets

Roof pitches with severe slopes require additional preparation or staging in order to provide a safe and functional work area while installing the roof tile. The staging of the roof will require the use of roof brackets and these brackets should be installed according to the instructions provided by the roof bracket manufacturer.

When using roof brackets while installing InSpire Roofing tiles, observe the following guidelines:

Installation

1. Locate the nail targets on the roof tile and place the roof bracket fastener through the roof tile to either the far right or the far left of the roof tile, but on a plane even with the nail targets.
2. Install the roof bracket and toe board in a safe and secure manner and in accordance with the roof bracket manufacture's instructions.

Removal

1. Lift the roof tile that overlays on the roof bracket fastener.
2. Remove the roof bracket from the fastener and lay it on top of the roof bracket fastener.
3. Lay the overlay roof tile on top of the bracket and place a piece of wood blocking on the top overlay tile.
4. Ensuring that the roof bracket is positioned over the roof bracket fastener, hammer the wood blocking and drive the roof bracket fastener flush with the surface of the roof tile.
5. Follow the instructions and proceed to the next staging area.

Roof Clean Up

In areas of hips and valleys where there will be an increased cutting of the roof tiles, it is recommended that these areas are swept daily and the cuttings removed from the roof surface. This is not only for safety, but also to prevent any trimmings from clogging the gutters and down spouts.
Application Guidelines - Slate
Installation

Preparation

Inspect all areas of the roof surface to be covered.

1) Under all circumstances, existing roofing materials must be removed down to the substrate prior to roof tile installation.

2) The surface area must be uniformly flat, smooth, sound, clean and free of irregularities.

3) Examine roof sheathing to verify that sheathing joints are supported by framing and blocking and/or metal clips.

4) Verify that substrate is sloped for drainage and completely anchored to sound framing. Any foreign particles shall be cleaned from interlocking areas to ensure proper seating and to prevent moisture intrusion and ice damming. Proper provisions must be made for flashings and roof penetrations.

5) Even though metal flashing and other specialty flashings may not be the responsibility of the roofing contractor, these items must be in place prior to the roof tile installation. Work by other trades which penetrate the roof plane must be completed.

6) Product handling and storage on a flat surface is very important. InSpire Roofing has a cambered design to ensure that the maximum pressure is transferred to the leading edge of the roof tile during the installation process. **Do not double stack pallets.**

7) Technical Bulletins are available to address specific aspects and/or requirements as they relate to certain applications. Please consult the website or contact InSpire Roofing for this information.

Tear off and Reroof

In the event of a roof tear off, it is imperative that the building materials will last the lifetime of the roofing material.

Carefully inspect decking material to ensure it will last the life of the roof tile. Roofing over compromised decking material will void the InSpire Roofing manufacturer warranty.
Underlayment

1) Ice and water barrier – Is highly recommended in cold climate areas where winter temperature can average below 25 degrees F to protect against ice dams. Ice shield at eaves should extend 2' beyond the interior wall and in all valleys, rakes and around all roof penetrations. Be sure to follow underlayment manufacturer installation recommendations and observe your local building codes.

2) For a Class C System – Single-layer Type II (No. 30) Asphalt-saturated Organic Felt, complying with ASTM D226: Felt should be preserved unbroken, tight and whole. Install perpendicular to roof slope in parallel courses. Lap sides of successive courses a minimum of 3" over each underlying course. Lap ends a minimum of 6". Stagger end laps between succeeding courses at least 72". Fasten with felt underlayment nails or equivalent. Observe local building codes.

   a) Install felt underlayment on roof deck not covered by self-adhering moisture barrier membrane. Lap edges of felt over self-adhering membrane not less than 3" in direction to shed water. Lap ends of felt not less than 6" over self-adhering membrane.

3) In order to achieve a Class A Fire Rating with InSpire Roof tiles the following is required:

   a) One Layer MB Technologies Layfast TU 35 underlayment to cover the entire roof deck. TU 35 should be installed following the manufacturer’s instructions. Additional peel and stick underlayment should be applied according to your local building codes prior to installing the TU 35.

Please note that all materials other than InSpire Roof tiles will also have their own manufacturer’s instructions that must be followed.
General Installation

Hip Roof Layout

1) Initial starting points may be from left side, right side or center of the area to be installed. 1/4” spacer tabs are provided on every roof tile.

2) One method of starting on a hip roof is to locate the center of the roof area to be covered. From both ends, position starter pieces and snap a horizontal line from the tops of the starters between these two points. Next snap a vertical perpendicular line. This can be done easily by marking 3ft along the eve, then where 4ft and 5ft intersect will form a perpendicular line. As long as the ratio 3:4:5 stays the same this will hold true, for example, 21:28:35. More horizontal and vertical lines may be snapped to ensure the roof tiles will stay true and plumb throughout installation. Begin by placing a starter tile on the right and left side of the vertical line maintaining a 1/4” spacing and continue to both ends.

3) The starter course should overhang a maximum of ½” at the eave and at the rake edge.

4) Begin the first course. With a full roof tile, align center locator line of the roof tile directly over the vertical blue chalk line. Continue to both ends, maintaining the 1/4” spacing between roof tiles. (See diagram below.)
1) After installing the underlayment and before installing the InSpire Roof Tiles, clean the surface of debris and dirt. Foreign particles shall be cleaned and removed from interlocking areas to ensure proper seating of the product and to prevent moisture intrusion and ice damming. All roof penetrations shall be properly flashed and secured into position with deck and underlayment fasteners properly driven and not protruding prior to installing InSpire Roofing products.

   a) Starter tiles may be ordered pre-cut. Full tiles may also be used on the starter course.
   
   b) These starter tiles will be used as the first row at the eve of the roof.
   
   c) To create the offset from course to course, use the center mark provided on each tile and cut the tile lengthwise. This ensures that the nail holes are covered with the next course of tiles and no through-joints are exposed to the deck.
   
   d) Strike the chalk lines horizontally, at the exposure level desired, to ensure that the tiles are installed straight and uniform. Vertical chalk lines will help maintain consistency in the keyways.
   
   e) Spacer tabs are provided on each tile to ensure consistent spacing between tiles.
   
   f) There shall be no through-joints from the roof surface to the underlayment.

2) Each synthetic roof tile shall be fastened with a minimum of two ring shank roofing fasteners. The fasteners must be a minimum of 1 1/2" long and 1/8" in diameter with a 3/8" diameter head. Copper and/or stainless steel fasteners are recommended.

   a) It is required that the fasteners be placed within the nailing target as provided in 2 places on each tile. Flatten tile then fasten. Fastener must penetrate decking at least 3/4".
   
   b) Caution should be taken where the underside of the roof decking is exposed to view, such as in an overhanging eave, where the nails should be long enough to penetrate the roof decking but not so long that they may be driven through the decking.

3) Begin the second course with a 6" (half tile) setback from the course below, the finished edge facing the gable edge. Align the full roof tile between the centerline locators from the lower course. Next, adjust the roof tile up or down to align the desired exposure lines with the top edge of the lower course. (See diagram at right)
Valleys

Open Valley Design

1. Install a full 36" piece of ice and water shield centered thru the entire valley
2. Install minimum 18" wide “W” valley or “I” seam valley
3. Fasten the valley every 2' using metal cleats
4. Shingle over valley by covering flashing by a minimum of 4". Make sure not to drive fasteners from shingles into the valley flashing.

Closed Valley Design

Closed valleys are formed by laying roof tiles tight to the valley line and placing pieces of metal under the roof tiles. The length of the roof tile and the slope of the adjoining roof section determine the size of the metal sheet. Each metal sheet should extend 2" above the top of the roof tile course that it will be applied to so that the sheet may be fastened directly to the roof deck. Each metal sheet should lap the sheet below by at least 3" and set in back of the butt edge of the roof tile above in order to be concealed. Each metal sheet should be wide enough to extend 7" from the center of the valley to the roof surface. With a closed valley design, cut the tiles in a straight line to fit no closer than 3/8" against tile of adjoining roof slope.
Flashings

Flashings should be used around all roof penetrations, such as walls, chimneys, dormers, parapets, vent pipes, skylights, etc. Proven extended life materials are copper, lead, and stainless steel.

NOTE: When dissimilar metals are placed in contact with one another, galvanic corrosion will result which can cause electropositive metals to deteriorate. One way this can be avoided is by placing strips of sheet lead between the two metals. InSpire Roofing Products does not warranty metal components and accessories.

Step Flashings

Step flashings are used over or under the roof coverings and are turned up on the vertical surface. Step flashings should extend under the uppermost row of the roof tile the full depth of the roof tile or at least 4" over the roof tile immediately below the metal. The vertical leg of the metal should be turned up a minimum of 4" and extend 4" on the roof tile with a 3/4" hem. Flashings should have a minimum length of 9" and must overlap a minimum of 2".

Apron (Roof to Wall) Flashing

Apron flashing is used when a roof terminates to a wall causing a course to be cut and face nailed. It is installed over the shingles and behind siding or counter/cap flashing.
Counter Flashing

1. Cut a minimum 1" deep reglet into the masonry material
2. Custom bend the counter flashing to fit into the reglet
3. Start by installing lowest piece first and work upwards for proper water runoff
4. Fasten the counter using either expandable anchors or masonry screws
**Vent Flashings**

Normal type of roof vents or flashings can be used. A lead stack for plumbing pipes is recommended. Extended-life materials should always be used.

![SOIL STACK DIAGRAM](image)

**Pitch changes**

InSpire Roofing tiles can be installed onto rolling roofs with a gradual pitch change. Some roof designs however have drastic pitch changes where the use of metal flashing is necessary.

![Sheet Metal Flashing](image)
Chimney Saddles

With chimneys more than 2' wide it is recommended that a cricket or saddle be installed to divert water from the back of the chimney.

With chimneys less than 2' may only require a simple pan flashing.
Snow Guards

Snow guards are recommended in areas of heavy snow to prevent snow and ice slides from damaging gutters, landscape, fixtures, and for personal safety. For all roofs use the standard three row pattern: Three rows 24” on center- 12” apart with the middle row staggered 12”.

Hip & Ridge Detail

When pre-formed hip & ridge roof tiles are used, place fastener at fastener guides targets. Fasten hip roof tiles with 2 fasteners (one on each side). Maintain a 6” exposure.

1) Hip & Ridge Roof Tile installation requires the roof tile to be nailed or screwed in place.

   a) Chalk a straight line by placing one piece of hip at the eave and one near the peak, hold the chalk line at the edge of the tile on the top and bottom pieces. This will help keep the hip straight in the event of a crooked hip.

   b) Cover heads of fasteners with an adhesive sealant compatible with the roof tile.

   c) Preformed Ridge Roof Tiles require 6” exposure and require 2” length fasteners.

   d) Fastener deck penetration must be a minimum of 3/4” in depth.
Staggered courses
A staggered roof pattern may be more visually pleasing. If the roof pitch is 5/12 or greater you must use a 6 1/2" exposure and 5 1/2" for a 4/12 pitch.

1. It is recommended that you chalk every course when applying this method.
2. After chalking lines simply place one tile on the line and one tile no more than 1" below the line.
Turret Installation

Turrets and cones need custom cut shingles which change depending on the radius and pitch. They can be quite difficult to install; time and care must be taken during installation.

1. Determine the taper by chalking lines originating at the peak, extending to eve spaced 11-5/8" apart (the width of one shingle)
2. Place the shingle at the eve between the 2 lines, this will give you the proper taper for the first course
3. Mark up from the top of your first tile your exposure. Repeat until you reach the top of the turret.
4. Each course will have a different taper as the pieces get smaller towards the top. You can now place a shingle to each mark and determine the taper per course.
5. Be sure to pay attention to the size of the tiles, if the tiles get too small it may be necessary to use a larger tile and re-chalk lines at some point.
6. Make sure measurements are periodically taken from eve and peak to ensure straight courses.

Precautions

Roof tiles may be slippery when wet or covered with frost. Fall protection equipment is required when working on a roof deck. The contractor may consider the use of toe boards. InSpire Roofing roof tiles should be stored in temperatures above 45°F and the ambient temperature of the product must be at a minimum of 45°F during installation in order to avoid webbing and/or cracking of the roof tiles.

Do not leave debris under the roof tiles while installing that will prevent the design of the roof tile from overlapping on the course below, thus allowing the potential for moisture build up from wind driven rain and/or ice dams.

Use accessory products with a life cycle as equally long-term as the roof tiles.

Technical Bulletins should be reviewed and considered prior to the start of any project.
Application Guidelines
Installation Tips

Technical Bulletins .......... The Application Guidelines address the general procedures for the installation of this product. Technical Bulletins are available to address specific aspects and/or requirements as they relate to certain applications. Please consult the website or contact InSpire Roofing for this information.

Temperature ..................... To avoid cracking or webbing when fastening, the recommended ambient temperature of the roof tiles should not be lower than 32°F; however hand nailing is required between 32° and 45°.

Decking .......................... Minimum 15/32" plywood, 7/16" OSB, or 15/16" minimum solid wood is required.

Underlayment ..................... Type II (No. 30) Asphalt-saturated Organic Felt, complying with ASTM D226 should be used on the decking surface along with standard self-adhering moisture barrier membrane at the hip, ridge, valley, eaves, and rake areas and in accordance with local building codes. For a Class A fire rating Layfast TU-35 SBS by MB Technologies underlayment must be used in place of 30 lb felt.

Chalk Lines ........................ Chalk lines should be snapped horizontally at the exposure line for each row course and vertically on an intermittent basis at the roof tile centerline to ensure that the tiles are straight and uniform. Do not use red chalk.

Bending & Blending ............. No need to bend or blend InSpire Roof Tiles due to the camber of the tile and our color consistency.

Starters / Overhang ............. Starter pieces should be used along eaves with the butts extending up to ½" beyond drip edge at fascia and rake edges.

Fasteners .......................... Ring Shank Stainless Steel or Copper Fasteners are recommended due to the extended life of the roof tile product. Ring Shank Galvanized fasteners are acceptable when the galvanized fasteners do not make contact with any extended-life metals that may be used in the valley or flashing areas. Corrosion resistant fasteners are always recommended, especially in coastal areas.

Fastener Lengths ................. Roof tiles should be fastened with a minimum of 1 1/2" length long fasteners with a minimum 3/8" diameter head. Ridge Cap pieces should be fastened with 3" long fasteners and with a minimum head diameter of 3/8".

Roof Tiles .......................... Flatten the camber of the roof tile to the deck. Install fastener centered within the nail target area. Fastener head should lay on top of the tile in the nail target area to avoid tile lift. Do not over penetrate the fastener!

Cuts ................................. To provide a clean, consistent edge in the valley, the valley tiles should be cut with a circular saw.

Scrap ............................... Up to a 10% scrap factor should be considered when estimating your project and considering the overall field of the roof and the total roof cuts required.