

# KasselWood & Sentry Install Guide

## Metal Shingle, Shake & Slate Profiles

- 1 Index
- 2 Sentry - Special Notes & Differences
- 3 Suggested Tools
- 4 General Installation Instructions
- 6 Deck & Substructure Preparation
- 8 Eave Starter Strip
- 9 Gable Edge Trim
- 10 Gable Channel
- 11 Panels into Gable Channel
- 12 Shingle Installation (KasselWood)
- 13 Staggered Starts
- 14 Damaged Panel Repair
- 15 Sidewall & Gable Trim Intersection
- 16 Pitch Change Transition
- 17 Simple Valley
- 18 Intersecting Valleys
- 19 Shingles into Valleys
- 20 Hips (note KasselWood vs Sentry)
- 21 Corner Hip Caps
- 22 Hip Lineals
- 23 Joining Hip Lineals
- 24 Chimney & Skylight Flashing
- 26 Crickets
- 27 Vent Pipes
- 28 Ridges (note KasselWood vs Sentry)
- 30 Permavent



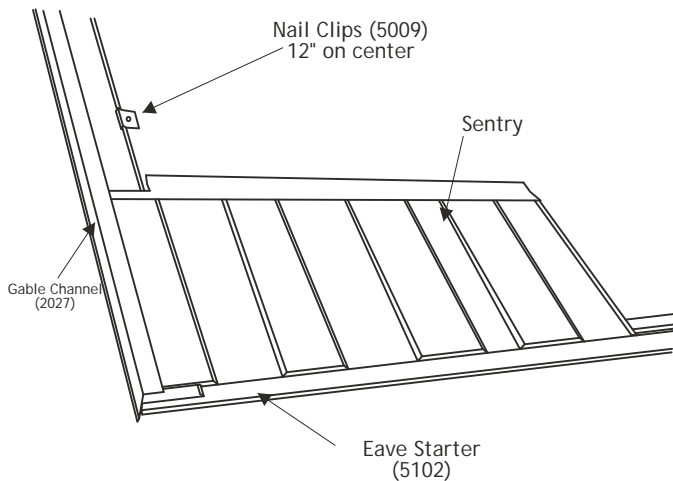
**WHILE MOST DETAILS IN THIS GUIDE APPLY EQUALLY TO SENTRY AND KASSELWOOD, SENTRY HAS SEVERAL UNIQUE DETAILS AS SHOWN ON THIS PAGE:**

**Full width nailing flange - Unique stagger pattern - 5207 Hip/Ridge Cap, requires Nail Clips**

### Sentry Shingle/Shake/Slate

Shingles are installed from left to right, eave to ridge. Begin the first shingle by inserting into the left trim piece. Remove the butt of the first shingle that covers the end of the water return channel. Lock the bottom edge of the shingle over the Drip Edge. Each shingle receives a minimum of five evenly spaced fasteners through the nailing flange. Succeeding shingles lock into the side lock of the previously-installed shingle and proceed on a parallel course from left to right. The bottom lock of the next course of shingles is locked into the top lock of the shingles below. Successive courses of shingles are staggered on a random basis, or in a full 2/3, 1/3 panel stagger pattern, avoiding direct repeat of vertical lines in successive courses.

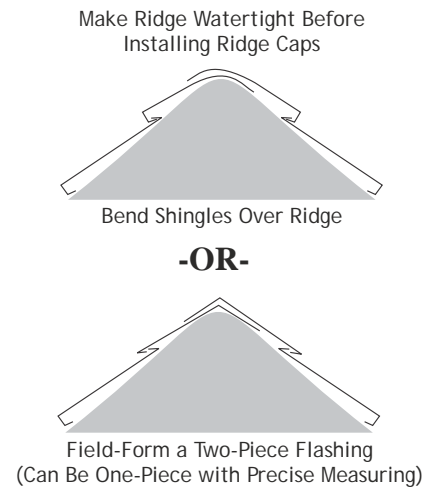
When a shingle is installed into the Gable Edge Trim, insert fully so it extends all the way into the receiving channel.



### Sentry Ridge Treatment

The ridge must be watertight before installing Ridge/Hip Caps (5207). Either: 1) bend the top course of shingles over the ridge by at least 2" or 2) field-form a flashing to make the ridge watertight.

Install a field-formed starter piece on the end of the ridge. Lock the first cap over the starter strip. Install Ridge Caps by engaging back flange into front flange of previously-installed cap. Fasten with four Nail Clips (5009) 4 per cap. Ridge Caps may be started at both gable ends and work toward the center. A trimmed cap attached once the center of the ridge is reached trim the last cap and attach it with sheet metal screws. Seal screw heads. Ridge Caps may also be run from one direction, with the low end of the caps facing the predominate wind direction.

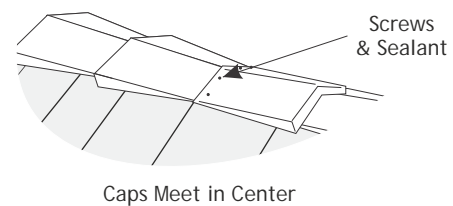
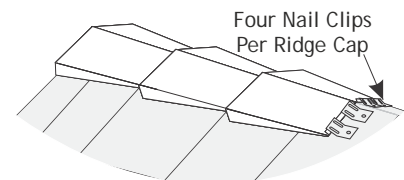
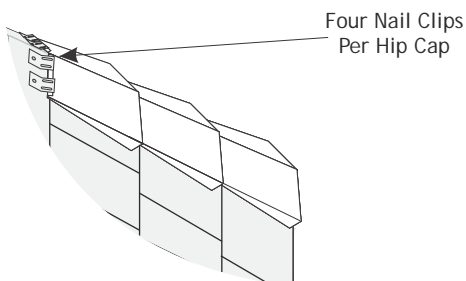


### Hip Treatment

Cut the panels to the hip angle so that the gap at the hipline is minimal and secure into place. As an option, fold the shingles from one side over the other.

For the first cap on a hip, modify a Ridge/Hip Cap (5207) that will fit over the shingles, lock into the Eave Starter (5102) and bend the end of the cap to conform to corner of the roof.

Hook four nail clips (5009) into the back flange of the Ridge/Hip Cap (5207) and fasten them in place. Be certain the fasteners are long enough to penetrate solid decking. Continue to lock the caps into each other as they are installed up the hip line. Flatten shingle butts as needed to allow Ridge/Hip Caps to sit as flat as possible.





## **Suggested Tools**

Below are some of the tools pictured that may be necessary or helpful for installation.

- |                          |                          |                     |
|--------------------------|--------------------------|---------------------|
| ⇒ Tool bag               | ⇒ Caulking gun           | ⇒ Circular saw      |
| ⇒ Tool belt              | ⇒ Protective caps        | ⇒ Extension cord    |
| ⇒ Soft brush             | ⇒ Chalk lines            | ⇒ Roof jacks        |
| ⇒ Framing square         | ⇒ Sliding T bevel        | ⇒ Safety glasses    |
| ⇒ Appropriate fasteners  | ⇒ Utility knife          | ⇒ Gloves            |
| ⇒ Plastic cap nails      | ⇒ Rivet gun and rivets   | ⇒ 2' portable brake |
| ⇒ Nailing clips          | ⇒ Tape measure           | ⇒ 10' brake         |
| ⇒ Hammer with rubber end | ⇒ Tin snips              | ⇒ Ladders           |
| ⇒ Wonder bar             | ⇒ Aviation snips         | ⇒ Scaffolding       |
| ⇒ Nail puller            | ⇒ Cordless drill         | ⇒ Fall protection   |
| ⇒ Zip tool               | ⇒ Drill bits             |                     |
| ⇒ Combination square     | ⇒ Assorted hand flangers |                     |
| ⇒ Screw drivers          | ⇒ Assorted markers       |                     |

**Always use cardboard or a soft surface when working on painted pieces.**  
**Additional tools will be needed to tear off of an existing roof.**



## General Installation Instructions

Use only galvanized or stainless steel ringshank nails or screws. Fasteners should be long enough to fully penetrate sheathing or at least 1" into solid lumber. KasselWood shingles have 4 integrated tabs for attachment and interlock on all four sides.

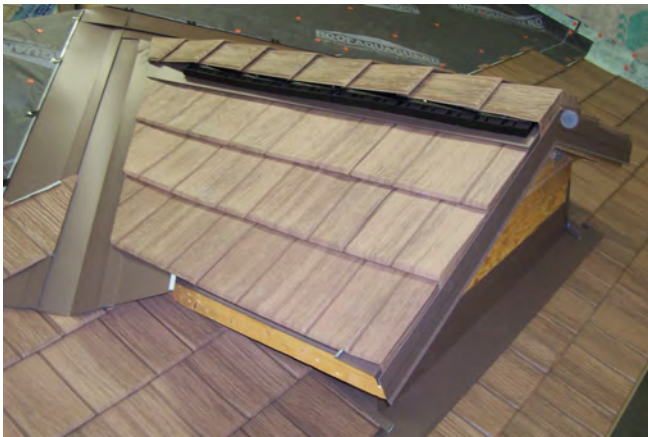
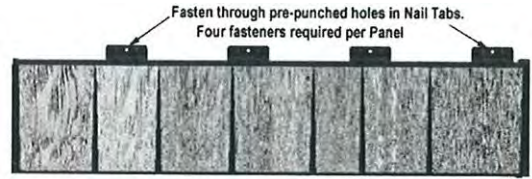


Fig. 1

When installing lineal pieces other than the Starter Strip, fasten a clip every 12" O.C. on the return flange. Do not penetrate the water return channels of any of the lineals except for one fastener at the upslope end to prevent slippage during and after installation. Do not flatten the return flange.



Fig. 2

Uphill flashings should nest inside or overlap downhill flashings by 3" and be sealed with color-matching or clear butyl rubber sealant (**Fig.2**).

Use only the accessories designed for use with the panel. Do not install accessories of dissimilar metal with this system. To protect against moisture problems and/or decay, insulate the product from contact with existing masonry or dissimilar metal by coating with bituminous paint or mastic, or by separating with roofing underlayment.



Fig. 3

Take care not to scratch the panel's surface. Touch up paint should be applied to exposed steel to prevent rust. Do not walk on the panel's bottom or side locks. Work from above the panels whenever possible.

**Roof Layout:** Before beginning panel application, lay out work to minimize cutting and waste. This can be especially useful in avoiding bending or cutting small, difficult pieces, such as when approaching or leaving a valley or hip. Chalk lines parallel to the ridge to ensure that courses remain straight and meet at the top of protrusions such as dormers (**Figs.3 & 4**).

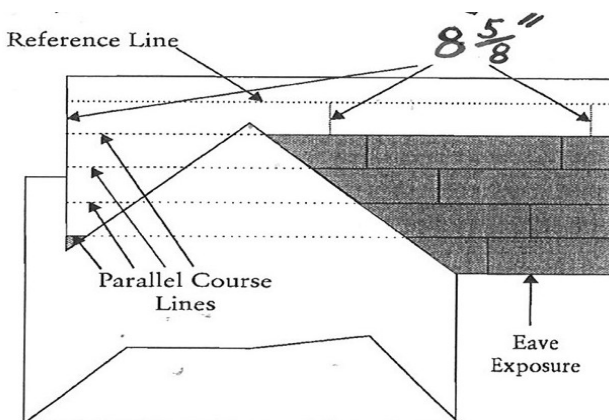


Fig. 4

## General Installation cont.

### **Regular Installation Sequence:**

1. Prepare deck and apply underlayment
2. Eave Starter Strip
3. Gable Channel
4. Valley Flashing
5. Sidewall Flashing
6. Shingles
7. Hip
8. Chimney Flashing
9. Vent Pipe Flashing
10. Ridge

**Safety Considerations:** Caution must be exercised when using ladders. Position the ladder to extend at least 36" above the point of support, with the base at an angle so that the horizontal distance from the foot of the ladder to the building is about 1/4 the working length of the ladder. The ladder should be secured to a permanent part of the roof to ensure safety. Inspect for damaged rungs and examine the locking system.

Upon reaching the roof, inspect it for working hazards. Note the presence of loose roofing or weakened substrate, protrusions such as pipe flashings, electrical wiring, nails, stabilizing wires, and extension cords. Look for moss growth or dampness that might make the roof slippery.

Power saws, especially on cutbacks, must be handled with extreme caution, and should be used only by experienced installers. Wear shatterproof safety glasses with side protection when using cutting tools. Power saws should not be used to cut steel panels or lineals because the heat generated in cutting will promote the formation of rust. Cut the shingles with snips, a guillotine shear or power shear.

Always be aware of your position on the roof relative to your surroundings. Take note of the locations of roof openings, roof edges, equipment, tie-off ropes, co-workers, and other potential hazards. Check with local building codes and other authorities for further safety requirements.



Fig. 5



Fig. 6



Fig. 7



Fig. 8



## Deck and Substructure Preparation

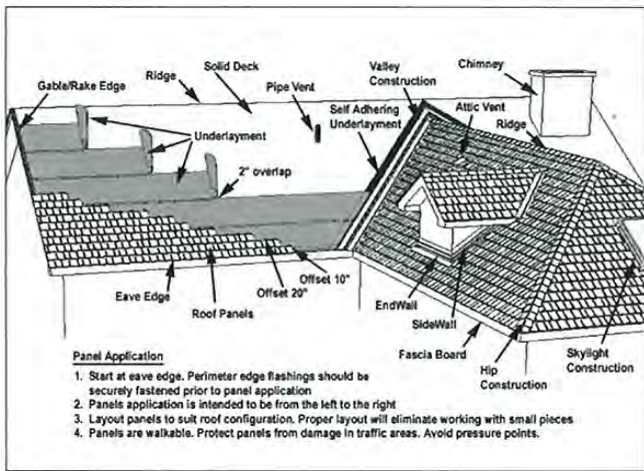


Fig. 9

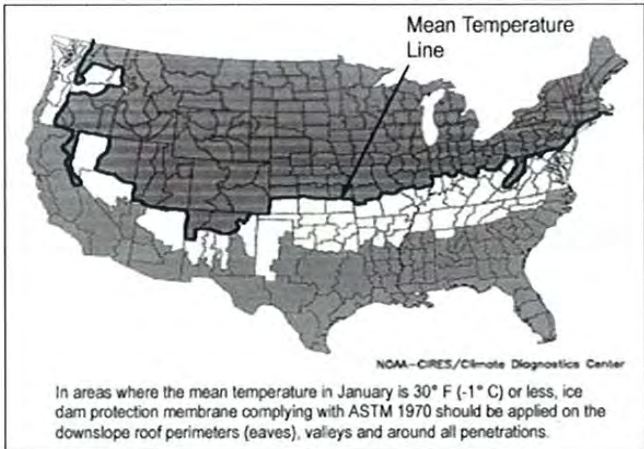


Fig. 10

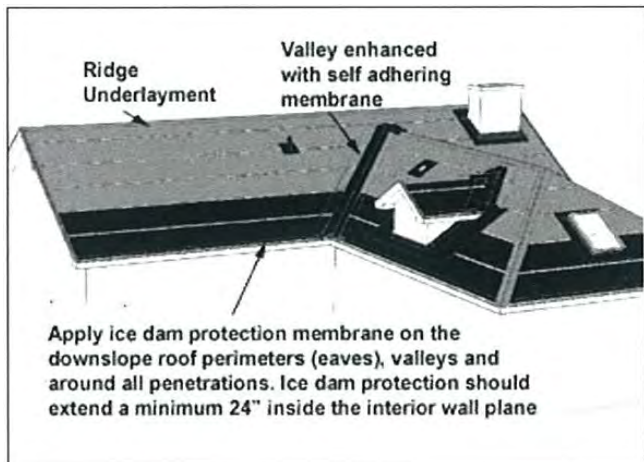


Fig. 11



Fig. 12

Study the diagram in **Fig.9** to be familiar with standard nomenclature for common roof features. Shingles require a **minimum pitch of 3:12** for proper installation. Half-inch plywood or 15/32" OSB deck substrate is recommended for best performance. Inspect and replace any damaged decking. Adequate ventilation from eave to ridge is necessary with any type of roofing to facilitate maximum cooling in the summer and prevention of ice damming in cold winter climates.

Application over an existing asphalt roof is acceptable, if permitted by local building code. All asphalt should be trimmed flush to the eaves and gables prior to application of new edge flashings. Removal of old metal edge flashings is required. Buckled or curled shingles should be flattened to provide a level surface for shingling.

**Fig.10** shows areas in the continental U.S. where the average January temperature is less than 30 degrees Fahrenheit. These areas, shaded darkest on the map, require the application of **ice and water shield** on the downslope perimeters (eaves), valleys, and around all penetrations (**Fig.11 & 12**). Be sure to check with local building codes for specific requirements. Read manufacturer's instructions for more application specifics.

**Class A Fire Rating:** To comply with the Florida building code Class A fire rated roof assembly, apply under the roof panels and over the underlayment, a minimum 1/2" water resistant core gypsum sheathing complying with ASTM C79, 1/4" Georgia-Pacific Dens-Deck™, Elk's VersaShield®, or other code-specified underlayment.

**Underlayment:** A minimum of one layer of synthetic Roof Aqua Guard UDLX (or equivalent) or one layer of ASTM 30-pound asphalt-saturated felt is required over all roof decking not covered by ice and water shield. Secure the underlayment with 1" plastic-top nails 12" O.C. vertically and 16" O.C. horizontally. End laps must be a minimum of 6" and side laps 4". Be sure to lap each top courses of underlayment over the course below. **All perimeter edges of the roof should be overlapped by 1" onto the fascia.** Gutters should be installed **behind** the overhanging underlayment and Starter Strip.



## Deck Preparation cont.

Apply ice and water shield the full lengths of valleys, overlapping where valleys meet. Relief cuts should be covered with a patch (**Fig.13**). At a valley location, run the synthetic underlayment completely across so that the courses of underlayment are woven together and lap at least 8" at the top of the preceding ply. Install this underlayment loosely in the valley to allow for a small amount of controlled shrinkage.

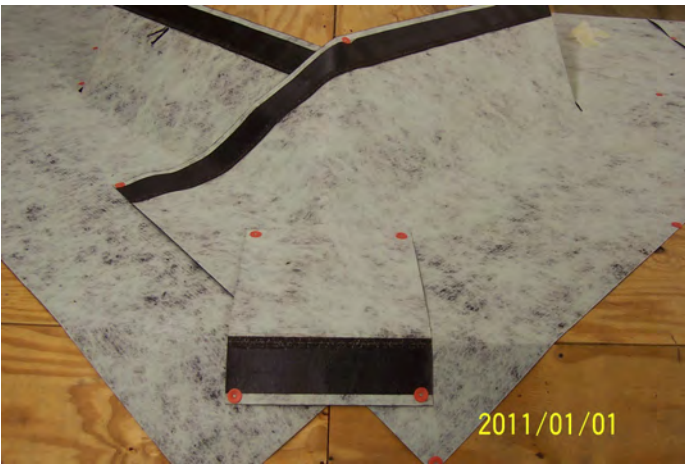


Fig. 13



Fig. 14



Corners that require a relief cut should be patched or sealed (**Fig.14 & inset**).



Fig. 15

**Fig. 15** shows a chimney with ice and water shield properly wrapped around the sides of the chimney from above.



Fig. 16

Run underlayment up the sides of all protrusions and seal appropriately (**Fig.16**).

On walls, underlayment should extend 5" up the side. Lap underlayment over all ridges and cut appropriate openings for all vents when ready to cover each opening (**Fig.17**). 7



Fig. 17



## Eave Starter Strip

When installing Starter Strip (5102) at the eaves, fold down and/or fasten 1" of overhanging underlayment, keeping it under the Eave Starter Strip. Form a 1" tab to wrap around the corner of eave/gable intersections (**Fig.18**).

Secure Eave Starter Strip by nailing it to the deck every 12" on centers.

Nail into rafters when the underside of the deck is exposed to view; otherwise nails may penetrate deck and damage the overhang area.

When joining overlapping pieces of Starter Strip, notch back 1" of the drip hem (**Fig.19 bottom arrow**). Also taper 1" of the leading edge (**middle arrow**) and bend back the water stop top hem to allow the pieces to nest together (**top arrow**).

Butt pieces together and nail through the overlap (**Fig.20**). Make sure that the Starter Strip remains straight and snug against the fascia but do **not** face nail.

At a hip line, mark the point 1" back from the leading edge of the Starter Strip where it will bend around the fascia. Notch the kick out on the drip hem (**Fig.21 middle arrow**) and cut a triangular piece out of the top of the Starter Strip (**top arrow**). Nail through the overlap (**bottom arrow**).

At inside corners, notch a 90 degree triangle out of the leading edge of the Starter Strip and a lesser angle out of the drip hem. Make a straight cut along the valley line of the nailing flange (**Fig.22 arrows**).

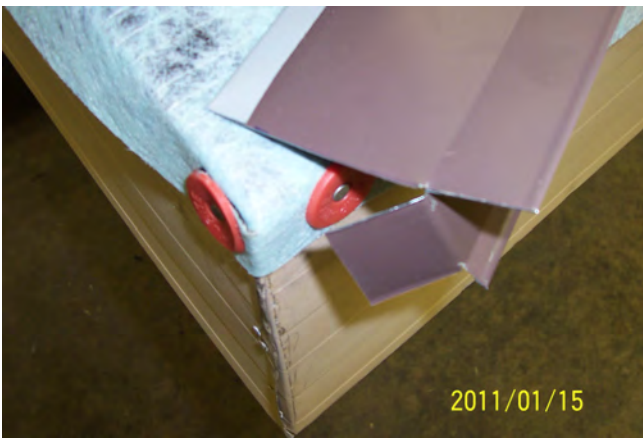


Fig. 18



Fig. 19



Fig.20

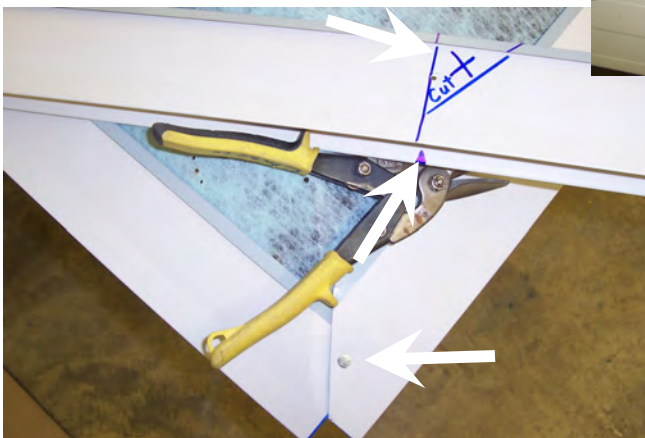


Fig. 21



Fig. 22



## Gable Edge Trim

There are **two options** for gable treatments in the KasselWood system. The **Gable Edge Trim** (5117), shown in **Fig.23**, offers a clean look and fast, easy shingle installation. The **Gable Channel** (5127) option, seen in **Fig.27**, securely anchors the edges of the shingles, avoids the entrapment of debris and highlights the tapered profile of the shingle.

**Gable Edge Trim:** Position the Gable Edge Trim so that it extends 1/2" beyond the Starter Strip (**Fig.23 arrows**). This will be necessary for proper water drainage through the butt of the shingle.

**Fig.24** shows the appropriate cut lines to be made at the peak of the first piece of Gable Edge Trim. Let the piece run 1/2" past the centerline on its side face to lap under the second piece of trim (**bottom arrow**). Also make a tapered tab on the upper face to insert into the upper face of the second trim piece (**top arrow**). Bend this tab down at the peak corresponding to the roof pitch.

Allow the water return channel to run 2" past the ridge. Make a relief cut in the hem of the water return channel at the peak and fold the channel over the ridge. Secure the Gable Edge Trim to the deck and tight against the fascia of the gable with one nail through the channel close to the ridge (**Fig.25 top arrow**). Put a dab of sealant over the nail head.

Plumb cut the second piece of Gable Edge Trim but leave a 2" tab to lap over the ridge. Bring the two pieces together at the ridge while inserting the tab from the first into the top face of the second. (Open this face up a little to receive the tab.)

Trim the second lineal to extend over the Starter Strip by 1/2" and then nail its tab to the deck at the peak nested inside of the hem of the first lineal. Seal the nail head. Attach both lineals with nailing clips every 12" on the hem of the water return channel.

**Fig.26** shows the intersection of a Gable Edge Trim with a piece of Starter Strip. Notice that the upper face of the gable trim needs to be notched back far enough to allow shingles to continue to be installed to the right. (This technique will be subsequently discussed on p.13)



Fig. 23



Fig. 24



Fig. 25



Fig. 26

## Gable Channel

Install Gable Channel up the length of the gable. Attach with nail clips every 12" on center. Uphill pieces should always nest inside and on top of downhill pieces. The overlap should be at least 3".

Over-bending the length of the Gable Channel before installation can help the lineal to hug the gable fascia better (**Fig.27**).

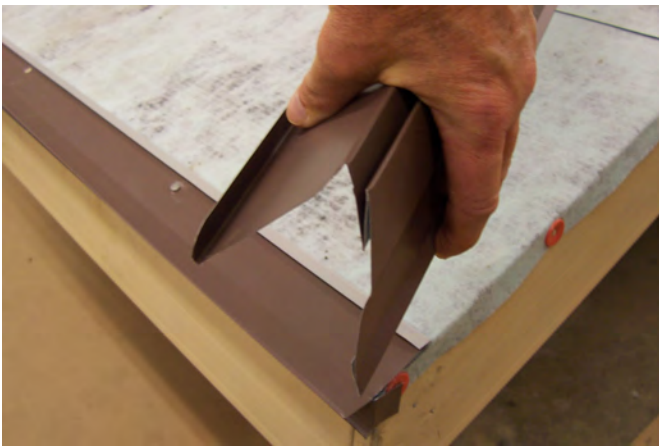


Fig. 27

Position the Gable Channel so that a plumb cut can be made on the gable face of the lineal while leaving a 1/2" extension of the water return channel past the Starter Strip (**Fig.28 lower arrow**).

A sliding T bevel (**upper arrow**) can be useful in setting and duplicating the appropriate angle for a plumb cut .

With the lower end of the Gable Channel extending 1/2" past the Starter Strip, mark a plumb line on the face of the lineal at the peak (**Fig.29 right arrow**). Cut the lineal, leaving 1/2" of material past the plumb line on the face and 2" past the ridge.

Make a relief cut in the water return hem at the peak and fold the 2" tab over the ridge. Secure the lineal with one nail through the tab and seal the nail head with butyl rubber sealant (**top arrow**).

A cut must be made in the bottom of the receiving channel in order to nest the second lineal in from the opposite side (**left bottom arrow**).

Cut the profile at the Starter Strip end of the second Gable Channel as described above, leaving 1/2" of the water return channel extending beyond the Starter Strip. Make a plumb cut at the ridge in the face of the lineal (**Fig.30 top arrow**) and allow 2" of material on top to lap over the ridge. Nest the two channels and drip hems together (**bottom arrow**) and nail the folded-over tab to the deck near the ridge. Seal the nail head.

Secure both lineals to the deck with nail clips every 12" O.C.



Fig. 28

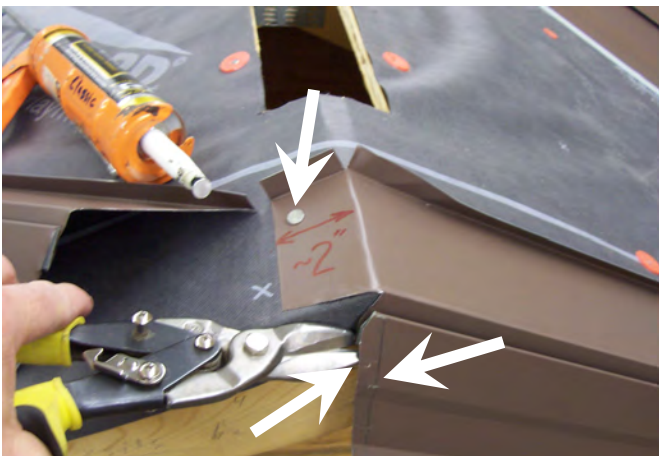


Fig. 29



Fig. 30



## Panels into Gable Channel

When installing Shingles into the 5127 Gable Channel, mark the shingle at the butt and at the top lock where the shingle crosses over the Gable Channel (**Fig.31 arrows & Illus.1**). This will be the bend line.

Also mark the shingle 1 3/4" past the channel at the butt and 1 1/4" at the top lock. This will be the cut line (**Fig.32**).

Cut the bottom and top locks and bend them open as seen in **Fig.32 and Illus.2**. Cut off these tabs leaving 1/8" of material past the bottom and top locks of the shingle. Cut the shingle along the taper line seen in Fig.32.

With a brake or wide hand flangers, bend the shingle down 90 degrees to form a side lock. (**Illus.3**). Engage the side lock into the groove of the Gable Channel as the shingle is locked into place (**Illus.4**).

The hem on the water return channel may be depressed slightly to enable the shingle to sit flat but do **not** flatten completely (**Fig.33**).

A 1/4" high drain will need to be cut in the first course shingle only for the water return channel to protrude 1/2" past the Starter Strip (see **Fig.23**).

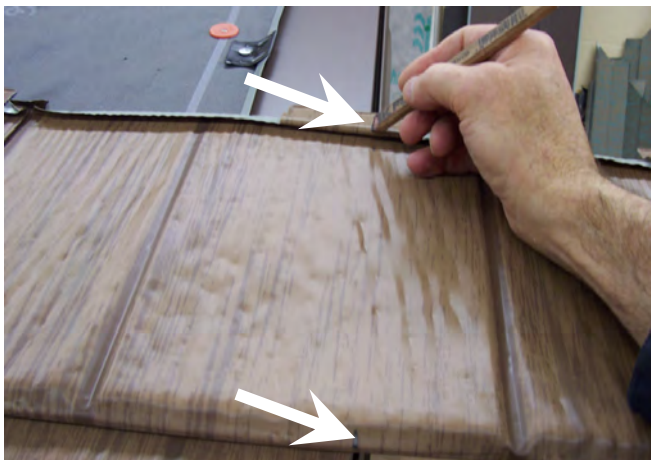


Fig. 31



Fig. 32



Fig. 33

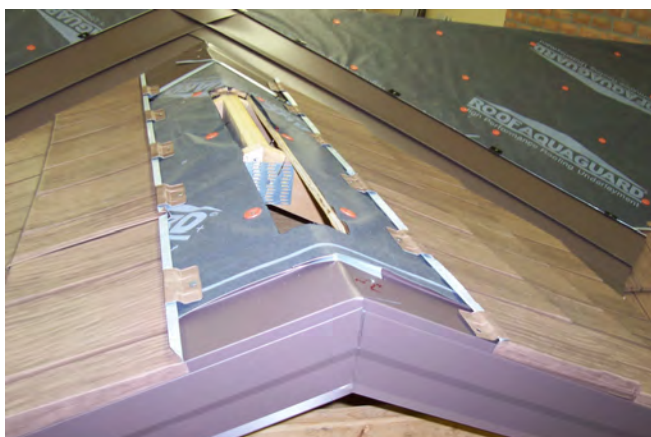
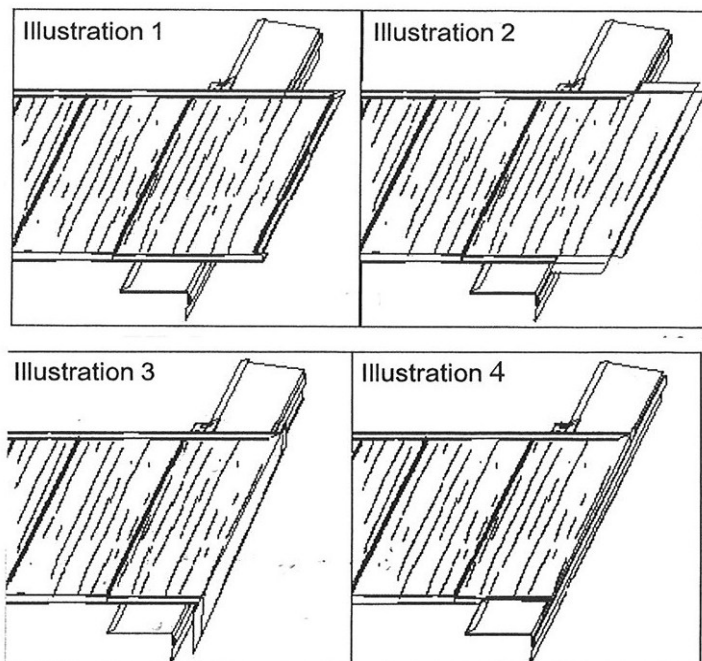


Fig. 34





## Shingle Installation

Applies to KasselWood. For Sentry, See page 2

Before panel application, lay out work to minimize cutting and waste (e.g. shifting the whole four course stagger pattern to the right or left to avoid crossing a side lock at a valley bend.)

KasselWood shingles (5101) are installed left to right, eave to ridge. Make sure all clippings and abrasive materials are swept from the material immediately to prevent scratching.

The bottom edge of the first course of panels hooks on to the Starter Strip. Subsequent panel courses interlock into place vertically by sliding the under-turned flange of the top course panel into the up-turned flange at the top of the panel below. **It is imperative that shingles be fully locked together.** Tapping the butt firmly with the rubber end of a hammer and using a block of wood on the side of the panel is highly recommended (**Fig.36 & inset**). Attach each panel with four galvanized or stainless steel nails through the integrated nail tabs.

Each panel course will have a vertical exposure of 8-5/8". Snapping horizontal lines is highly recommended to ensure proper panel position. Chalking a line up 10-1/2" from the edge of the starter will ensure that the tab tops of the first course line up.

**Fig.36** shows the standard KasselWood stagger pattern. (**Note: Panels to the right are removed for illustration.**) The first course begins at the left edge of the roof with a full panel. The second course begins with a half panel, the third with three-quarters, and the fourth course with a quarter panel. The fifth course begins the pattern repeat with a full course.

**Fig.37** shows the cut positions corresponding to 1/4, 1/2, and 3/4 of a panel. These cuts correspond to taking 30, 20, and 10 inches off the left side of the panel, leaving the right side with its lock to be used in starting the 2nd, 3rd, and 4th courses. Note that these cut positions, conveniently, are each 1/4" to the right of each corresponding tab (see arrows).

Drain slots must be cut in the first course shingles where they cross a water return channel. Flip the panel to place the cut (**Fig.38**) and remove 1/4" of the butt above the water return channel (inset).



Fig. 35



Fig. 36



Fig. 37



Fig. 38





## Staggered Starts

**Fig.39** shows a bump out or a staggered start situation that would cause the top locks of the two roof sections to not align (**arrows**). The amount of offset in this picture amounts to two or three inches.



Fig. 39

There are two methods shown on this page for making up this offset. Both make up the difference at the eave. It is critical that the **precise** distance to be made up is known. Temporarily setting shingles in place from the lower eave can enable this measurement to be determined (**Fig.39**). Avoid short courses in the middle of a field.

The first method entails using coil stock to make up the difference at the eave. The coil should run a minimum of 3" upslope beyond the difference to be made up. An additional 1" is needed for an under-turned hem to lock on to the Starter Strip. The coil stock will extend horizontally into the gable treatment and needs to have a drain slot cut for each water return channel (**Fig.40 arrows**)

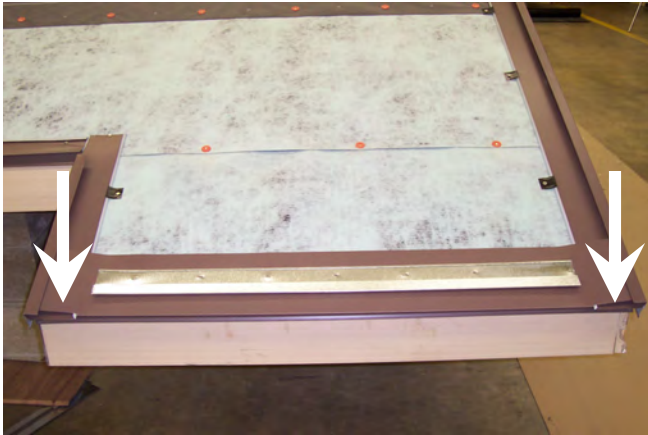


Fig. 40

Fasten a piece of anchor strip between the water return channels at the exact distance needed parallel to the edge of the Starter Strip. Nail every 12" O.C.

**Fig.41** shows this coil stock method with shingles installed and may look best when there is less than 5" or so to make up.

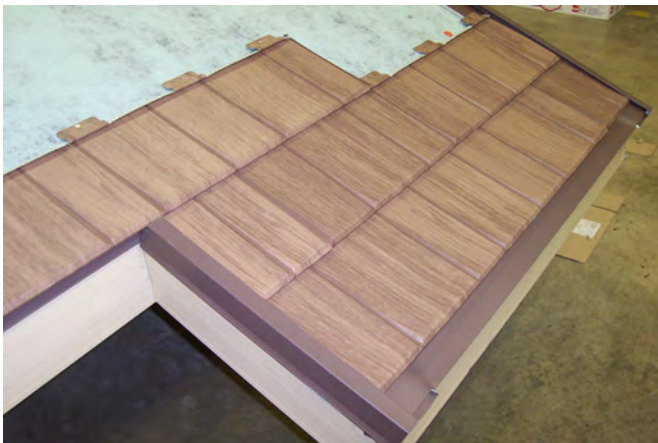


Fig. 41

A second method is to install the first course of shingles and fasten the anchor strip through the shingles at the appropriate distance upslope (**Fig.42**). This method of applying in a short course at the eave may look the best when there is more that half a shingle's height to be made up.

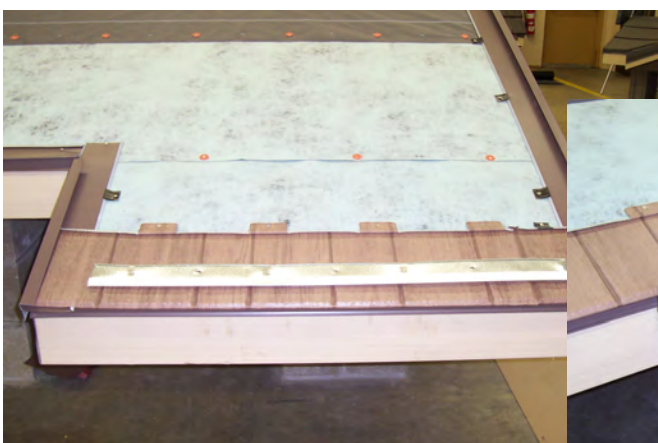


Fig. 42

**Fig.43** shows this short course method with shingles installed.

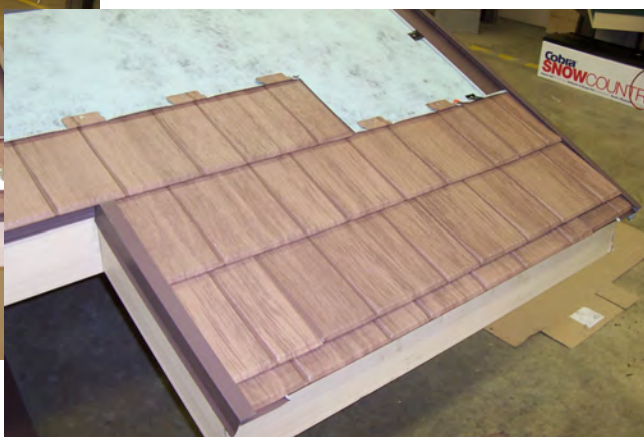


Fig.43

## Damaged Panel Repair

Should a panel become damaged, in most cases the individual sections can be easily capped over.

Identify the section of panel damaged and use butyl rubber sealant to fill any penetrations. Find the corresponding section of panel from a scrap piece of panel if possible.

Score the middle of the rain grooves on each side of the section several times (**Fig.44**).



Fig. 44

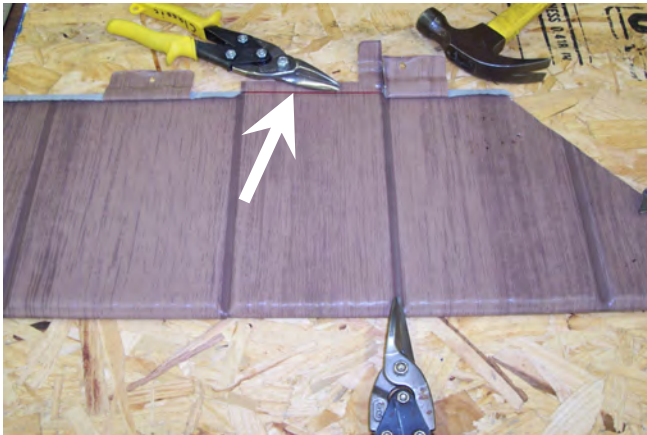


Fig. 45

Cut the top and bottom locks in line with scores lines just made (**Fig.45**). Open up the top lock and cut off the upturned portion at the crease (**arrow**).

Bend the shingle back and forth along the scored lines to separate the section from the shingle.

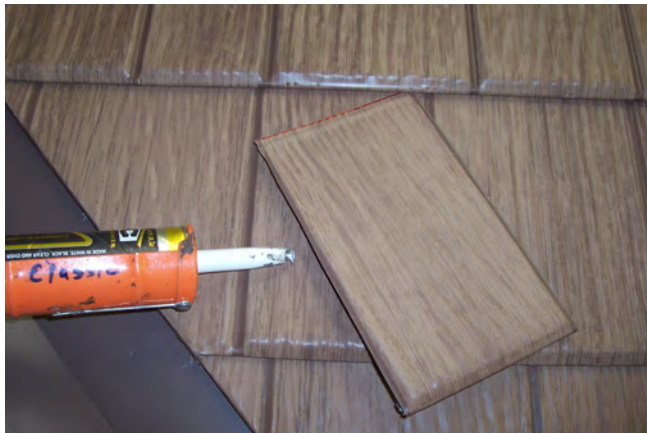


Fig. 46

Apply a liberal bead of sealant around the entire perimeter of the damaged section (**Fig.46**).

Slip the replacement section over the top of the damaged section. Using the rubber end of a hammer or similar tool, firmly engage the section in place (**Fig.47**).

Make sure the section is fully inserted under the bottom lock of the shingle above and locked around the bottom lock of the shingle being capped over.

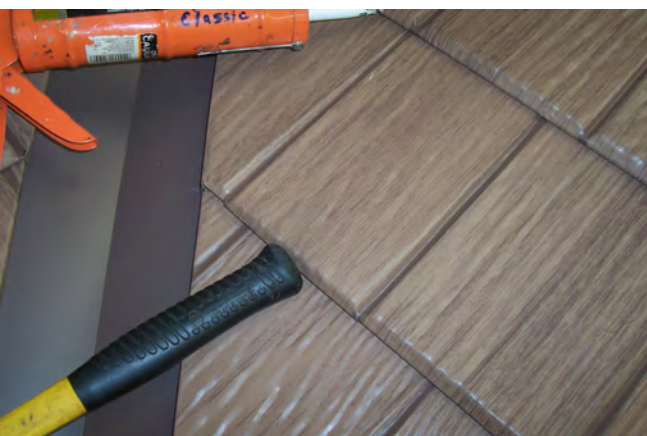


Fig. 47



## Sidewall and Gable Trim Intersection

A Sidewall and Gable will intersect when a shed dormer without an overhang meets the main roof of a house. Care must be given to not allowing water infiltration at this intersection.

Position the Sidewall to trace the necessary bend and tabs (**Fig.48**). Make sure the sidewall water return channel extends 1/2" past the Starter Strip. Leave a tab to wrap under the exposed, unpainted part of the "F" channel (**arrow**).



Fig. 48

Install the Sidewall Channel as seen in **Fig.49**. Nail clips need to be fastened every 12" O.C.

The top of the shingle receiving channel needs to be terminated 1/2" before the point where the top lock of the course of shingles coming in from the left in **Fig.49** will meet (**left arrow**). This will allow panels to be installed across the top of the channel. Measure up from the Starter Strip in increments of 8-5/8" to find this point or temporarily stack panels up to this point (**see Fig.39**).



Fig. 49

Position the Gable Edge Trim so that the water receiving channel extends 1/2" beyond the Starter Strip. The drip leg of the Gable Edge Trim coming into the intersection will need to be tapered and bent out (**Fig.49 right arrow**) to rest upon the top of the shingle receiving channel of the Sidewall Flashing. Do **not** cut this bend-out off so that water infiltration between the pieces will be prevented.

The end and side of the drip hem near the end should be bent to wrap around the top of the Sidewall Flashing (**Fig. 50 arrows**).

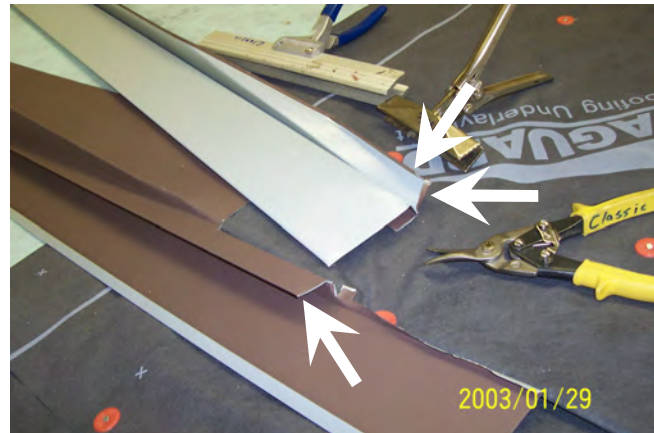


Fig. 50

Position the Gable Edge Trim over the Sidewall Flashing, hook into place, and secure with one nail at the top of channel (**Fig.51 top arrow**). Apply sealant liberally to the top space between the two pieces (**bottom arrow**). Seal the nail head as well.

A further water infiltration prevention measure (a tab) will be incorporated into the transition flashing dealt with in the next section.

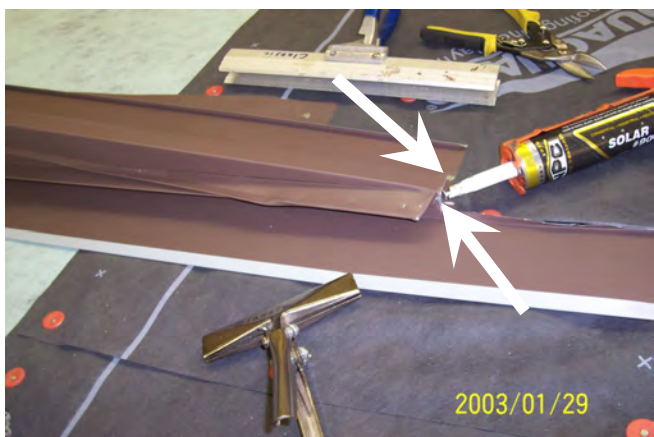


Fig.51

## Pitch Change Transition

With the roof sections shingled as shown in **Fig.52**, field form a piece of trim coil to be installed at the pitch change.

In the situation seen in **Fig.52**, the transition piece extends to the outside edges of the Sidewall Channel marked by the **outer arrows**. Tabs are then cut back to allow the piece to nest inside of the Gable Edge Trim (**inner arrows**). These tabs will need to be folded over the exposed ends of the Gable and Sidewall Channels to divert water (**Fig.55**).

The transition flashing should have a 5/8" under-turned hem to lock into the top lock of the last course of shingles below it (**Fig.52 middle arrow**). The flashing should be bent to mirror the pitch change and then extend a minimum of 4" up the roof.

Underlayment should be woven under the underlayment course above the transition and brought down over the transition flashing to the pitch change point (**Fig.53**).

Snap a line between the top locks of the top course of panels on the sides of the dormer. Fasten an anchor strip between these two top locks to provide one continuous lock for the next course of panels (**Fig.54 arrows**).

**Fig.55** shows the trimmed tab folded over the two channels and secured with a 1/2" stainless steel sheet metal screw. Extra sealant should be put under the tab and over the screw. Note the alignment of the top lock of the shingle and the anchor strip.

Follow standard installation procedure and install the next course of panels across the top of the transition (**Fig.56**).

Transitioning from a **high to low pitch**, such as on a gambrel barn roof, is done in a similar manner but with the coil flashing being bent in the opposite direction mirroring the pitch change.



Fig. 52



Fig. 54



Fig. 55



Fig. 56

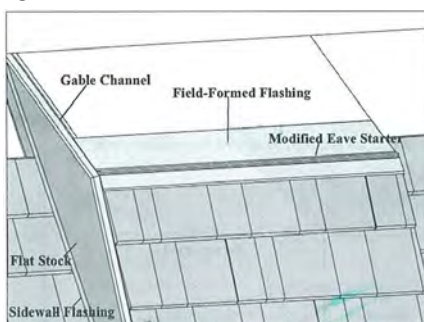


Fig.57



## Simple Valley

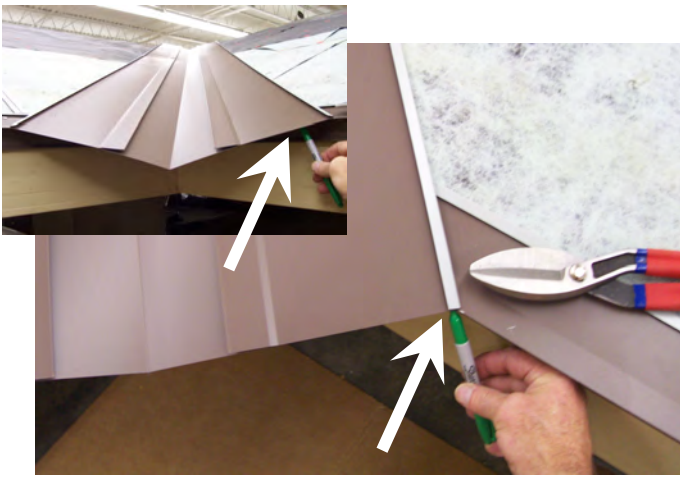


Fig. 58

Valleys (5125) have a subtle taper to facilitate nesting pieces on long valleys. Make sure that the wide end is upslope so that the upper Valley piece can nest inside the lower piece.

After snapping a chalk line down the center of the Valley Underlayment, align the center of the Valley with this chalk line. The corners on both sides of the Valley should be even with the edge of the Starter.

Mark the underside of the Valley the full length where it runs along the Starter Strip (**Fig.39 arrows**).

Carefully turn the Valley over and cut the Valley along a parallel line, 1" further toward the end. Make a relief cut from the cut line to the bend line (**Fig.40 arrow**).

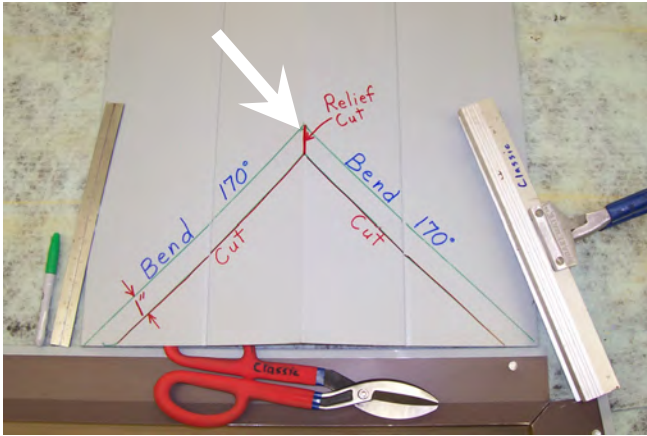


Fig. 40

Using hand flangers, bend the locking tabs back about 170 degrees (**Fig.41**). These tabs will lock under the Starter Strip.



Fig. 41

Turn the Valley back over, center it on the chalk line, and push it up, fully engaging it on to the Starter Strip. Secure it to the deck with nail clips spaced every 12" O.C. (**Fig.42**).

Two nails can be driven through the **top outside edges only** of the water return channel right next to the upturned, outside hem to prevent slippage. Seal these nail heads. If the Valley piece extends to the ridge, cut it 3" past the ridge and drive two nails through this fold-over and seal.

If more than one Valley length is required, the uphill section must overlap the lower section by 3" with sealant applied in between.



Fig. 42

## Intersecting Valleys

When two Valleys intersect as at the top of a dormer, care must be exercised to make sure the two Valley pieces are “woven” together properly and sealed.

Position the Valley piece so that the water return channels extend past the drip edge of the eave and over the course of shingles perpendicular to the dormer. The butts of the shingles over the water return channels must be cut to allow these channels to drain (**Fig.43 arrows**).

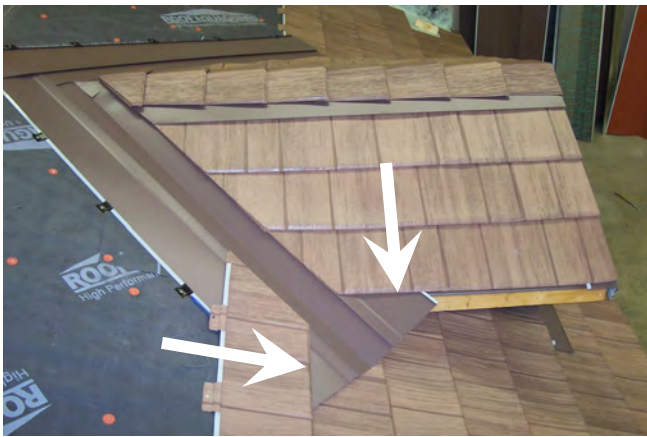


Fig. 43

Mark a line across the Valley extending from the ridge line to the upper corner of the Valley (**Fig.45 right arrows**).

Using a framing square or similar tool, mark and cut a stair step pattern as seen in **Fig.44** to allow triangular tabs to extend **across** the ridge line.

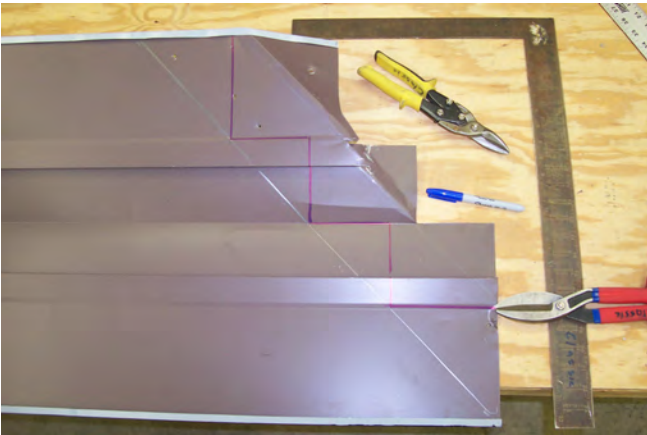


Fig. 44

Repeat this procedure for the Valley coming in from the opposite side of the dormer.

Using hand flangers, slightly over-bend the two tabs that will lap over the ridge. Center the Valley and secure with two nails at the outer edges of the water return channels and seal (**Fig.45 left arrows**).



Fig. 45

Trim the second Valley if necessary to nest inside of the first as it laps over the extended ridge line. Apply sealant **under** the overlap area before installing.

Slightly over-bend the tabs that lap over the ridge and secure the piece with two nails near the outer hems (**Fig.46 arrows**). Seal both the nails as well as all cut edges and overlaps with butyl rubber sealant.

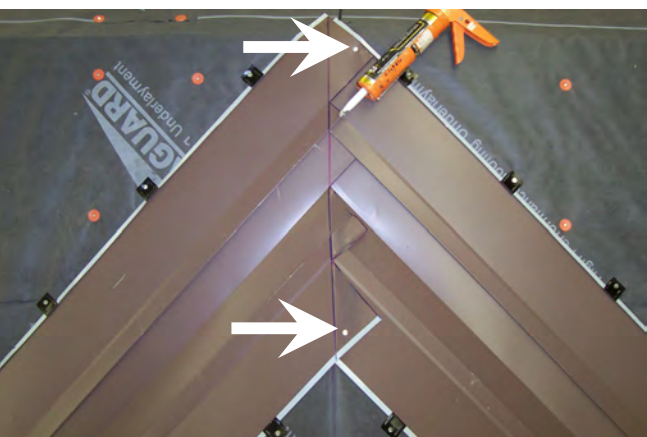


Fig. 46



## Shingles into Valleys

When installing shingles into Valleys, snap chalk lines across the roof section every two or three courses to ensure that courses remain parallel to the ridge.

An edge taper should be bent into the valley side of the shingle tapering from 1/2" at the butt to 1/8" at the top (**Fig.47 right arrows**). A drain slot will need to be cut corresponding to the width of the valley water return channel (**left arrows**).



Fig. 47

Securely lock the panel in place and mark where it crosses the receiving hem in the Valley (**Fig.48 arrows**). Remove the panel and rough cut it about 1-1/2" past these marks.



Fig. 48

Cut and fold open the top and bottom locks at the marks just made (**Fig.49**). Make a fold line connecting the marks (dashed blue line nearest to the body of the shingle). Cut the locks perpendicular to the **inner** fold line leaving about 1/8" extra material (**Fig.49 outer arrows**).

Make another fold line that is 1/2" out from the butt and 1/8" out at the top of the shingle representing the shingle taper (**outer dashed blue line, inner arrows**).

Draw a third line another 5/8" out from the taper line. This will be the cut line for the side lock that will fit back into the Valley Receiving channel (**center arrow on red line**).

With a portable brake, bend the shingle 90 degrees on the **outer** fold line. Straighten the shingle back out and repeat the same fold a couple times to produce a "memory" in the steel that will allow hand bending this fold after the other fold is bent.

With the shingle nearly straight, bend the shingle 90 degrees on the **inner** fold line (**Fig.50 and inset**). Remove the shingle and hand curl the side lock 180 degrees under. Remove the shingle and fit it into the Valley Receiving channel as seen in **Fig.47**.

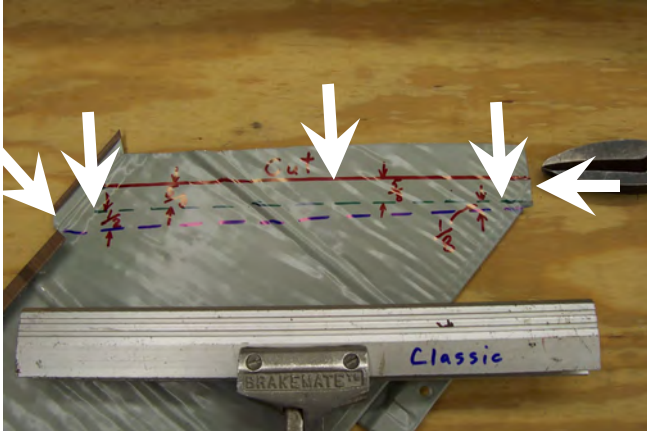


Fig. 49



Fig. 50



## Hip Caps

KasselWood shingles have two hip treatments using either Hip Caps (5107, **Fig.54**) or Hip Lineals (5170, **Fig.64**). The following procedures are for the installation of Hip Caps.

Chalk a line along the hip from eave to ridge. Cut all shingles coming to the hip from the left even with the ridge line (**Fig.51 arrows**).



Fig. 51



Fig. 52

Shingles on the right side of the hip line will lap over the hip line 2" to the left of the line. Sealant will need to be applied about 1-1/2" to the left of the hip line as each shingle is installed. This is indicated by the line drawn in **Fig.52 (arrows)**.

As mentioned above, lap the shingles on the right side of the hip 2" over the hip line to the left and on top of a bead of sealant. Fasten the ends of each shingle with two or three nails to cause the shingle to rest flat against the shingle on the other side (**Fig.53 arrows**).

**Below applies to KasselWood. Sentry requires 4 clips per hip/ridge. See page 2**

The forming of the first corner cap is discussed on the next page. Fold each Hip/Ridge Cap as required to fit the specific hip or ridge pitch. Chalk a line along the hip line over the lapped shingles to keep Hip Caps straight as they are being installed.

Using only nails or screws of a length long enough to fully penetrate the substrate, fasten the Hip/Ridge Cap through the two pre-punched holes in the anchor portion of the cap. Make sure each subsequent cap is fully engaged before nailing. The butts of the shingles on each side of the caps will need to flatten a little to ensure each cap sits flat. Each cap should have an 8" vertical exposure (**Fig.54**).

At the intersection of two hips and a ridge, lap the last Hip Caps, through-fasten, and seal.

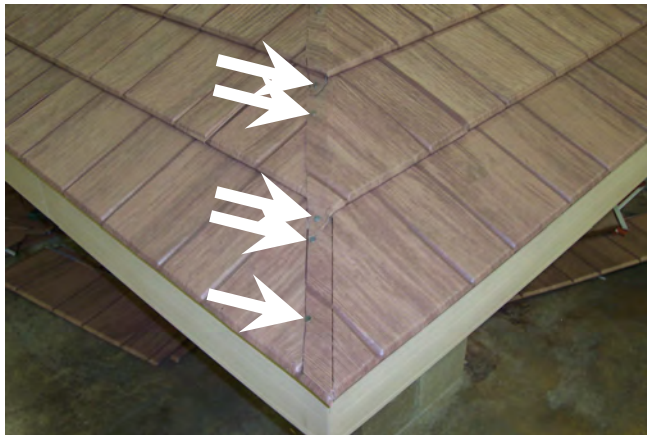


Fig. 53

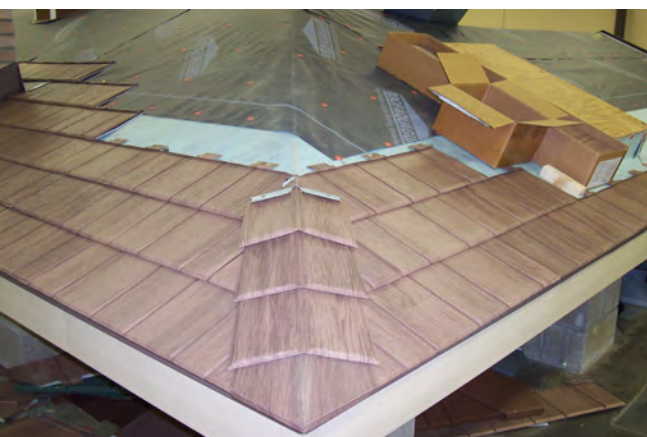


Fig. 54



## Corner Hip Caps

The first Hip/Ridge Cap at each hip will need to be modified to hook over the first course shingles as they meet at the corner of the eave. The end of the cap will need to conform to the corner of the roof.

After opening up the bottom lock of the first Hip Cap, center the cap on the hip line far enough down to fully mark the corner roof angle (**Fig.55**).



Fig. 55

Turn the cap over and check to see that the two fold lines that were just traced (**purple in Fig.56**) meet in the center of the cap and are equal distances down from the top corner.

Mark a second set of fold lines parallel to and 5/8" down from the first set of fold lines (**green**). Mark two **cut** lines another 1" down from and parallel to the second fold lines (**red**). Notch the side of the cap about 3/8" (**Fig. 56 arrow**) so that the flattened sides can be re-bent into position after the butt is formed. Cut out the Cap as seen in **Fig.56**.

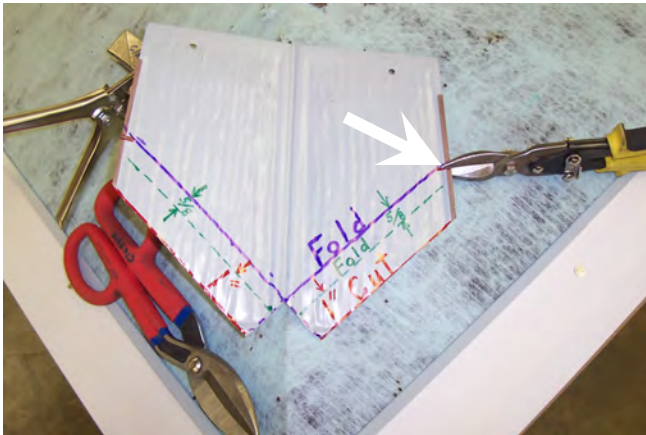


Fig. 56

In a brake or with hand flangers, bend the cap as seen in **Fig.57** to form a new butt and under-turned lock. Bend the outer folds first and then flatten so that the inner folds can be bent on both sides. Refold the under-turned lock by hand or with hand flangers.

**Fig.58** shows a properly formed corner Hip Cap. Note the miter cut at the **bottom arrow** and the down-turned sides (**top arrow**).

Fasten the corner Hip Cap into position centered on the hip line through the pre-punched holes in the anchor portion of the cap. Install Hip Caps the entire length of the hip. Make sure that each cap is fully engaged into the next cap and centered on the hip line (**Fig.54**).

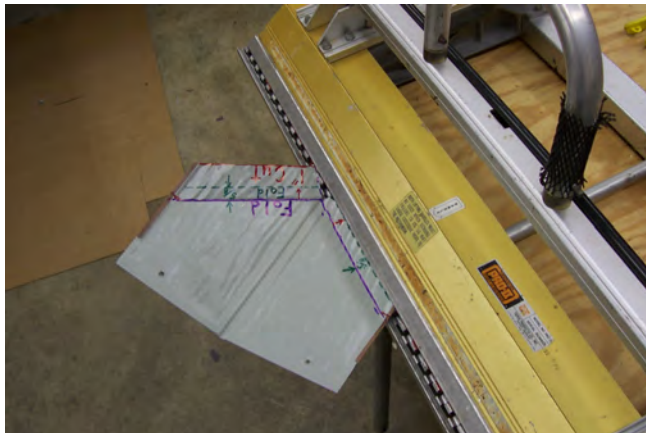


Fig. 57

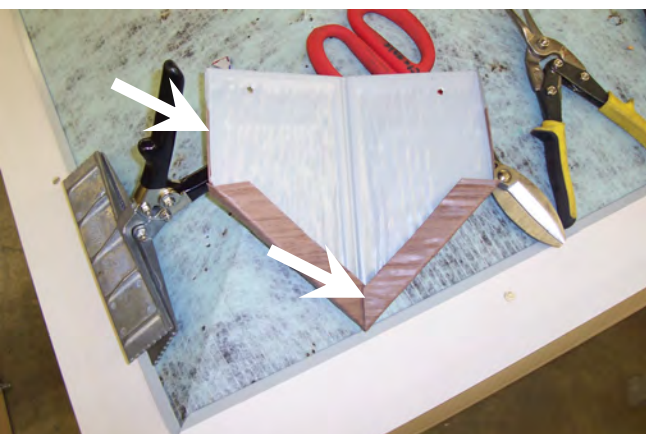


Fig. 58

## Hip Lineals

Center a square 7"x 7" piece of cardboard on a hip line with one edge just over the Starter Strip. Trace the angle and cut the cardboard to make a **template** for cutting the hip lineals. Fold on the center line. Using a pencil, transfer this angle to the hip lineal at the end and also 1" in from the end (**Fig. 59**). Cut the front edge with snips.



Fig. 59



Cut the outside nailing flanges back to the 1" mark and angle back slightly for a neat appearance (**Fig.60 left arrow**). Cut the bottom inside of the water return channel 1" back to allow for a tab to be folded under. Using hand flangers, bend tabs 7/8" back (**Fig.60**). These tabs will fit into the Starter Strip.



Fig. 60

Slightly taper cut the outside edges of the "T" top of the hip lineal back to the 1" mark (**Fig.60 right arrow**).

Score the underside of the "T" top 1" in and parallel to the end of the lineal (**Fig.61 arrow**). Remove this material in order to be able to make a crisp bend for a down-turned tab.

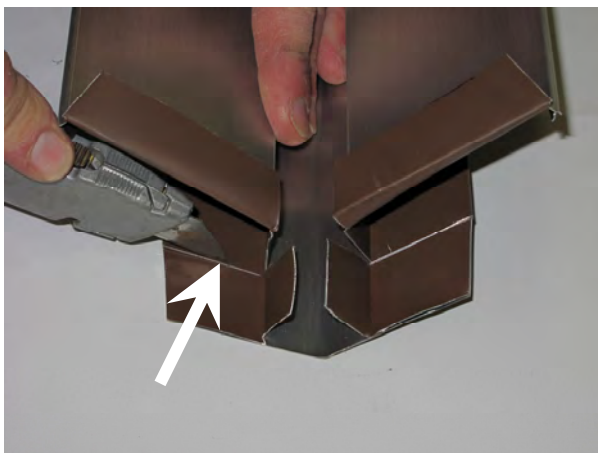


Fig. 61

Cut a narrow "V" centered on the top of the "T" to allow the down turned tabs to fit neatly together. Be careful not to trim too much.

Using hand flangers or uniform pressure from three fingertips, bend top tabs approximately 80 degrees down (**Fig.62**). Trim center "V" cut as necessary and insert tabs into eave starter.



Fig. 62

Secure hip lineal with clips on both sides 12" O.C. Cut and insert shingles remembering to maintain the stagger pattern and to cut a drain in the first course (**Fig.63 arrow**).

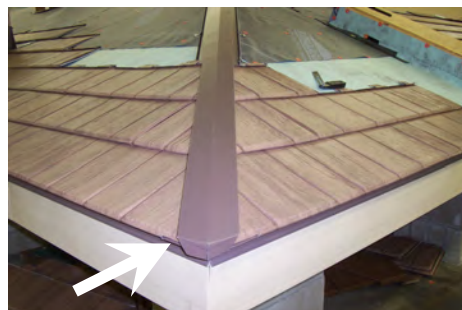


Fig.63





Fig. 65



Fig. 66



Fig. 67



Fig. 68

## **Joining Hip Lineals**

(For hip lengths over 10' or pitch changes)

The bottoms of the hip lineals should be formed and check fitted into the Eave Starter.

The procedure for joining two lineals is as follows:

Mark both sides of lower lineal "T" top at 3".

Slightly taper cut both sides to the 3" mark (**Fig.65**).

With a utility knife, score the top of the inside wall of the lower lineal back 3" and lift top (**Fig.66**).

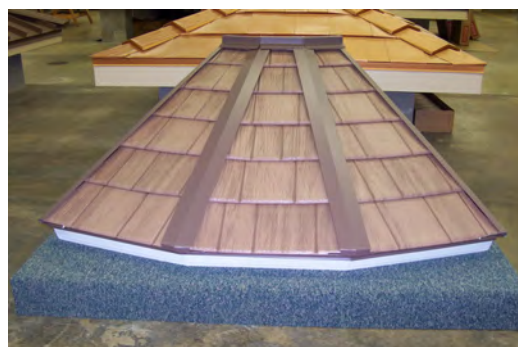
Open both nail flanges of the lower lineal enough to receive the bottom 3" of the Top lineal. The lower flanges (coming from the left in **Fig.67**) will be wrapped around the upper flanges (**arrow**).

Apply two parallel lines of butyl sealant in the 3" overlap section of the water return channel of the bottom hip lineal.

Slide upper lineal over the taper in lower lineal (on the right in **Fig.68**) to the 3' mark.

Wrap lower flanges around upper flanges.

Secure lineals every 12" O.C. with nailing clips and galvanized or stainless steel ring shank nails on both sides of lineal.



## Chimney and Skylight Flashing

The pictures in this section show recommended flashings around a **chimney**. **Curb mounted skylight** flashings will be identical with the exception of the top of each flashing which will need to be formed to fit the specific counter-flashing that comes with the skylight. The techniques and pieces for the front and sides of the chimney will be the same for a **dormer**.

Inspect the chimney and its flashings to see if any repairs need to be made before proceeding. Remove old chimney flashings **only** if they interfere with new flashings. Make sure that underlayment has been run at least 5" up the sides of the chimney as described at the beginning of this manual.

A 1/2" deep masonry cut must be made at a uniform height (at least 5") parallel to the deck all the way around the chimney. The cut should be above existing flashings. It may be possible to use a 2x6 or 2x4 as a guide to make this cut on the sides and front (**Fig.70**). If not, use a chalked line as a guide. Ideally, 1/2" of height for insertion into the kerf should be left in the height of the Sidewall Flashing. If the kerf needs to be higher than the sidewall height, counter-flashing will need to be formed to lap down to the shingles.

**Fig.71** shows the profile of the front, field-formed apron flashing. The flashing must extend down to the roof deck and 4" on top of the shingles below and be **5" wider** than the chimney on **each side** so that the 4" wide sidewall water return channel completely empties on to it. A bend and an under-turned hem will add a finished appearance and additional strength. Depending on where the course below the chimney falls, it may be possible to hook this into a top lock. Notice in **Fig.72** that the shingle below the chimney was not cut off but rather run up the chimney to function as a water stop (**arrow**).

**Fig.72** displays the cut and fold that needs to be made to wrap the apron flashing around the sides of the chimney and to nail it (**Fig.73 arrow**) to the deck.

Butyl rubber sealant should be placed into the kerf before the insertion of the flashings (**Fig.73**), A second bead of sealant can then be applied after the flashing is in place.



Fig. 70



Fig. 71

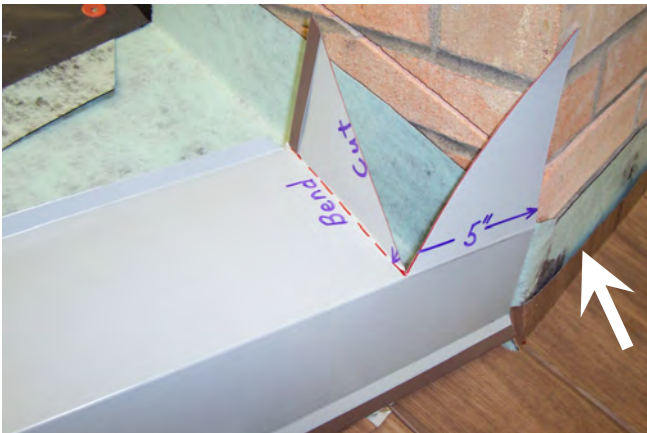


Fig. 72



Fig. 73



## Chimney Sidewall and Upslope Flashings

Install 5121 Sidewall Flashing along the two angle sides of the chimney. Each piece must be long enough to extend 1" past the bottom corner of the chimney and at least 1/2" through the butt of the first shingle to be inserted into the channel. The Sidewall Flashing should extend at least 3" uphill of the chimney and attached with a sealed nail at the very top (**Fig.76 top arrow**) and nail clips every 12" O.C.

Hold the sidewall piece against the chimney to mark the front and back fold lines shown by the dotted lines in **Fig.74** (**inner arrows**). Draw lines for 1" tabs to wrap around the chimney. Notice that another tab is left to be wrapped down around the metal that will be exposed over the front apron (**left arrow**).

Cut a drain slot in the bottom lock of the first shingle to be installed into the Sidewall Flashing (**Fig.75 top arrow**). Apply clear or color matching butyl rubber sealant to all joints and openings (**side arrows**).

Using a brake, form a flashing for the back of the chimney that extends at least 12" up the roof and 5" up the back of the chimney with a 1/2" lip to insert into the previously made saw kerf (**Fig.76**). The flashing should be 9" wider than the chimney to form "dog ears" on both sides that will divert water around the chimney. The dog ears should be 2" wide at their base. The extra 2-1/2" of material should be used for a back fold to cover the unpainted metal.

Form 1/2" upturned water return flanges on the sides of the back flashing (**Fig.77 outer arrows**). Continue running shingles up the sides of the chimney and notch the top shingle on each side to fit around the dog ears. Install a piece of underlayment the width of the back flashing between the flanges, over the flashing and up under the course of underlayment above it.

Install a piece of anchor strip the width of the back-flashing between the top locks of the courses of shingles on both sides. This will be the lock for the full course of shingles running past the top of the chimney. Put a dab of sealant at the spots where the nail will penetrate the pan before driving the nails.

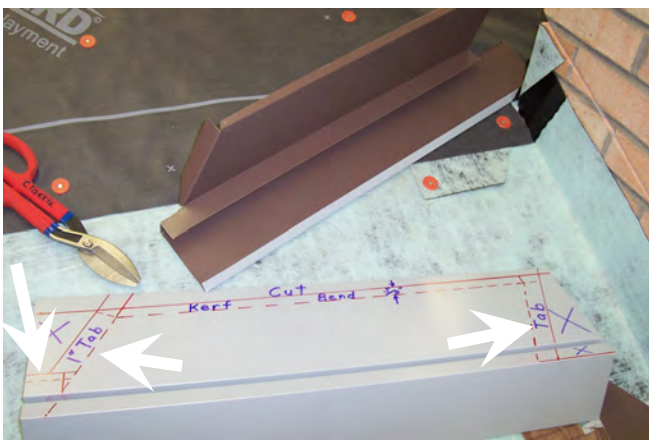


Fig. 74



Fig. 75

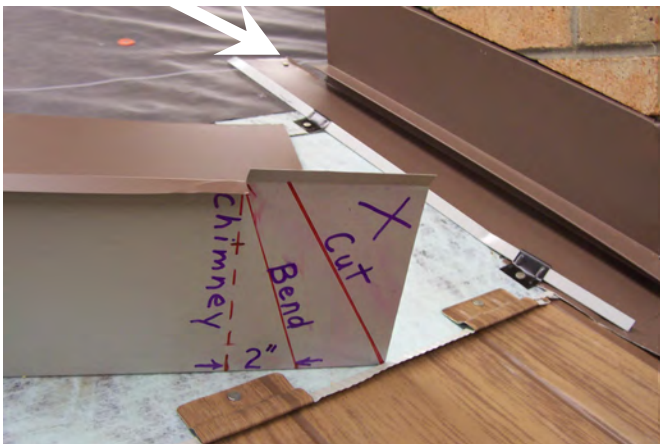


Fig. 76



Fig. 77

## Chimney Upslope Flashing and Crickets



Fig. 78

**Fig.78** shows properly installed chimney flashings. It is essential that sealant be applied in the corner areas indicated by the **arrows**.



Fig. 79

**Fig.79** pictures the first full course of shingles running past the back of the chimney.

If the chimney is located at the bottom of a long run near the eave, a diverter may be installed one course up from the chimney. **Fig.80** shows the pattern for such a diverter. Note that the bends that wrap around the bottom lock of the shingle should fit snugly. A liberal bead of sealant must be applied between the bottom lock and the diverter to prevent water from flooding the lock.



Fig. 80

For larger chimneys, especially near the eave, a cricket or saddle should be installed on the backside of the chimney. **Fig.81** illustrates the cut and bend pattern to be employed using coil stock.

If the chimney is quite large, valley pieces can be used such as detailed in the previous section on “intersecting valleys”. The sides of the cricket can then be covered with coil stock or shingled and capped like a dormer.

*Cricket flashing at Backside of Chimney*

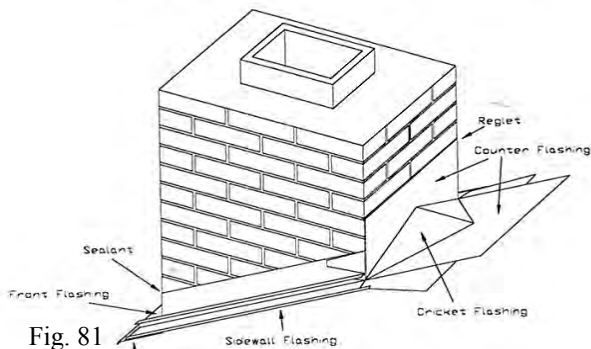
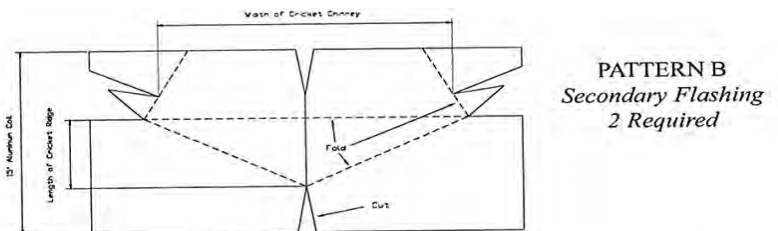
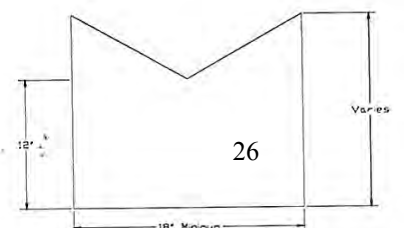


Fig. 81



PATTERN A  
Base Flashing

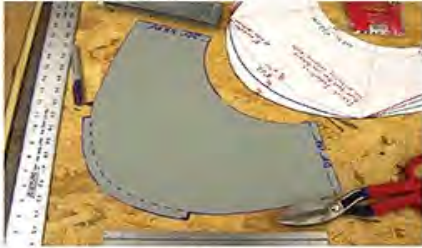




**Vent Pipes** - Use the pattern included in the coil stock box from Isaiah Industries to cover all neoprene pipe flashings.

**PATTERN INSTRUCTIONS**

**\*Sidenote 1-A**



If the cone will straddle two courses, it may be preferable to leave extra material to step down over the butt and rest flat on the pan below.



Sealant should **NOT** be applied to the lowest point in order to allow any moisture to drain.



1. Cut, lay out, and trace the cone pattern onto coil stock, corresponding to the pipe size and desired roof pitch.

NOTE: Shingles with a significant taper will lessen the slope accordingly.

Position multiple tracings to minimize scrap.

\*See sidenote 1-A.



2. Install vent pipe flashing over the pipe and on top of the course below. Cut and install a shingle over the top of the flashing pan and pipe.

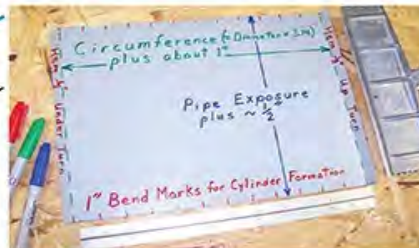
Bend 170°, ½" upturned and under-turned tabs on the sides of the cone to lock together. Roll cone gently back and forth to produce cone curvature without creases. Hook tabs together and check opening size for a snug fit. Trim if necessary.



3. With the cone fit over the pipe and against the installed shingles, mark the circumference of the pipe at the top of the cone. Lift up the cone and apply a thick bead of sealant all the way around the pipe just above the mark.



4. Push the cone down over the sealant and against the shingles. Apply sealant to the uphill ¾ of the cone-shingle joint.



5. Form a sleeve to fit over the exposed portion of the pipe. The width of the coil stock used should be about 1" wider than the circumference of the pipe plus another 1" for the two ½" tabs. For steel and thicker aluminum, bends should be made with a break every 1" to neatly form a cylinder.



6. Slide sleeve over pipe. Apply a full bead of sealant between the top of the pipe and the sleeve for the complete circumference.



**PROTECTIVE VENT PIPE CONE TEMPLATE**

- Protects from harmful UV breakdown of typical pipe flashings.
- Indefinitely extends the lifetime of vulnerable neoprene boots.
- Ensures ongoing protection against water infiltration into the home.
- Adds color coordinated appeal to common roof protrusions.





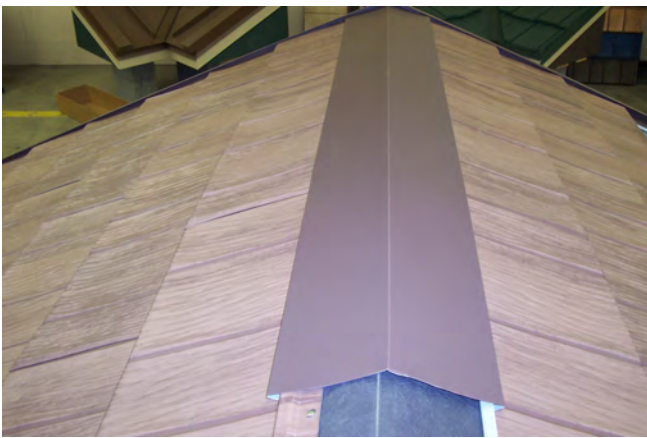


Fig. 82

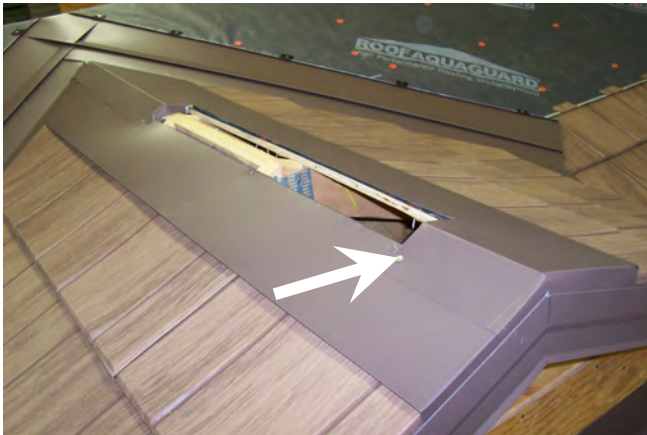


Fig. 83



Fig. 84



Fig. 85

## Ridges

Below applies to KasselWood. Sentry utilizes its own ridge cap - 4 clips per hip/ridge required. See page 2

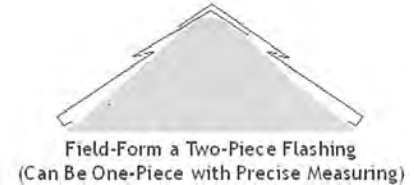
The ridge must be watertight before Ridge Caps (5107) are installed. There are three methods for accomplishing this:

1) Bend shingles over the ridge from both sides and attach (**illustrated below**).

2) Form a one piece flashing with 1/2" under-turned hems that snap into the top locks of the shingles on both sides (**Fig.82**). Nails through the Ridge Cap will secure it in place. Run a bead of sealant in the locks after the caps are installed.

3) Form two flashings with 1/2" under-turned hems that extend over the ridge by 2" and then are nailed (**Fig.83 arrow**). Notice how the flashing is bent to fit into the 5027 Gable Channel.

Make Ridge Watertight Before Installing Ridge Caps



On long ridges, overlap flashing lengths by 3".

Ridge Cap installation occurs either over lapped shingles or lapped flashing(s) mentioned above. Fold each cap along its center line to mirror the roof pitch. **Fig.84** shows the first Ridge Cap inserted into the "C" channel of the Gable Edge Trim and then nailed through the anchor portion of the cap. Each subsequent cap is then firmly engaged and nailed into place. Snap a chalk line on the ridge to keep the caps in line.

Caps may be started at both ends of a ridge with one of the two middle two caps cut and lapped over the other to split the length between bottom locks and give a symmetrical appearance. The lapped shingle is then face-nailed and sealed.

**Fig.85** shows a cap that has been field-formed to hook into a valley. These locking tabs will need to be opened up for the cap to be locked into the anchor tab of the previous cap. The field-formed lock will then be hand curled back into place to hook into the valley and sealed.



## Ridges cont.



Fig. 86

**Fig.86** displays a completed dormer roof. Note the exposure of the color coordinated coil stock. If this look is not desired, an extra course of shingles can be installed on both sides of the ridge before applying the Ridge Caps.



For the application of a Ridge Vent an opening at the ridge of 3 to 3-1/2" will need to be cut with a circular saw. A 2x4 nailed parallel to the ridge can provide a handy guide for cutting (**Fig.87**). Underlayment should be run right up to the opening before installing ridge vents.

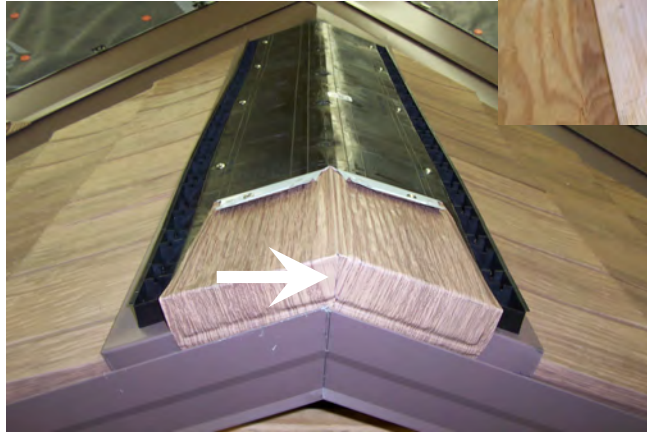


Fig. 88

Fig.87

Plastic Ridge Vents commonly available should extend to the gable even though the opening would not normally be cut to the gable. This will avoid having to step up the Ridge Caps to the height of the vent. If the plastic vent is substantially wider than the Ridge Caps, the exposed plastic can be covered with coil stock for protection and aesthetic appeal.

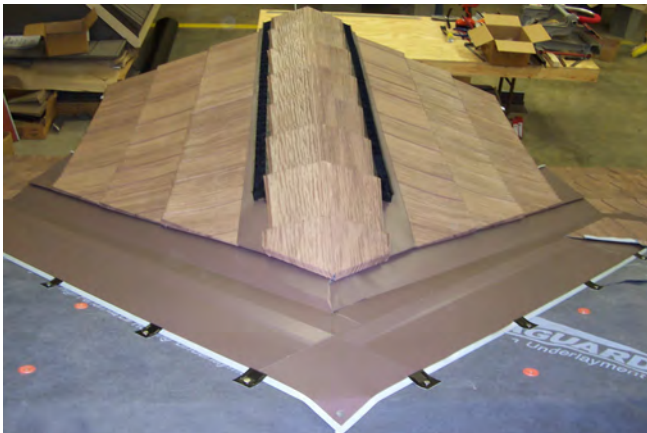


Fig. 89

**Fig.88** shows a Ridge Cap formed to fit into a 5027 Gable Channel. In this case, the bottom lock of the cap needs to be opened up and then re-bent to allow enough material to cover the end of the vent and extend 3/4" down into the channel.

Plumb cut one of the tabs to lap on top of the other for a finished appearance (**arrow**). Two rivets or trim nails can be faced nailed through the Gable Channel and Ridge Cap tabs into the gable to secure the Ridge Cap. Cover the exposed heads with sealant or touch up paint.

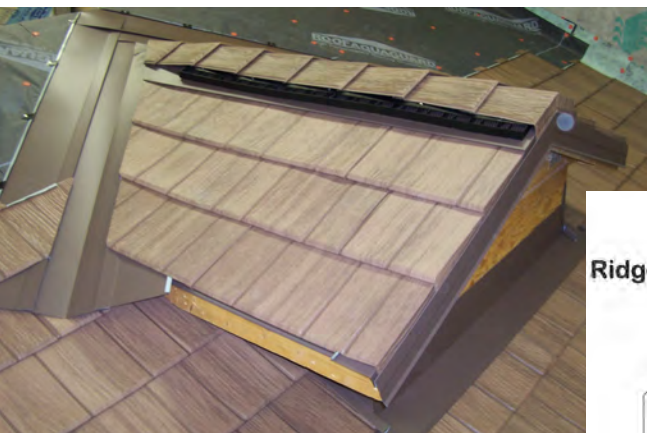
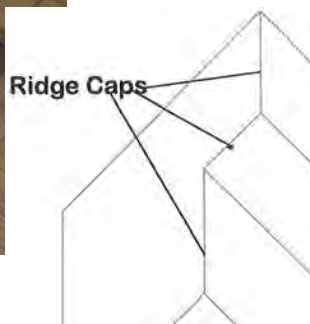


Fig. 90

**Figs.89 & 90** capture the top-down and profile views of a dormer with a typical plastic ridge vent. Notice the step down that was necessary just before the valley was reached.



In situations where a ridge runs into a hip, the top of the cap the width of the anchor clip can be cut off to form a starter cleat to position the first Hip Cap in the direction of the hip line (**Fig.91**).

Fig.91



## Perma-Vent



Fig. 92

Perma-Vent incorporates a two piece lineal system that includes internal baffles that allow positive air-flow out of the building yet provide secure protection against wind driven rain and snow.

Install a 2" wide strip of Ice and Water Shield with its inner edge flush with the ridge opening. This will isolate the aluminum cleat from the steel coil below it. Trim as necessary to not be seen from the ground. Place the Z Cleat (462) with its upper, top leg perpendicular to the roof deck at the ridge opening (**Fig.92 arrow**). Check to make sure that the Ridge Vent Base (460) will set on the upper leg of the cleat in the appropriate position (Illus.2 arrow).

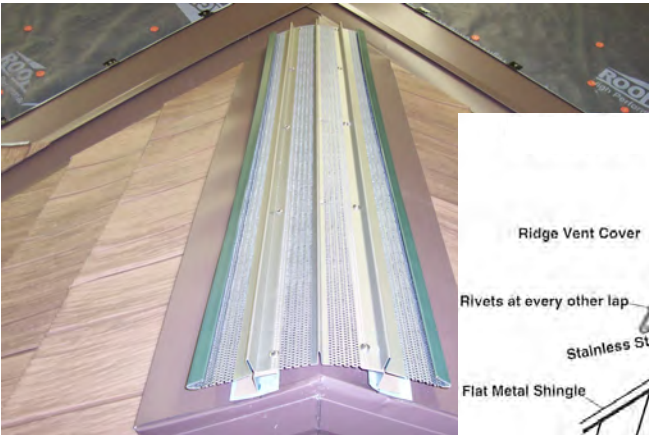


Fig. 93

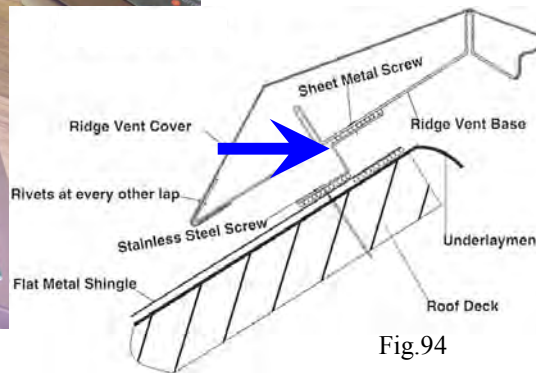


Fig.94

Fasten the Z Cleat to the roof using stainless steel screws of adequate length to penetrate the roof decking every 12" O.C.

Apply sealant to the top leg of the Z Cleat and then place the Ridge Vent base squarely over the Z Cleats and attach with 1/2" stainless steel screws 12" O.C.



Fig. 95

Install subsequent pieces of Z Cleat and Ridge Vent base prior to installing the Ridge Vent Cover. Ridge Vent base pieces should be lapped 3" by removing all three ribs and the outside returns from the upper pieces. Fasten together with 1/2" S.S. screws.

The Ridge Vent Cover (461) is installed by snapping it over the Base, making sure that it is firmly locked on both sides. Subsequent pieces of Ridge Vent Cover should be lapped by 3". Seal between the overlapped pieces. Secure the overlapped pieces at every joint to each other and to the base with 1/2" S.S. screws.



Fig. 96

Ends of the assembly should be closed with a field-formed cap made from matching coil stock. Cut the cap to fill the opening, allowing an extra 3/4" of metal on all sides to be bent 90 degrees toward the middle of the roof. Insert these tabs **under** the Ridge Vent Cover and secure with 1/2" S.S. screws. Seal or paint all exposed fastener heads.





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