

KasselShake Detailed Installation Manual

8510 Industry Park Drive
Piqua, Ohio 45356
Toll-Free: 866-544-4766
Fax: 937-778-5116
www.kasselshake.com



PREMIER STEEL ROOFING SYSTEMS™

Table of Contents

Section 1 - Tools & Safety

Suggested Tools - 1.2
Safety Considerations - 1.2
Review - 1.3

Section 2 - Roof Preparation

Slope Requirements - 2.2
Roof Tear-off - 2.2
Roof Overs - 2.3
Wood Shingle/Medium
Wood Shake Roof Overs - 2.3
Sheathing & Felt Underlayment - 2.4
Underlayment Application - 2.4
Review - 2.6

Section 3 - Eave & Gable Treatment

Eave Starter Strip - 3.2
Gable Channel - 3.9
Gable Edge Trim & Gable Caps - 3.11
Review - 3.13

Section 4 - Valley Installation

Simple Valley - 4.2
Eave Panel Valley - 4.6
Dog Leg Valley - 4.7
Gable/Panel Valley - 4.9
Review - 4.10

Section 5 - Panel Installation

Panel Installation - 5.2
Random Appearance - 5.3
Panel Installation (Gable Channel) - 5.4
Panels Into Valley - 5.8
Panels Out Of Valley - 5.15
Low To High Pitch Changes - 5.20
High To Low Pitch Changes - 5.22
Matched Courses - 5.23
Review - 5.25

Section 6 - Brake Operations & Roof Protrusions

Portable Brake - 6.2
Front Flashings - 6.3
Sidewall Flashings - 6.5
Rear Flashings - 6.5
Flashing Against Siding - 6.6
Sidewall Flashing Installation - 6.6
Pipe Flashing - 6.9
Large Penetration Flashing - 6.15
Review - 6.19

Section 7 - Chimney & Skylight Flashing

Brick Chimney Flashing - 7.2
Skylight Flashing - 7.10
Stone Chimney Flashing - 7.12
Review - 7.13

Section 8 - Hip Treatment

Hip Treatment - 8.2
Mismatched Courses - 8.3
Review - 8.6

Section 9-Ridge Treatment

Panel to Ridge Treatment - 9.2
Complex Hip-Ridge Situations - 9.8
Ridge Vent Installation - 9.9
Review - 9.11

Section 10-Special Gable Treatments

Dutch Gable - 10.2
Review - 10.4

Section 11-Appendices

Damaged Panel Repair - 11.2
Measuring a Roof - 11.5
Installation of Gravity Vents - 11.6
Starting Reference Lines - 11.6
Heavy Snow Areas And Snowguards - 11.7
Special Installation Issues - 11.9
Installation Over Stress-Skin-Panels - 11.9

General Installation Instructions

Fastener Specifications

Only use the following approved fasteners:

- 1) galvanized steel
- 2) stainless steel

Fasteners must be ringshank nails or screws. Fasteners should be long enough to fully penetrate sheathing or at least 1" into solid lumber.

When installing the panel, use three Nail Clips per full panel. Fasten a clip at each end of the panel, and one in the middle. When installing lineal pieces, fasten a clip every 16" on center. Secure each Nail Clip with four nails.

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 and separating with a layer of underlayment.

Work from above the panels whenever possible. When work must be done from below, distribute weight loads by placing planks across ladders or other scaffolding. Protect the panels with carpet, foam, etc.

Take care not to scratch the panels' surfaces.

Walk on the panels' upper halves only and avoid walking on the panels' sidelocks.

Always keep the uphill portions of flashings on top of the downhill portions to prevent water from running under the flashings.

Tools & Safety

Suggested Tools - 1.2

Safety Considerations - 1.2

Review - 1.3

Suggested Tools

Some of the tools that may be needed for proper installation include:

Hammer
Power saw
Tin snips
Utility knife
Aviation Snips
Power Shear
Pop rivet gun
Hand drill
 $\frac{9}{64}$ " drill bits
Hand flangers
Pliers
Roof jacks
Scaffolding
Ladders
Tape measure
Chalk line
Portable brake
Caulking gun
Compass
Soap pencil
Extension cords
Safety Glasses
Zip Tool

Remember to follow each tool manufacturer's instructions on safety and maintenance.

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 $\frac{1}{4}$ 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 and cause equipment to slip.

Power saws, especially on cutbacks, must be handled with extreme caution, and should be used by only professional, experienced installers.

Wear shatterproof safety glasses with side protection when using cutting tools.

Always be aware of your position on the roof relative to your surroundings. Take note of the locations of roof openings, roof edges, equipment, co-workers, and other potential working hazards.

Review

Assemble tools before beginning the job.

Be aware of hazards to yourself and others.

Roof Preparation

Slope Requirements - 2.2

Roof Tear-off - 2.2

Roof Overs - 2.3

Wood Shingle/Medium Wood Shake Roof-Overs- 2.3

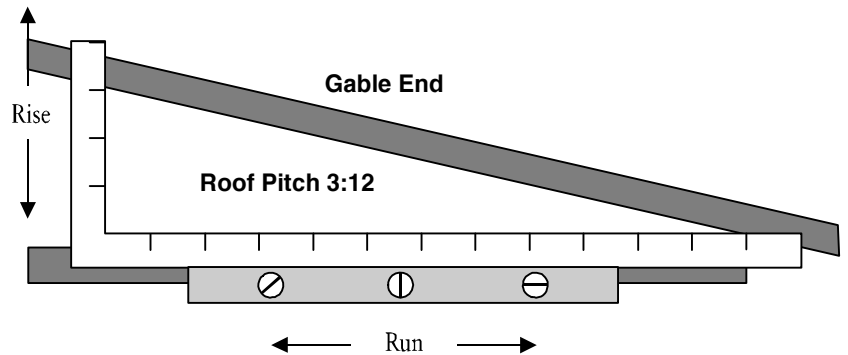
Sheathing & Underlayment - 2.4

Underlayment Application - 2.4

Review - 2.6

Slope Requirements

The minimum roof pitch is 3:12 (three:twelve).



Roof Tear-Off

Assure the homeowner that property will not be damaged during tear off. Workers should employ caution at all times during this procedure.

Dust control is critical when removing wood shakes.

Wood roofing should be placed in barrels, which are then unloaded off the roof into a container located close to the work area.

Before starting a project, check for any obvious interior and exterior damage.

Replace damaged or rotted areas with new lumber before installing any new roofing.

After the old roof has been removed and any deteriorated lumber has been replaced, install ½" minimum decking or equivalent, fastened per local code requirements.

The building inspector may wish to inspect the deck before installation begins.

Be sure to comply with all local building code requirements.

Roof Overs

KasselShake panels can be installed over these roofing systems:

Asphalt composition shingles
Wood shingles up to 3/4" butt thickness

Existing clay tile, cement tile and metal roofing must be removed before applying underlayment.

In most cases thick wood shakes must be removed before installing the panel. See the Section on Wood Shake Roof-Overs for details on installations over wood shakes.

Inspection of asphalt composition shingle roofs should include:

a) The number of layers of asphalt shingles. (Because of weight constraints, some local building officials

limit the number of layers of old roof that can be covered.)

b) The condition of the asphalt shingles. (Badly buckled or cupped shingles should be repaired to provide a flat, smooth surface.)

Before reroofing over wood shingles or medium wood shakes, remove and replace any damaged material.

Wood shingles are approximately 18" in length with a maximum butt thickness of 3/8". The shingles are typically installed with a 5" exposure to the weather.

Medium wood shakes with a maximum butt thickness of 3/4" are the only wood shake product permitted for roof-overs with KasselShake.

Wood Shingle/Medium Wood Shake Roof-Overs

Remove all hip and ridge caps. Nail down any loose or curled shingles and protruding nail heads. Build up ridges with lumber (if necessary) to maintain roof slope.

Remove the outer edge of the wood shingles along eaves and gables, including any old starter strip or drip edge.

Use a circular saw to cut around the entire perimeter of the roof an adequate distance to allow 1" X 4" lumber to be installed flush with the fascia. Use a carbide tip blade for best results. Set the saw depth to cut only the wood shingles; do not penetrate the wood deck or sheathing. This cutback procedure is made along the outer edge of the building, and extreme caution must be used.

Inspect the outside perimeter, including both deck and fascia, for any deterioration. If damage has occurred, remove and replace the damaged material.

Some underlayments may tear when they are installed over wood shingles or other irregular surfaces. To resist tearing over the uneven surface, install at least one layer of synthetic underlayment. Additional underlayment is required when a fire rating must be met. Detailed underlayment

installation instructions can be found on pages 2.4-2.5.

When roofing over existing wood shingles or shakes that are attached to spaced sheathing, special precautions must be taken. After the underlayment is installed, snap chalk lines to match locations of roof rafters and lathe boards.

Attach all courses of panels either to the spaced sheathing when available or to roof rafters when a course falls over a gap in the sheathing. These courses should be hand nailed with 3" nails to ensure adequate penetration. Detailed panel installation instructions can be found in section 5 of this manual.

Sheathing & Underlayment

The minimum sheathing thickness for new construction application is ½" plywood type sheathing or equivalent. Follow local codes to anchor the plywood sheathing securely to the roof framing. Inspect the plywood for gaps and weak spots.

The minimum requirement for underlayment is one layer of SP-7000 RoofTopGuard II, one layer of SP-6000 Roof TopGuard, or one layer of ASTM 30-pound roofing felt.

Underlayment must meet or exceed local building and fire code requirements. A minimum 18" vertical and 6" horizontal lap is required.

Underlayment should overhang all roof edges by 1 ½", extend up all vent pipes at least 1 ½", and extend up all sidewalls and other penetrations by at least 6".

Important: A full width of underlayment is installed up all valleys, after the standard underlayment is woven across the valley.

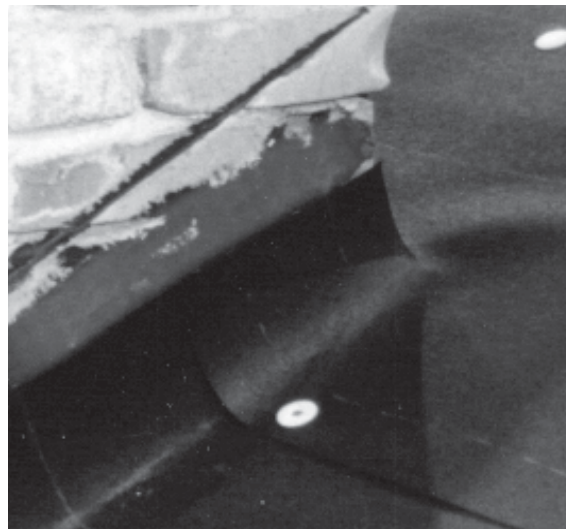
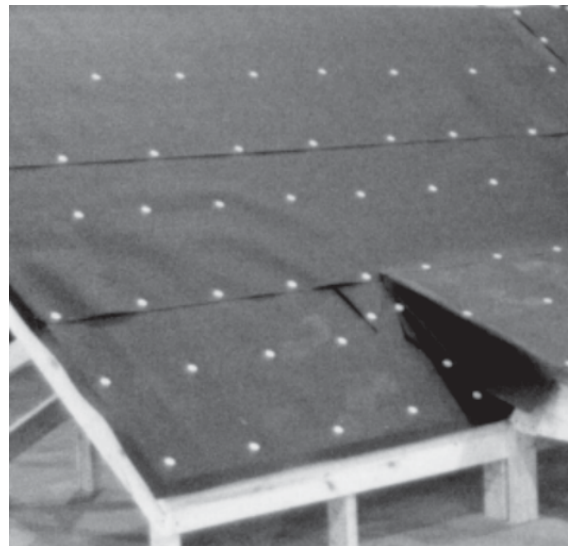
Underlayment Application

Underlayment should be securely fastened using N-501 Plastic Top Nails.

The underlayment is fastened as needed to resist tearing or wind blow off. Fasten the underlayment as dictated by local building codes. Underlayment should be fastened a minimum of every 12" vertically and 12" horizontally.

Unroll the underlayment. Eliminate any buckles or ripples. The underlayment can then be attached. Do not overstretch the underlayment.

Around roof penetrations such as chimneys, skylights or dormers, cut the underlayment to extend at least 6" up the side of the penetration, or as high as possible without interfering with any flashing or panel installations. Where underlayment is cut around any penetration, secure the underlayment to the penetration with VP-275 butyl rubber sealant or roofing cement. This is done to prevent water from infiltrating the underlayment prior to panel installation. It is important to install this neatly and not puncture or tear the underlayment.



Underlayment Application (Continued)

Make sure that the underlayment overlaps a minimum of 18" vertically and 6" horizontally.

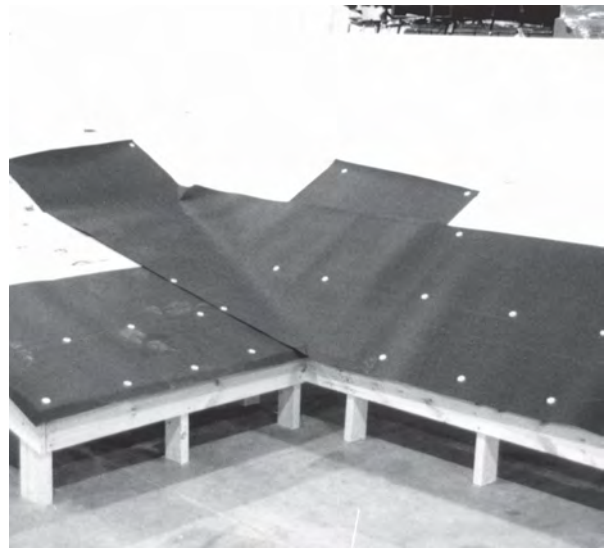
If there are lines on the underlayment, they should be used as a guide to ensure proper underlayment alignment.

Since underlayment has a tendency to sag, do not use these lines for panel alignment. Use a chalk line and make new reference lines to align the panels.

At a valley location, run the underlayment completely across so that the courses of underlayment are interwoven and lap at least 8" at the top of the preceding ply. This provides double coverage at the valley. The underlayment should conform to the valley to avoid any tears or punctures. SP-6000 Roof TopGuard and SP-7000 RoofTopGuard II underlayments will have a small amount of controlled shrinkage once heat from the sun reaches it. Therefore, install it loosely in the valley, so that, with shrinkage, it will not "pop" upward. Apply a third layer of underlayment with a full width extending the entire length of all valleys.

If the underlayment tears or fractures, install patches made of underlayment and sealant to repair these areas thoroughly.

It is critical that the underlayment be installed properly to avoid problems in the future. Metal roofing can develop condensation beneath it during certain weather conditions. The underlayment prevents such moisture from causing damage.



Review

Minimum roof slope is 3:12.

Thoroughly inspect the roof before installation.

If applicable, remove old roofing and repair any damaged decking.

Roof over composition shingles, wood shingles or medium wood shakes only.

Lap underlayment a minimum of 6" horizontally and 18" vertically. At hips and ridges, double lapping is required. Valley is triple lapped.

Extend underlayment over roof edges by at least 1½"

Eave & Gable Treatment

Eave Starter Strip - 3.2

Gable Channel - 3.9

Gable Trim & Gable Caps - 3.11

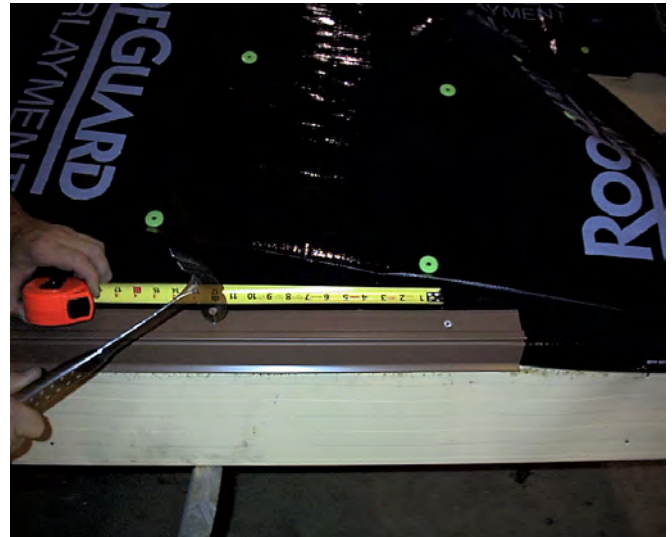
Review - 3.13

Eave Starter Strip

When installing the Eave Starter Strip (5002), fold down the 1½" of overhanging underlayment keeping it under the drip leg of the Eave Starter Strip.



Secure the Eave Starter Strip in place by nailing it to the roof deck every 12". Do not nail the Eave Starter Strip into the fascia.



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



Eave Starter Strip (Continued)

Where the Eave Starter Strips overlap, notch the lock.

Make a 1" cut at the back of the lock.



Make a 1" cut at the front of the lock.



Remove the lock.



Eave Starter Strip (Continued)

Angle-cut the drip leg.



Open the drip hem of the installed piece. Slide the pieces together. Make sure the locks and drip hems nest together.



The photo at right shows a properly installed Eave Starter Strip.



Eave Starter Strip (Continued)

At the hip line, mark the front of the lock of the Eave Starter Strip.



Mark the back of the Eave Starter Strip.



Make a “V” notch on the nail hem of the Eave Starter Strip.



Eave Starter Strip (Continued)

Snip the drip hem.



Bend the Eave Starter Strip around the corner.



Eave Starter Strip at an Inside Corner

To determine where to notch the Eave Starter Strip, turn Eave Starter Strip upside down, place the opposite end into the inside corner, and place it against the installed piece of Eave Starter Strip. Mark it 1" past the intersection of the two Eave Starter Strip pieces. The extra inch is needed to make the joint.



Eave Starter Strip (Continued)

Cut the nailing hem of the Eave Starter Strip. Cut the drip hem, bend to conform to the corner, and temporarily set it into place.

Note: The valley flashing will lock into the lock of the Eave Starter Strip. See section 4 for complete valley installation techniques.



Mark the joint and cut as described earlier. Be certain the pieces nest together correctly. Fasten in place.



Mark the top of the Eave Starter Strip where it is flush with the gable edge.



Eave Starter Strip (Continued)

Mark the drip leg of the Eave Starter Strip 1" past the gable end.



Make a 1" tab and bend it around the gable end. Be certain it is flush with the gable end.



Remove enough of the top lock of the Eave Starter Strip to allow the Gable Channel (5027) to rest flat on the deck.



Gable Channel

Set the Gable Channel in position. The ends of the panels will fold into the groove on the edge of the Gable Channel.



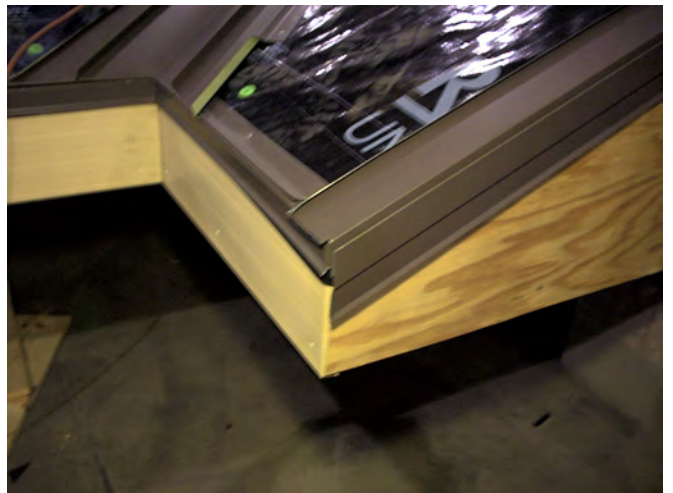
The Gable Channel should extend 1/2" past the edge of the Eave Starter Strip.



Plumb cut the fascia leg of the Gable Channel so it is flush with the eave.

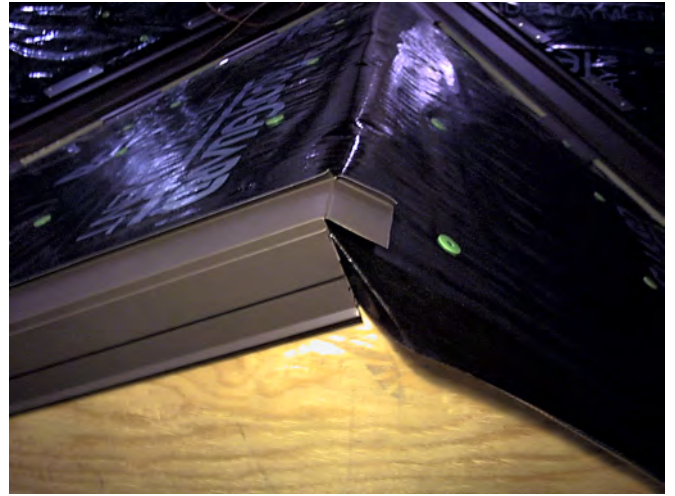
On long gables, upper gable flashing should be installed on top of lower gable flashings. Upper flashings should lap lower flashings by at least 4". Seal the joint with C-190 sealant.

Note: The bottom edge of the Eave Starter Strip will not match the bottom edge of the Gable Channel in most instances.



Gable Channel (Continued)

At the ridge, trim the Gable Channel so the water-return channel extends approximately 2" past the ridge. Fold it to conform to the roof's angle. Trim the fascia leg of the Gable Channel so it extends past the ridge. The fascia leg should be covered by the Gable Channel from the opposite side of the roof.



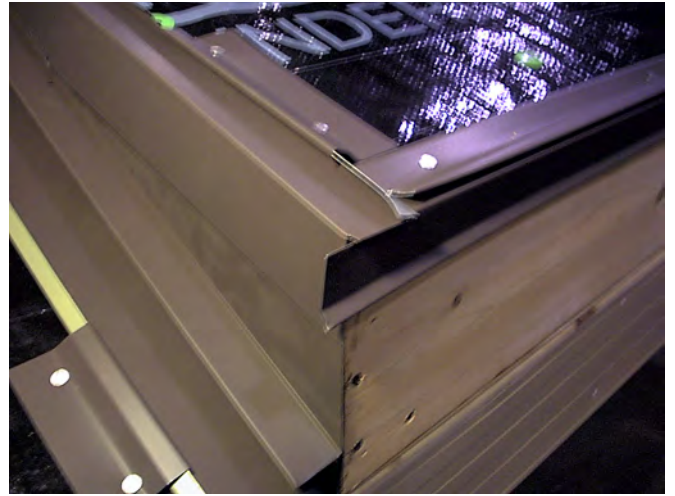
At the ridge, open the return flange of the installed Gable Channel. Form the Gable Channel for the opposite side of the roof. The water-return channel of the second Gable Channel should also extend past the ridge. Mitre-cut the fascia leg to create a neat appearance. Set the new channel into the previously installed channel and bend the return flanges back into position. This will hold the flashings in place. Fasten the flashing to the deck with nail clips every 16" on center.



Gable Edge Trim and Gable Caps

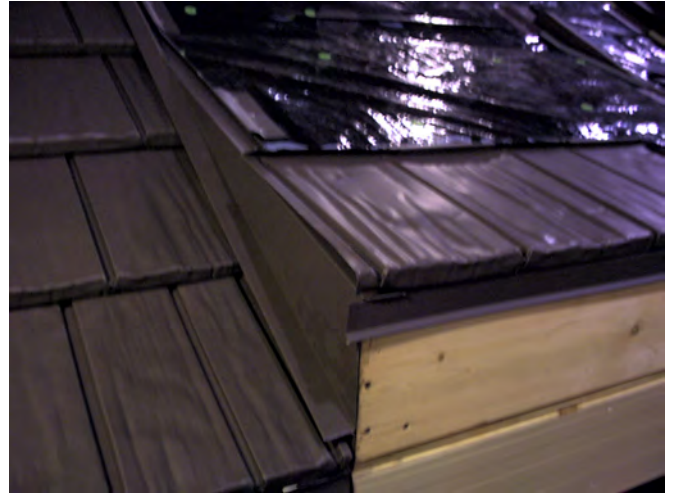
There are two methods of completing a gable. One method is to use Gable Channel as described previously. The other is to install Gable Trim (5005) and Gable Caps (5006).

When installing the Gable Edge Trim and Gable Caps, the drip leg of the starter strip should extend 1" past the gable. The extra inch of drip leg is needed to cover the small opening at the bottom end caps. Do not bend the drip leg around the gable. Remove the lock of the starter so the Gable Edge Trim rests flat on the deck. Fasten the Gable Edge Trim into place with nail clips every 16" on center.

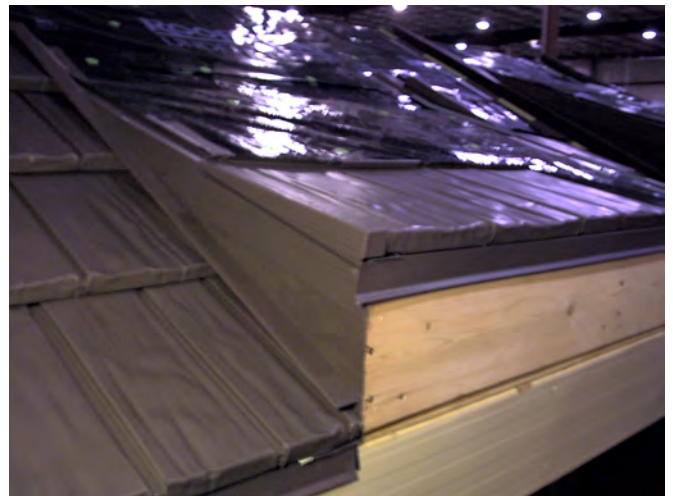


Install the panels so they extend 3/4" past the edge of the gable. The extra 3/4" will hold the Gable Caps in place.

Remember to stagger the panels for a random appearance. See page 5.3 on random panel appearance.



Install Gable Caps over the end of the panel. The Gable Caps have pre-punched holes on each end.



Gable Edge Trim and Gable Caps (Continued)

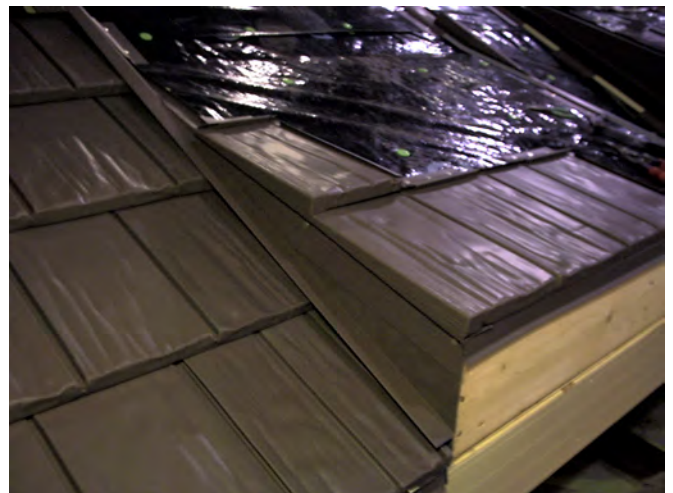
For a neat appearance, remove the portion of the Starter Strip's drip leg that extends past the edge of the end cap.



Continue to install the panels up the roof. Remember to extend the end of the panel $\frac{3}{4}$ " past the edge of the roof.



Install upper Gable Caps over lower Gable Caps. Align the holes of the Gable Caps and fasten them together. When correctly installed, Gable Caps will "share" a nail.



Review

Install eave and gable flashing after underlayment has been applied.

Remove the lock of the Eave Starter Strip to allow gable flashing to rest on the deck.

Do not butt accessory pieces together - overlap the accessories and seal the joints.

Panels should extend 3/4" past the gable when installing Gable Caps.

Gable Caps will “share” a nail hole.

Valley Installation

Simple Valley - 4.2

Eave Panel Valley - 4.6

Dog Leg Valley - 4.7

Gable/Panel Valley - 4.9

Review - 4.10

Simple Valley

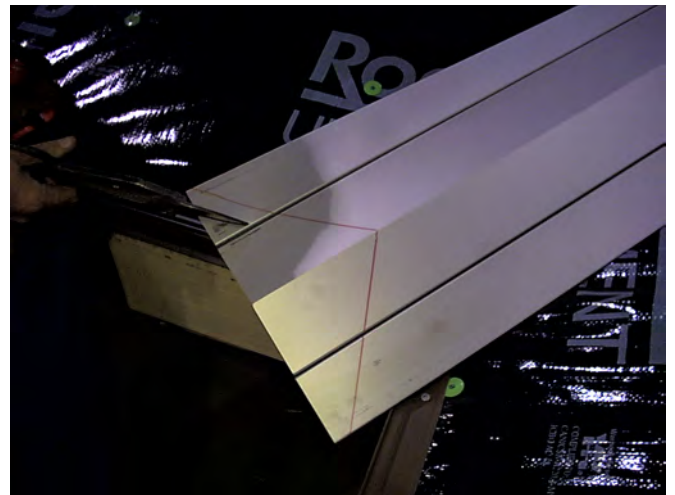
The Open Valley (5025) is 10' long with a 7" opening for water drainage with 1" high standing ribs. It has two 3¾" wide water return channels and two return flanges.

Chalk a line down the center of the valley. Align the center of the valley flashing with the chalk mark.

The water return channels on both sides of the valley should extend past the Eave Starter Strip. This will ensure that water will flow away from the roof.

Mark the underside where the open valley meets the Eave Starter Strip.

Cut the valley 3/4" past the mark.



Using hand seamer, bend the locking tabs on the end of the valley.



Simple Valley (Continued)

The photo at right shows a valley with field-formed locking tabs.



These tabs will slide into the lock of the Eave Starter Strip.



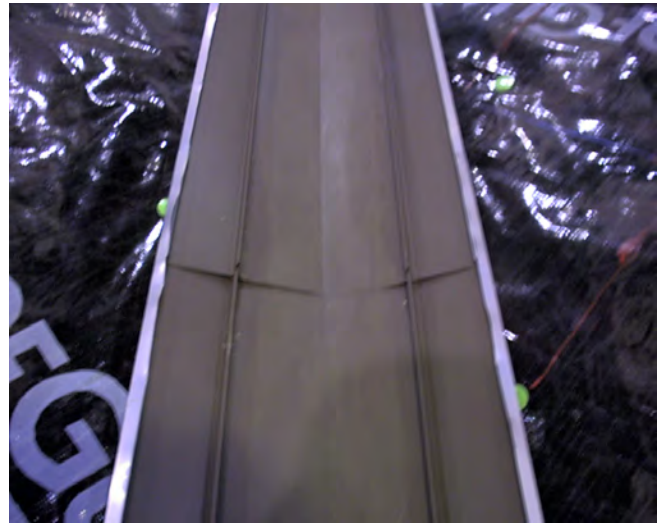
Center the valley into position. Hook Nail Clips over the return flanges every 16" on both sides of the valley and fasten into place.

Fasteners should not penetrate the valley.

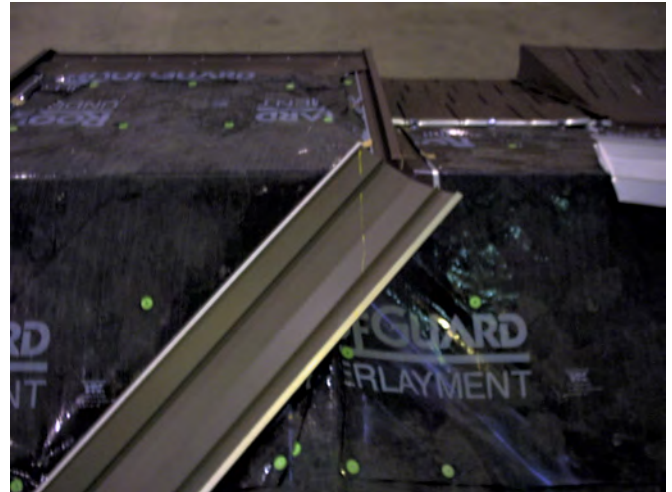


Simple Valley (Continued)

Valleys should be run in one length if possible. If more than one valley section is required, the uphill section must overlap the lower by 6". Seal the valley joints with VP-275 sealant. The return flanges on the sides of the valley must never be flattened as they prevent water from washing under the panels.



At the ridge, make sure the valley's water return channels extend 3" past the ridge line.



Cut the Valley.



Simple Valley (Continued)

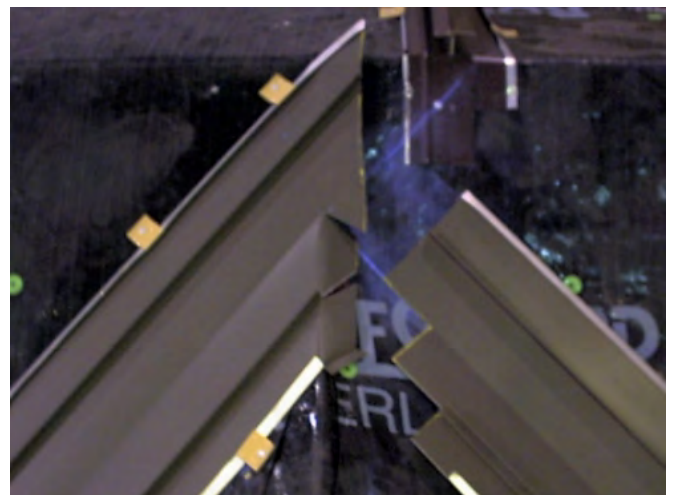
Trim the valley so the metal that extends past the ridge will rest flat on the opposite side of the roof. Fasten the valley in place with nail clips.



Rest the valley from the opposite side of the roof over the installed valley. Mark on the new piece of valley where the center of the valley intersects the center of the installed valley. Mark where the standing ribs intersect the standing ribs of the installed valley. Mark where the water-return flanges intersect those of the installed valley.



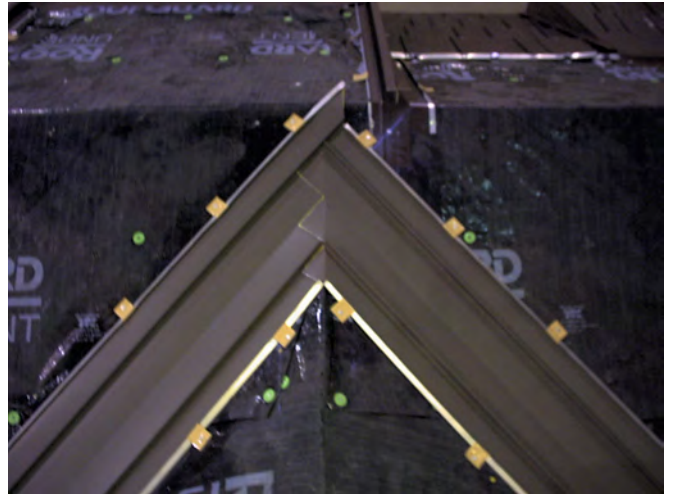
Trim the second valley so the standing ribs and water return flanges will butt into each other. Trim to allow as much metal as possible to lap onto the installed valley section while maintaining a neat appearance.



Simple Valley (Continued)

Apply sealant under the overlap before installing.

The metal that extends past the ridge line should be folded to rest flat on the opposite valley.



Seal the cut end of the valley.



Eave Panel Valley

An eave panel valley has one half of the valley draining onto a panel and the other half terminating at a roof eave.

Set the valley into place extending it over the Eave Starter Strip. The valley should channel water away from the corner where the valley meets the eave and panels. Apply sealant along the return flange area to prevent water from filtering under the valley pan.



Dog Leg Valley

A dog leg occurs on the roof when there is a change in slope and direction.

After snapping chalk lines down the center of each section of valley, position the top edge of the lower section of valley 6" past the slope change.

Be certain the bottom of the valley extends past the Eave Starter Strip.

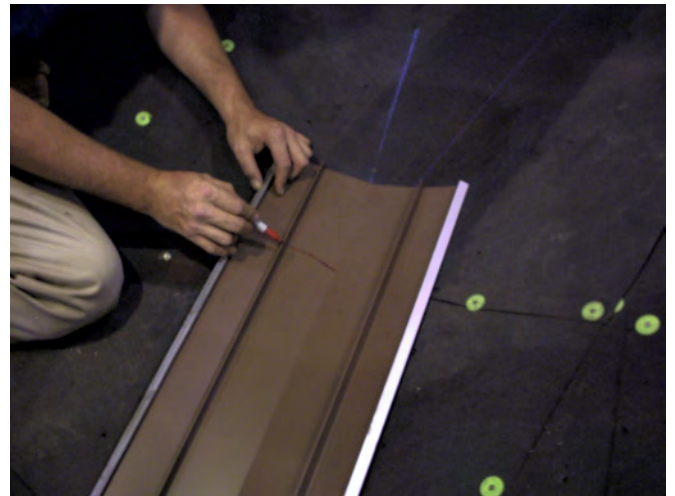
Where the valley changes direction, make a perpendicular line that intersects the standing rib.

Remove the standing rib so the upper valley section rests flat on the deck.

.

Set the upper valley section on top of the lower valley section.

Mark the standing rib where the valleys lap.

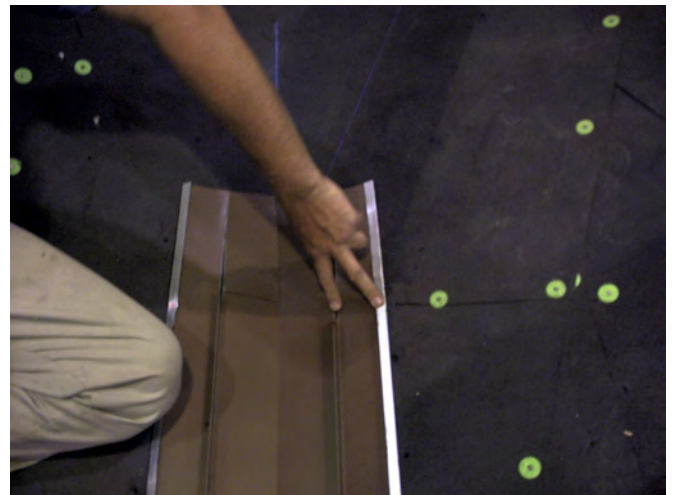


Dog Leg Valley (Continued)

Mark the water return flange.



The point on the standing rib indicates where it should be removed, and the point on the water return flange indicates where it should be bent back to allow the upper valley section to rest flat on the decking.



Remove the standing rib. Cut the return flange and bend away from the center of the valley.



Dog Leg Valley (Continued)

Trim the upper valley section so the standing ribs of the upper valley section slide over the standing ribs of the lower valley section.

Apply sealant to the overlap area.

Set the upper valley section into position.

Always install uphill sections on top of downhill sections.



Secure the valley to the deck with Nail Clips (not shown).



Gable/Panel Valley

In this situation, half of the valley drains onto a lower shake panel and the other half runs onto a gable end.

Before installing valley, install panels below the gable.

Mark and modify valley, allowing one portion to rest on the shake panel and the other to slide onto the gable.

Review

Install the valley so the water return troughs extend past the Eave Starter Strip.

Properly center all valley flashings.

Always install uphill sections over downhill sections.

Valley overlaps should be properly sealed.

Fasten the valley to the decking with Nail Clips 16" on center.

Fasteners should never penetrate the valley flashing.

Panel Installation

Panel Into Gable Channel - 5.2

Random Appearance - 5.3

Panels Into Valley - 5.8

Panels Out Of Valley - 5.15

Low To High Pitch Change - 5.20

High To Low Pitch Change - 5.22

Matched Courses - 5.23

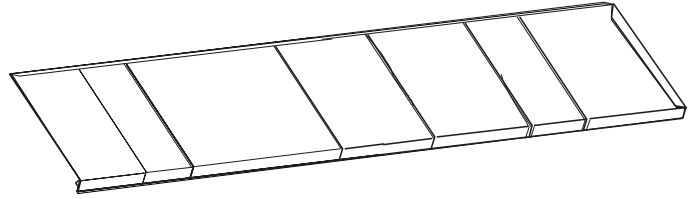
Review - 5.25

Panel Into Gable Channel

KasselShakes are packaged 10 pieces per carton. Each panel provides 1' by 4' of coverage. Each panel has a four-way interlock consisting of continuous horizontal top and bottom locks and two sidelocks.

Fasteners must be galvanized steel ringshank nails or stainless steel ringshank nails. Fasteners should be long enough to fully penetrate sheathing or at least 1" into solid lumber.

Prior to panel installation, gable, sidewall and valley accessories should be installed as described elsewhere in this manual.



To install the first panel, start in the lower left hand corner of the roof section and install the panels from left to right.

Once the panel is locked into place, fasten the panel to the deck with three Nail Clips 16" on center. Each clip is fastened with four nails.

Partial panels should have at least one Nail Clip per foot and at least two Nail Clips per partial panel to keep the panel straight and secure.

Random Appearance

To ensure a random look with the panels, stagger the courses. Do this by using an alternating series of small and large panel pieces. Proper appearance can be achieved by utilizing the following series of cuts:

Start with a full panel 48"

Second panel 24"

Third panel 36"

Fourth panel 12"

Note: In the photo at right, panels were removed from the first and second courses to show the stagger pattern.



Make sure the ends of panels never line up diagonally. When starting a new course, remove a portion of the left end of the panel to provide a random appearance. Cut the shakes using tin snips, aviation snips, a powershear, a guillotine shear or a circular saw with a blade designed to cut steel. When using a circular saw, a portable saw table makes cutting panels easier. A saw guide will provide a suitable track for cutting. This saw guide should adjust for vertical and diagonal cuts.

Fully engage side and front locks of succeeding panels before fastening. This is done by tapping the panels with the palm of the hand or hammer handle until tight and flush with neighboring panels.

Use caution when walking on the completed roofing areas. To minimize the possibility of damaging the shake panels, walk on the panels' upper halves and avoid walking on the sidelocks of the panels. Distribute weight loads across the panels by using walkboards or similar protective measures.

Panel Into Gable Channel (Continued)

Lock the panel in place and mark the location of the water drain to be cut into the panel.



Mark the top of the panel approximately 1 1/4" past the edge of the gable.



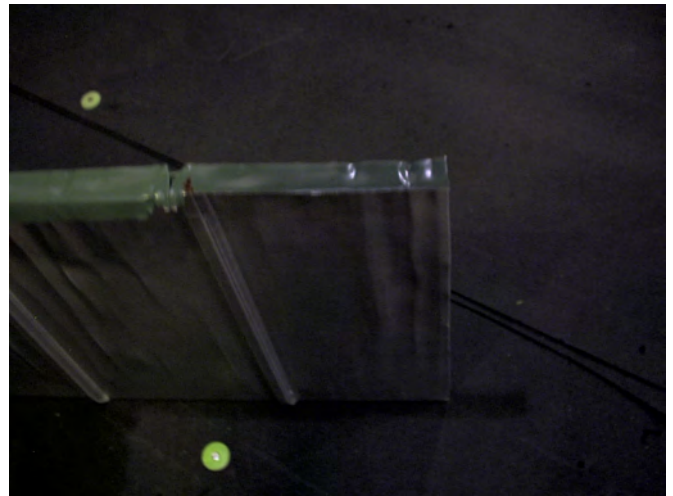
Mark the bottom of the panel approximately 2 1/4" past the edge of the gable.

This extra material will become the sidelock that will rest in the slot of the Gable Channel.



Panel Into Gable Channel (Continued)

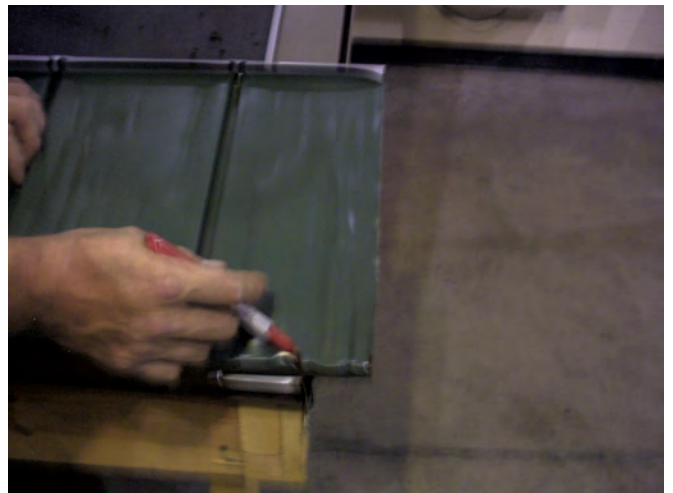
Cut the butt of the panel where it covers the water-return channel of the Gable Channel. Remove the portion of the panel that extends past the side marks.



Lock panel back in place. Mark the top of the panel over the groove in the Gable Channel.

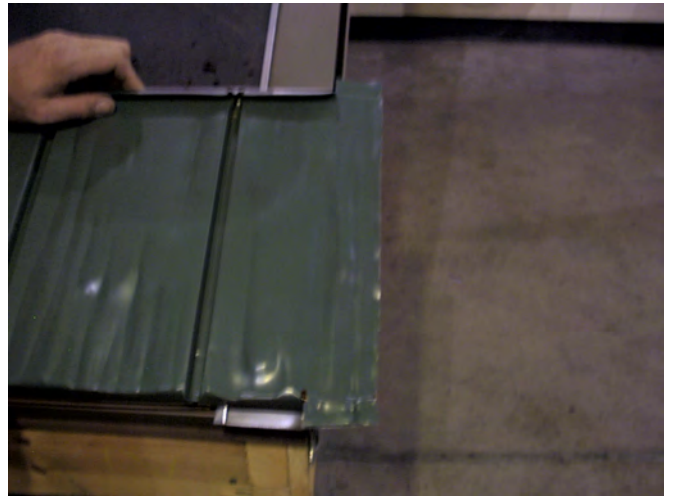


Mark the bottom of the panel over the groove in the Gable Channel.



Panel Into Gable Channel (Continued)

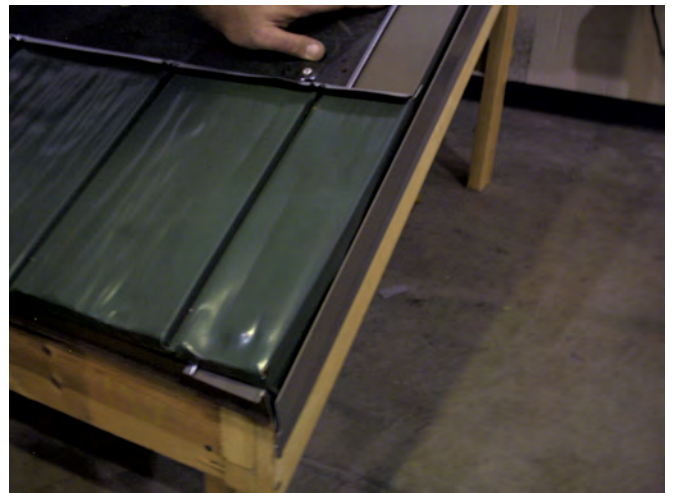
Cut the panel at these marks and bend the locks flat.



With a hand seamer, bend this edge down 90°.

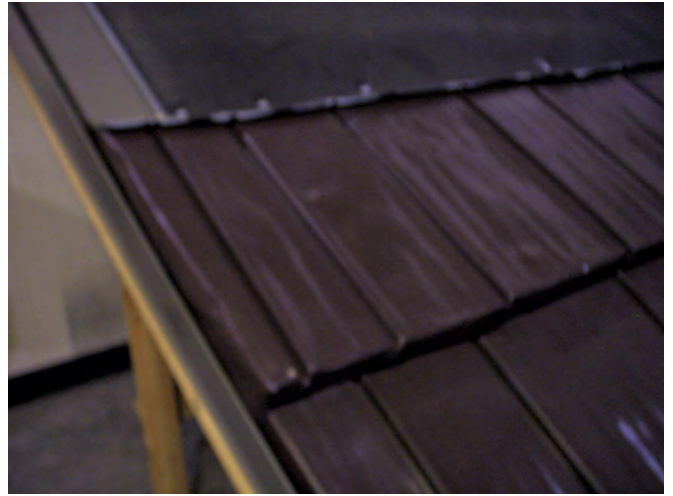


Lock the panel into position with this newly formed side lock resting tightly into the groove of the Gable Channel. If the panel does not rest flat against the deck, remove part of the side lock until a good fit is achieved.



Panel Into Gable Channel (Continued)

When using Gable Channel, remember to stagger the panels and engage the locks.



Panels Into Valley

Position the panel over the valley and mark the panel about 2" past the standing rib.



Mark the bottom of the panel approximately 2" past the standing rib of the valley. Cut the panel along this line.

It is important that the panel is cut to an accurate angle. Mis-cuts or badly angled pieces should not be forced into the valley.

A template can be made at the necessary angle and used to cut the panels on the ground.



When modifying this bottom panel, the bottom lock must be removed where it covers the valley's water return channel. Removing the lock will allow water to drain out the valley's water-return channel.

Mark the panel butt where it intersects the standing rib and the return flange. Make a drain hole in the panel by removing this section of the butt.



Panels Into Valley (Continued)

The photo at right shows a panel with field-formed drain.

It is also necessary to flatten the deep grooves in the



Mark the top of the panel where it intersects the standing rib.

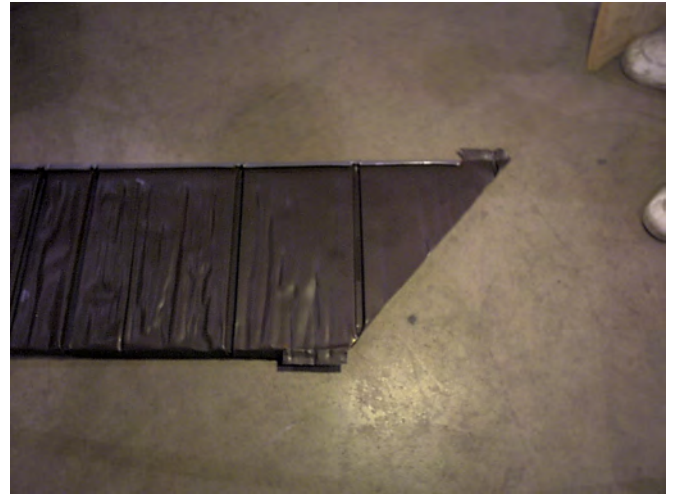


Mark the bottom of the panel where it intersects the standing rib. Cut the top and bottom locks at these points.



Panels Into Valley (Continued)

Open and flatten the top and bottom locks.



panel. Lay the panel face down on a piece of cardboard, wood or other surface to protect the panel's finish. Flatten the grooves toward the middle of the panel. This is achieved by carefully hammering the back of the panel. Flatten the grooves about 3" in from the angle cut.



With a portable brake or hand flanger, bend the flattened

area at the previously marked standing rib intersections. During installation, the panels must be pulled firmly



Panels Into Valley (Continued)

Bend the panel 90°.

The sidelock should be long enough to extend over the valley's standing rib and down to the base of the valley.



Remove some of the excess material from the sidelock.



The panel's angled sidelock should extend about 1" past the front of the panel butt. Remove any excess material.



Panels Into Valley (Continued)

On the panel of the first course, the sidelock should be 1¼" wide at the bottom of the panel.



Sidelock at the top of the panel is ¾".



together against one another and must meet the valley snugly. Place a Nail Clip in the top lock and as close to the valley as possible. (Be certain to install Nail Clips approximately every 16" on the remainder of the panel.) Small panel sections may have to be pop riveted to large sections. Cover any rivets with sealant.



Panels Into Valley (Continued)

The panel of the first course into the valley will differ from succeeding courses. The length of the sidelock at the bottom of the panels and all other courses will be $1\frac{3}{4}$ " wide, rather than the $1\frac{1}{4}$ " on the first course panel. This is because the panel sits on the panel below it. The panel of the first course does not rest on any other panel, necessitating a thinner sidelock. Form the panel as described earlier and trim away the excess material.



The photo at right shows a panel with $1\frac{3}{4}$ " front end of sidelock.



Sidelock tapers to $\frac{3}{4}$ ".



Panels Into Valley (Continued)

The photo at right shows installed panels indicating the difference between initial and succeeding sidelock heights.



Keep the courses running straight, not up hill or down hill.

Take care to ensure the panel courses do not “grow” (extend uphill) as you approach the valley. They will have a tendency to do so, and occasional adjustments may be necessary.



Avoid having two panels intersect the valley on one course. The panel shown at right does not extend far enough into the valley to cover the water-return channel. A small piece of panel is required to cover the water-return channel. Avoid this situation if at all possible.

Note: A panel was removed from the top course on the right side of the valley.



Panels Into Valley (Continued)

To avoid this "short-panel" situation, two methods can be used. The first is to create a field-formed panel of less than full length. The shortened panel should alter the stagger pattern enough to allow the panel that intersects the valley to extend past the water-return channel.

Note: A panel was removed from the top course on the right side of the valley.



The second method is to alter the stagger at the beginning of the course to allow the panel that intersects the valley to extend past the water-return channel.

Note: A panel was removed from the top course on the right side of the valley.



To avoid ending with an unmanageable section of panel, transpose lines from such areas as valley and gables. Since panels install from left to right, transpose reference lines from right to left to establish a starting point. Measure from the ending location back toward the starting area in increments of 48". When installing the first panels, do not position them within 6" of the reference line (See section on page 11.6 regarding starting reference lines for details on avoiding unmanageable panel sections).

Panels Out Of Valley

Position the panel over the valley, allowing excess material for folding the panel into the valley and mark the top of the panel approximately 2" past the valley's standing rib.

Remember the stagger pattern when installing panels out of the valley.



Panels Out Of Valley (Continued)

Mark the panel at the bottom approximately 2" past the standing rib. Cut the panel along this line.



Mark the top of the panel where it intersects the standing rib.



Mark the bottom of the panel where it intersects the standing rib. A fold will be made along this line to form the sidelock of the panel.



Panels Out Of Valley (Continued)

Mark the bottom of the panel where it intersects the standing rib, then mark where it intersects the return flange to indicate the location of the drain.



The photo at right shows a panel with field-formed drain.



Flatten the deep grooves as previously mentioned.

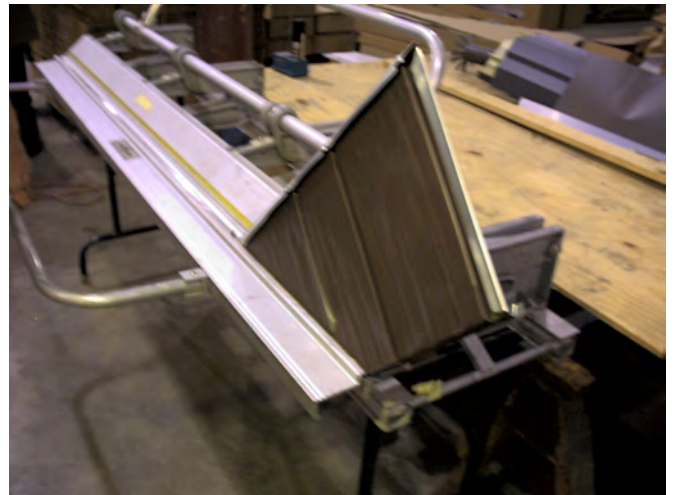


Panels Out Of Valley (Continued)

With a portable brake or hand seamer, bend the flattened area at the previously marked standing rib intersections.



Bend the panel 90°.



Insert the sidelock into the handbrake. Insert the top so 3/4" is revealed, and insert the bottom so 1 1/4" or 1 3/4" (depending on the course of the panel) is revealed. With a utility knife, score the sidelock and remove the excess material.



Panels Out Of Valley (Continued)

Remove some of the excess material that extends past the butt.



Hint: By selecting where the flattened area of the panel is, the valley installation is simplified. The panel can be shifted to the left or right to an area of the panels where the grooves don't cover the valley. Remember the panels need a random stagger pattern so there will be a limit as to how much panels can be shifted.



Hint: When installing panels out of a valley, it's helpful to connect a full panel to the right side of the partial panel in order to ensure squareness and a straight run.

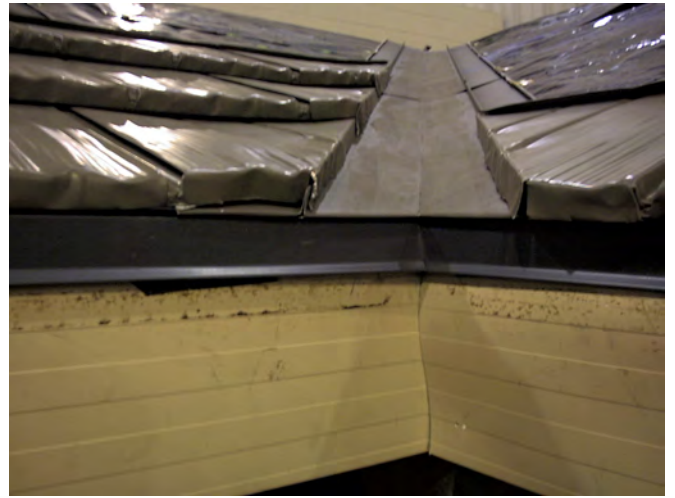
When installing panels in and out of valley, make certain that panels are running parallel to the ridge. At no time should any nails or other fasteners penetrate the valley flashing.



Panels Out Of Valley (Continued)

The photo at right shows panels correctly installed in and out of valley.

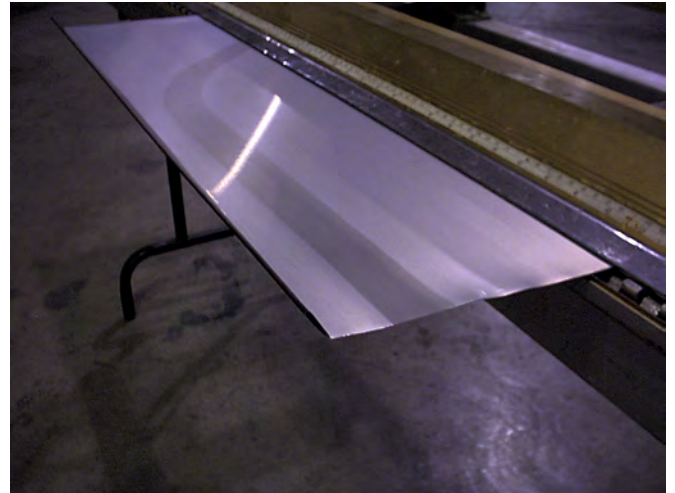
Note: The panels that intersect the valley transition of a dog-leg valley should be cut and bent to adapt to the angles of the transition.



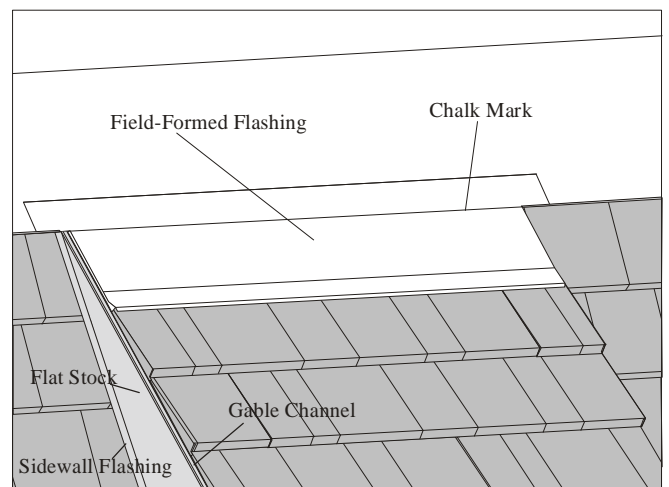
Low To High Pitch Changes

Field form a piece of trim sheet to be installed at the pitch change.

The trim sheet should cover the top lock of the lower course of panels and extend past the top lock of the upper course of panels. Fold a $\frac{3}{4}$ " hem with a slight angle on the lower portion of the flashing to add rigidity to the trim sheet.

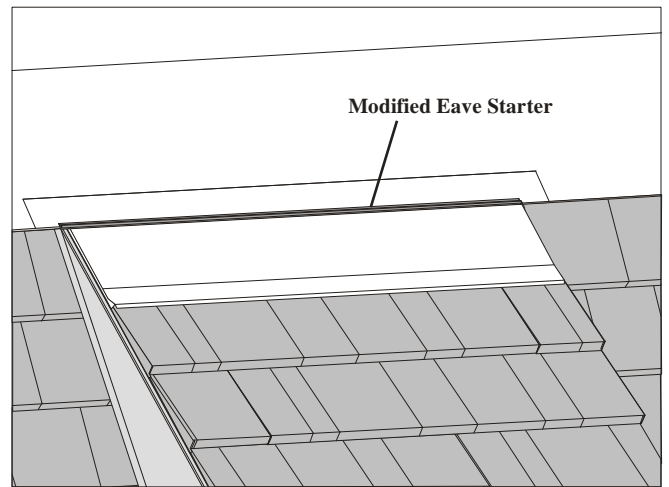


Snap a chalk line between the top locks of the top course of panels.

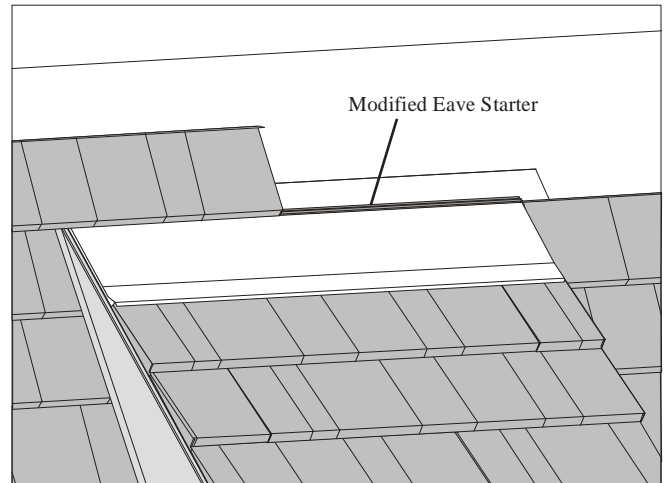


Low To High Pitch Changes (Continued)

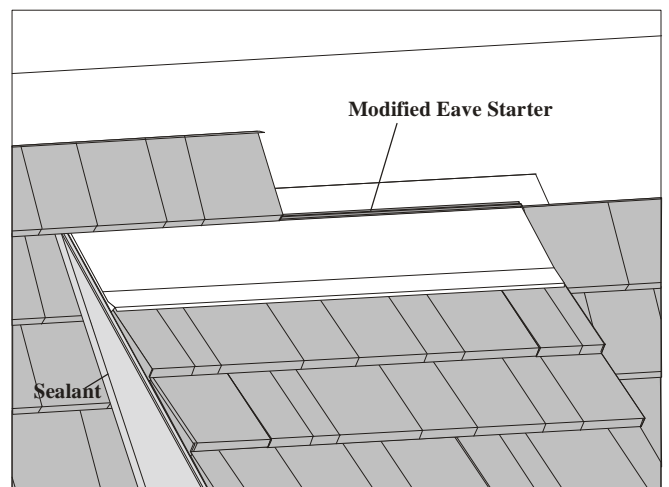
Remove the drip face from a piece of Eave Starter Strip (SH-402). The remaining piece of Eave Starter Strip will be used as a lock to secure the panels. Install the modified Eave Starter Strip along the chalk line. This provides a complete locking strip for the next course of panels.



Follow standard installation procedure and install the next course of panels into the modified Eave Starter Strip.

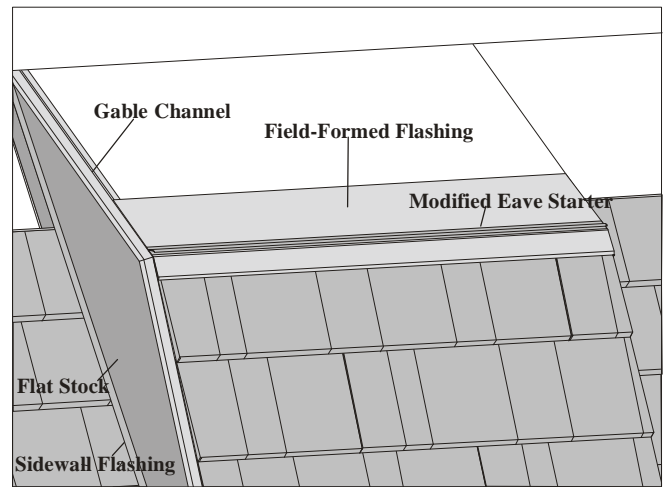


Apply sealant where the gable flashing intersects the Sidewall Flashing.

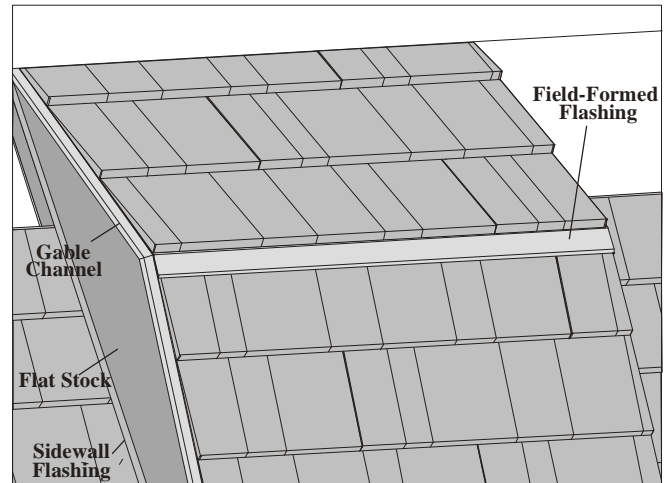


High To Low Pitch Change

If necessary, trim the top of the panels on the lower sections just below the pitch change. Face-fasten the panels to the deck. Next, field-form a flashing to extend over the lower roof section by at least 4" and at least 10" onto the upper roof section. Remove the drip face from a piece of Eave Starter Strip and install it just above the pitch change.

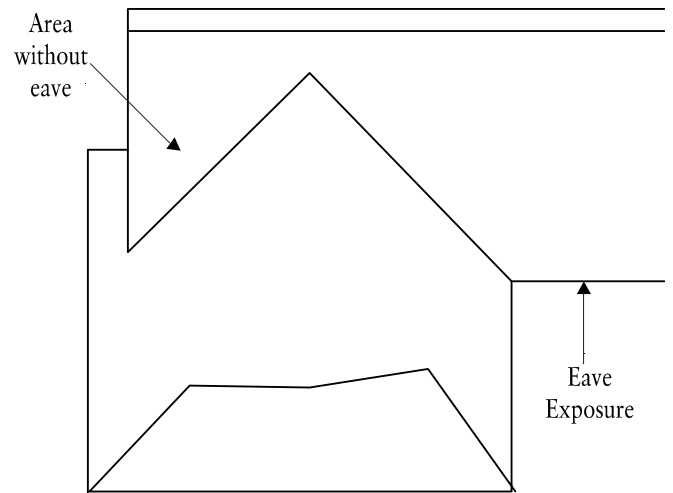


Continue installing panels.



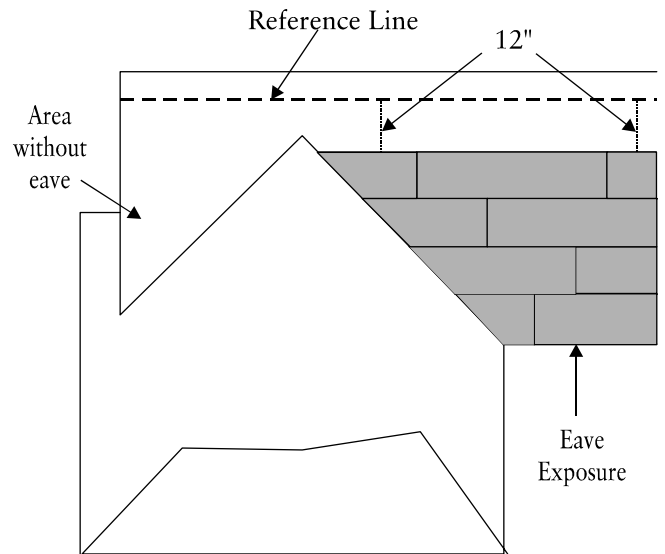
Matched Courses

Some roof sections will have an area without an eave, or with some other obstruction that may cause mismatched courses. In this example, a valley and an area without an eave will be shown. This procedure details how to ensure the course of shingles coming from both sides of the intersecting ridge is properly aligned above the valley peak.



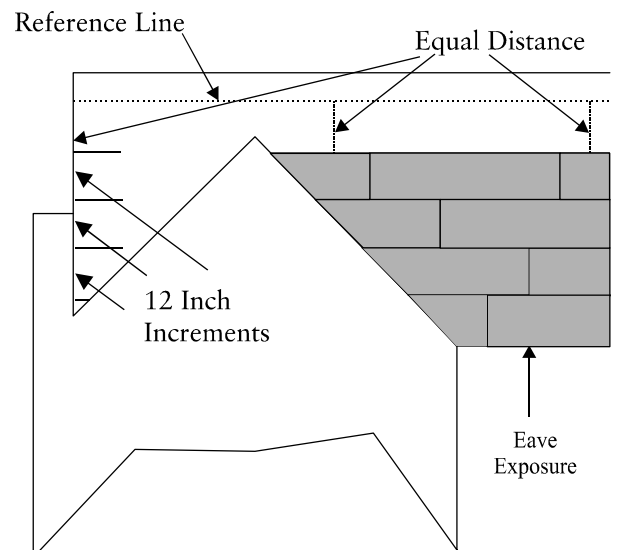
To develop a reference line, measure up 12" from the top of the installed panels. Do this in two locations.

Snap a chalk line across the top of the 12" marks and extend it to the gable end to establish a reference line.



Down from the reference line, mark at 12" increments (the exposure of a panel).

Continue marking down the gable edge until no more 12" increments can be marked.

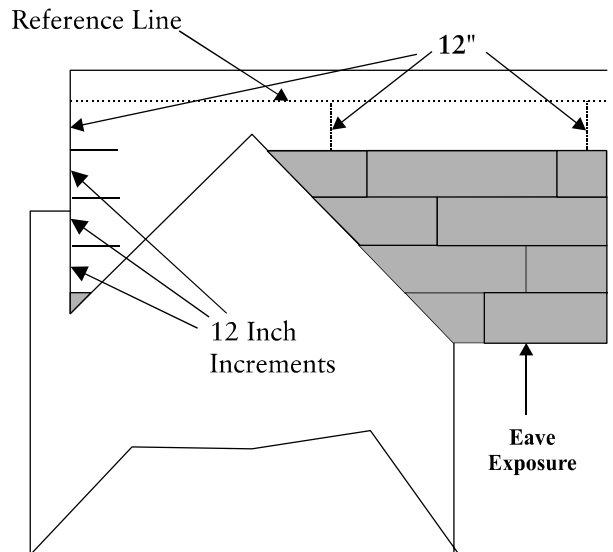


Matched Courses (Continued)

Remember to trim the butt of the panel at the bottom of the valley and gable to allow water to drain.

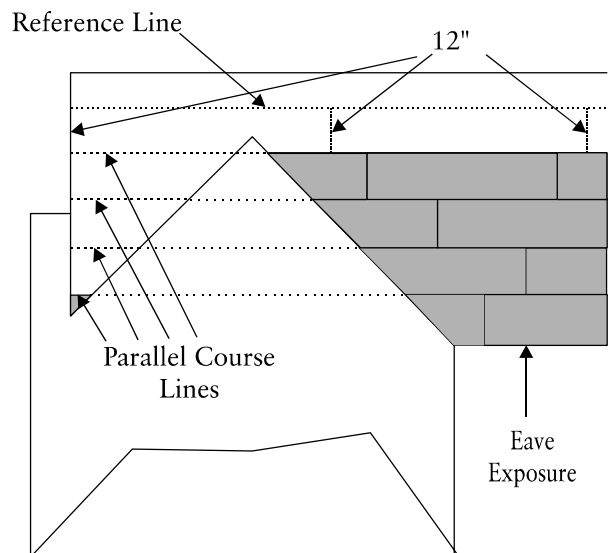
Set the panel in place, making sure to align the top with the reference point.

The lowest course shingle will need to be modified as necessary for the proper exposure so that successive courses meet the chalk lines. If not already installed, install the gable edge accessory pieces. If gable caps are used, modify an end cap for this short course and modify a panel to fit into the valley. If desired, and particularly in heavy snow areas, the bottom triangular area can be fitted with coilstock instead of a modified shingle.



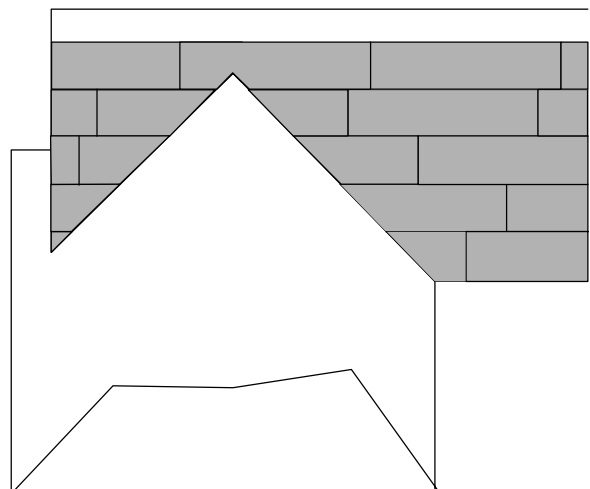
Snap chalk lines at each 12" increment. The chalk lines will ensure the course will align with the courses on the right roof section.

Install the panels so that the panels' top locks touch the chalk lines. While applying succeeding courses, confirm panel alignment by measuring to the reference line.



Continue installing the panels left to right up to the top of the valley.

Since the panels are installed left to right, the tendency would be to start with a full panel in the left roof section and install panels to the top of the valley intersection. The reference line could be established on the right roof section instead of the left roof section. Twelve-inch increments could then be measured down until the eave is reached. The result would be a short course at the eave, involving multiple panels. For aesthetic reasons, this should always be avoided. Examine all the roof sections before laying out the roof.



Review

Install panels left to right.

Engage all of the interlocks

Use three Nail Clips for each full panel.

Install panels according to guidelines to ensure a random appearance.

Accurate angle cuts are critical at valley areas.

Form a new starter in areas at pitch changes.

Develop reference lines to start panels in areas with no eaves.

Carefully plan the roof in advance so as to only install short courses at the ridge.

Brake Operations & Roof Protrusions

Portable Brake - 6.2

Front Flashings - 6.3

Sidewall Flashings - 6.4

Rear Flashings - 6.5

Siding Against Siding - 6.6

Sidewall Flashing Installation - 6.6

Pipe Flashing - 6.9

Large Penetration Flashing - 6.15

Review - 6.19

Portable Brake

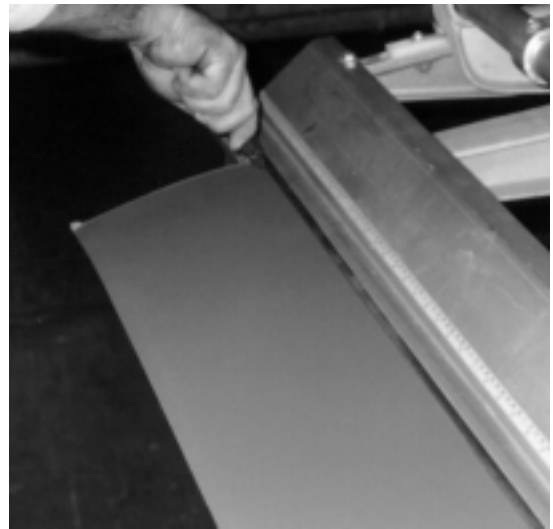
The best way to master the use of the portable brake comes from hands-on experience. Mastering this device requires trial and error.

Mark the dimensions needed on the trim sheet that will form the flashing.

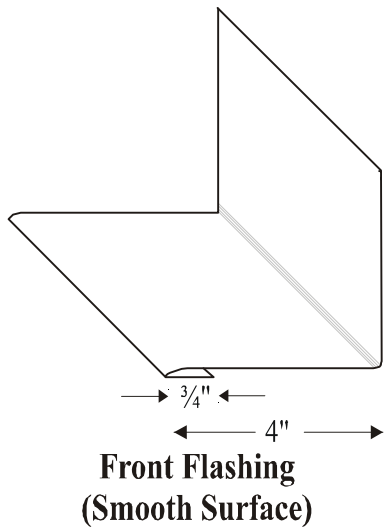


Cut the various lengths needed, using a straight edge and a utility knife. Score the trim sheet several times and fold along the score line to break the metal.

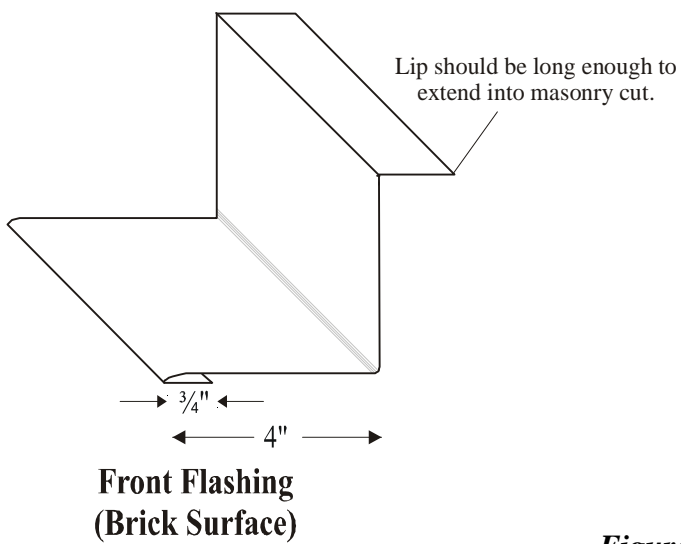
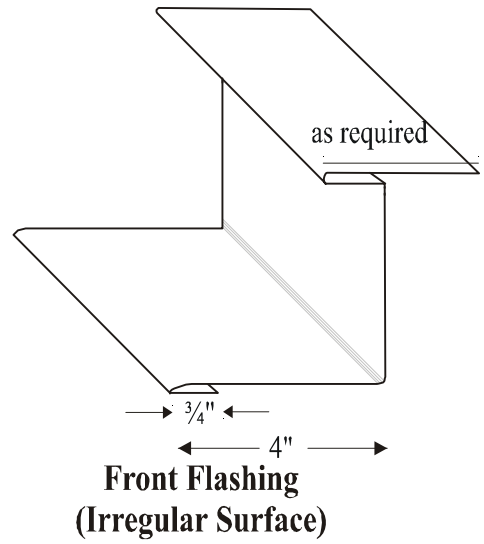
Insert the trim sheet into the portable brake and trim to desired width by scoring with a utility knife and breaking. Adjust to designated points and bend to the proper angles.



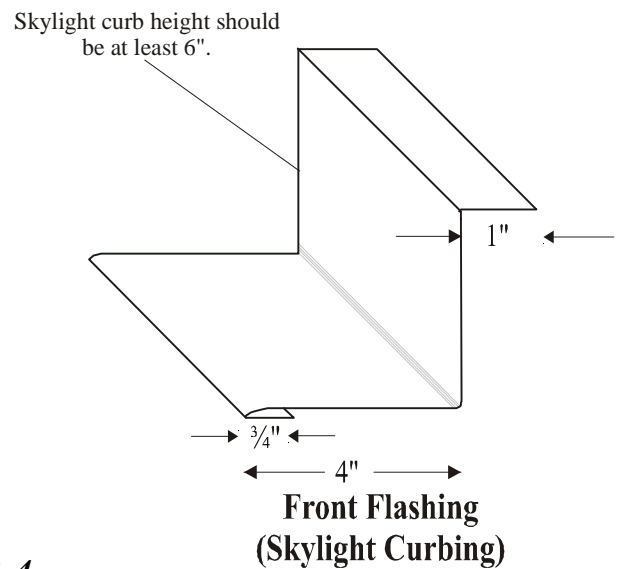
Front Flashings



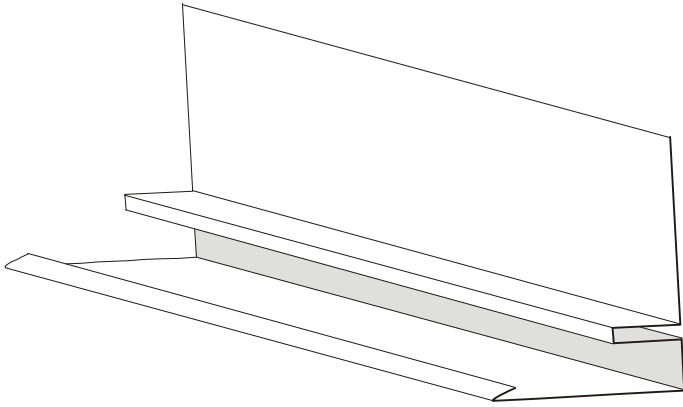
Figures 1 & 2



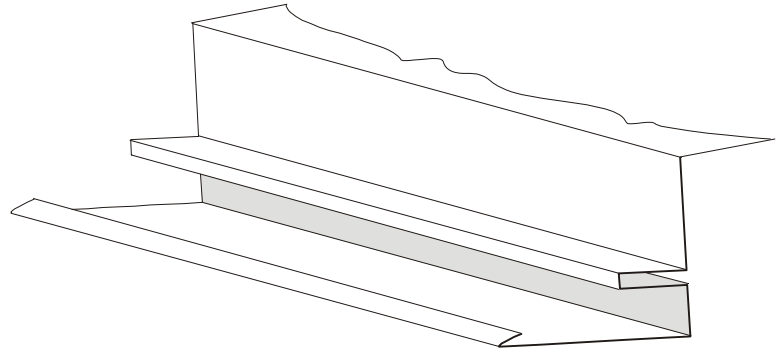
Figures 3 & 4



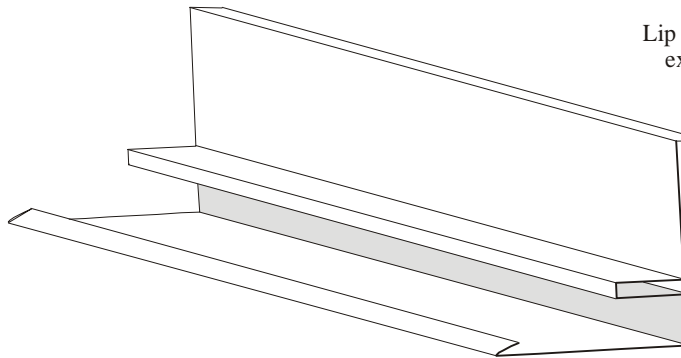
Sidewall Flashings



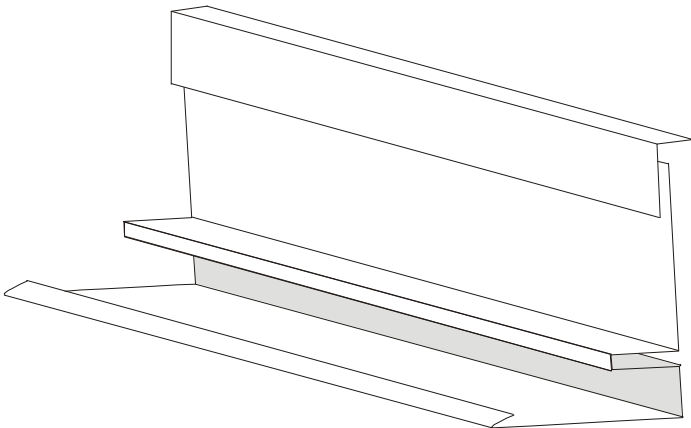
**Sidewall Flashing
(Smooth Surface)**



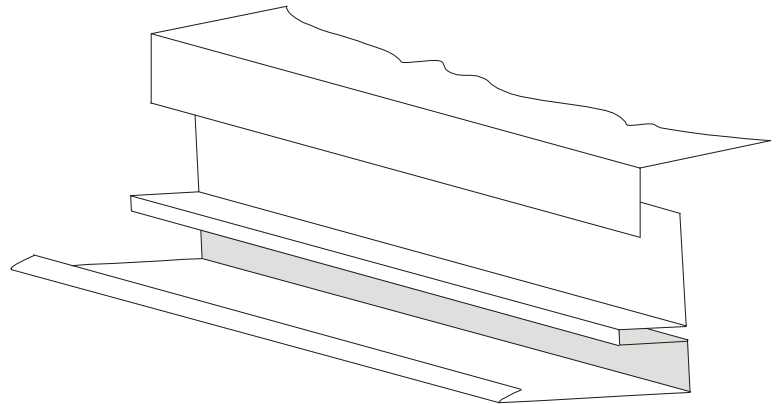
**Sidewall Flashing
(Irregular Surface)**



**Sidewall Flashing
(Brick Surface)**



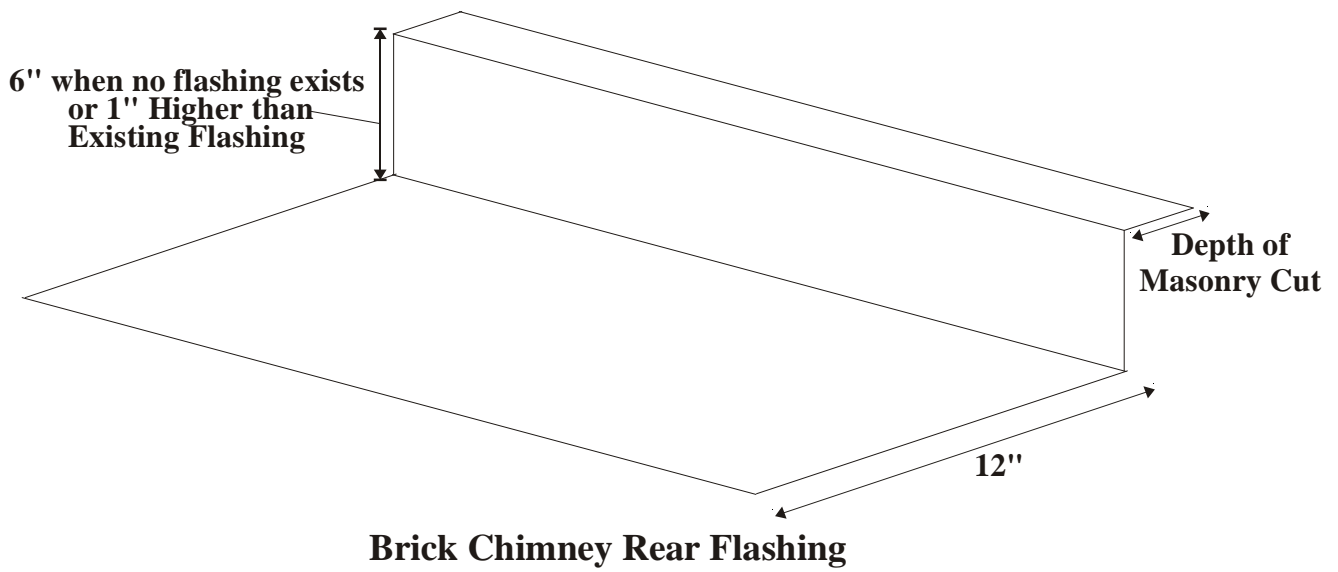
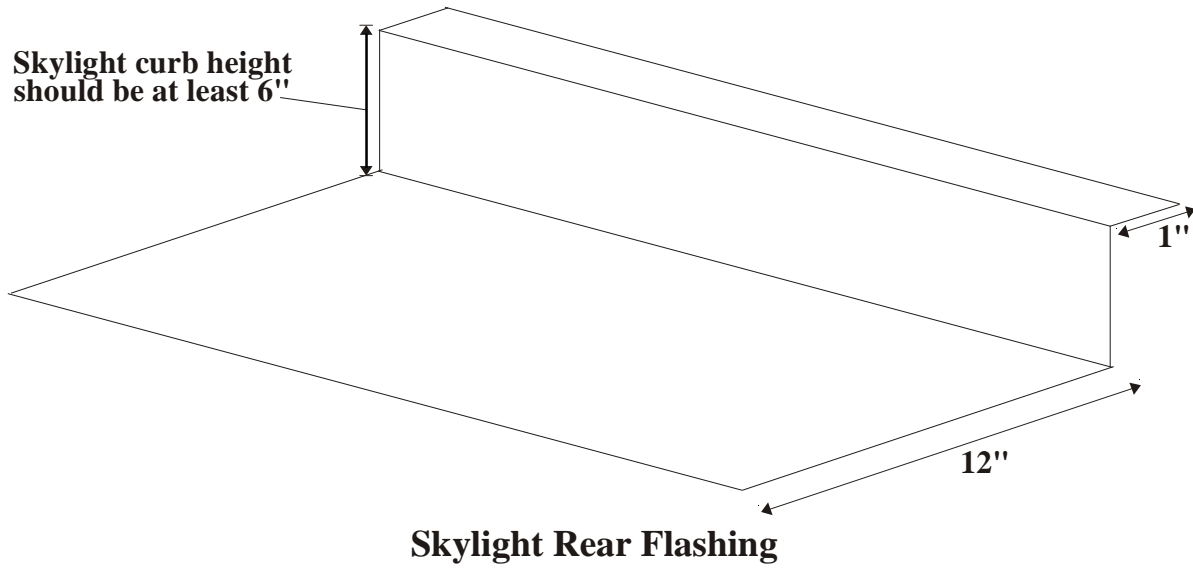
**Sidewall Flashing
(Brick Surface)**



**Sidewall Flashing
(Two-Piece Irregular Surface)**

NOTE: Use this two-piece Sidewall Flashing system when the existing flashing extends past the top of the Sidewall Flashing.

Rear Flashings

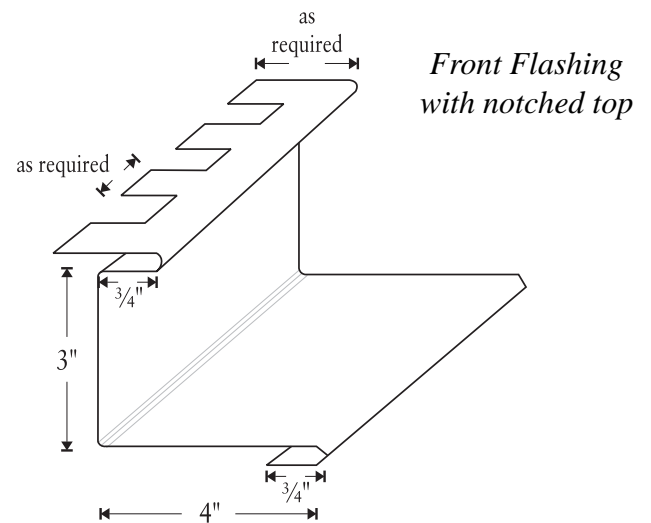


Siding Against Siding

Battens

Whenever possible, field-form a front flashing and either extend it up and behind the siding or bend it into a 1/2" deep slot cut into the siding if this cannot be done.

Form a flashing to extend 4" out over the face of the panels with a 3/4" hem and extend up the wall approximately 3". Bend the flashing so that it lies tightly against the roof panels. If the front flashing cannot be fitted under the siding, and a cut cannot be made in the siding, notch the top of the flashing to fit around the siding battens.



Horizontal Siding

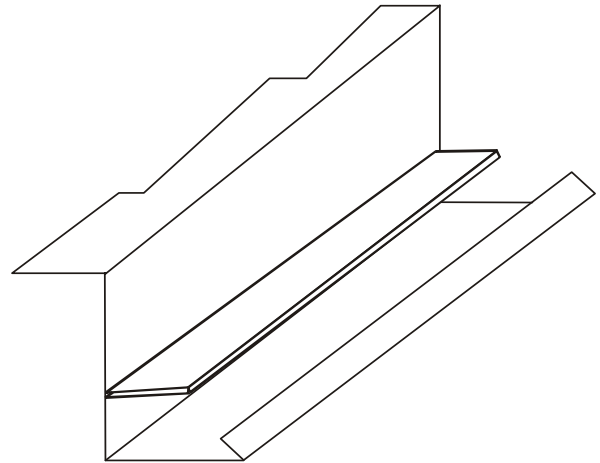
When flashing can't go behind or into siding, form Sidewall Flashing (5029) so the width of the flashing ledge matches the butt thickness of the horizontal siding.

Form a ledge on the top of the Flashing.

Mark the location where the flashing and the butts of the siding intersect.

Cut the flashing edge on a taper to match the siding profile at the marked butt areas.

Fasten the flashing into position with Nail Clips. Seal the ledge around the battens.



Sidewall Flashing Installation

Prior to installing Sidewall Flashing (5029), remove the lock from the Eave Starter Strip so the Sidewall Flashing lies flat against the deck.



Sidewall Flashing Installation (Continued)

Set the Sidewall Flashing into place. Fasten it to the deck with Nail Clips at 16" intervals.

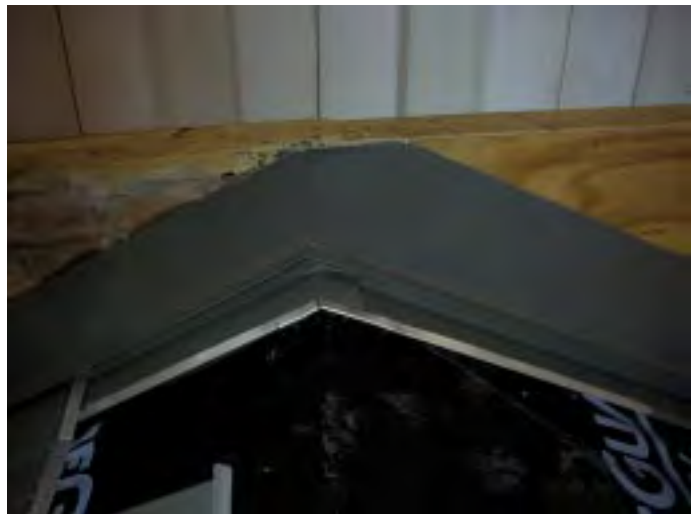


Do not drive nails through the water-return channel of the Sidewall Flashing.



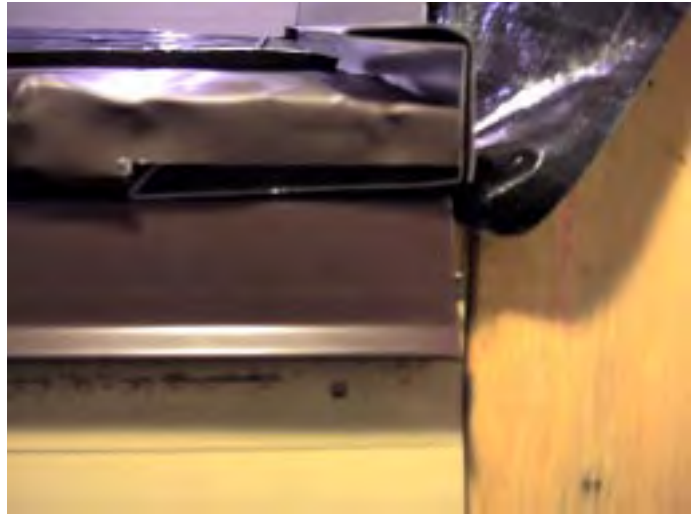
When Sidewall Flashings intersect at the ridge, cut the water return channel and wall portion of the first section so it extends a few inches past the ridge line. Bend the water-return channel over the ridge. Install the second flashing from the opposite side of the roof.

The top piece of Sidewall Flashing must overlap the lower piece. Be certain a portion of the water return channel extends past the ridge and down the opposite side. The water-return channel of the second Sidewall Flashing should nest into the water-return channel of the first Sidewall Flashing. Miter cut the wall portion of the flashing to provide a neat look.



Sidewall Flashing Installation (Continued)

When installing panels into the Sidewall Flashing, remove a portion of the butt of the lower panel that covers the eave end of the Sidewall Flashing. This will allow water which may accumulate in the water-return channel to drain.



When installing panels into the Sidewall Flashing, be sure to leave no less than a 1/8" gap between the edge of the panel and the inside wall of the Sidewall Flashing.

Wider gaps may collect debris.



Do not crush the water return flange of the Sidewall Flashing.



Pipe Flashing

Bring underlayment up around the vent pipe by 1½" and seal it to the pipe with roofing cement or sealant. See section 2, "Roof Preparation," for more details on underlayment installations.



Install courses of panels until there is less than 12" (the width of a panel) between the vent pipe and the course of panels below it. If there is more than 12" between the vent pipe and the course of panels below it, install another course of panels before installing the pipe flashing.



Measure from the bottom of the vent pipe to the top lock of the course below. Subtract that dimension from 12" and measure that distance down from the top lock of the panel to be cut.

Transfer this measurement onto a panel.



Pipe Flashing (Continued)

On the course of panels, measure from the side lock of a full panel to the side of the vent pipe. If the distance between the panel and the vent pipe is greater than 4', install another panel.



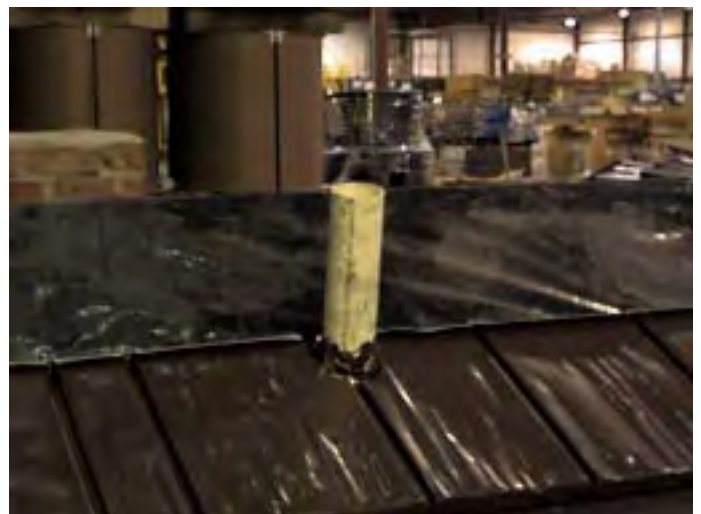
Transfer this measurement onto the panel. Cut out an opening for the vent pipe, enlarging it just enough to allow for the movement necessary to lock the panel around the pipe.

An alternate method of fitting the panels around the pipe is to position the panel under the pipe and engage the side locks. From the sides of the pipe, extend lines down onto the panel.



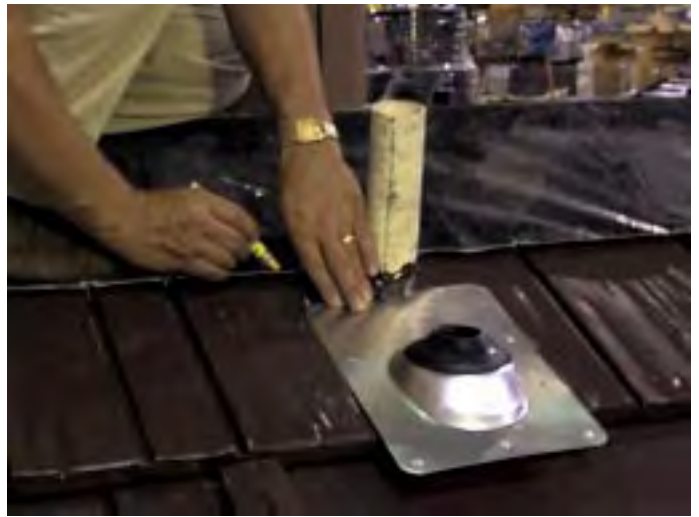
Position the panel to the side of the panel and loosely engage the bottom lock. Extend lines across the panel that represents the top and bottom of the pipe. Once the pipe's location has been marked, on the panel, remove that part of the panel.

Place the panel around the pipe and engage both the side and bottom locks.



Pipe Flashing (Continued)

Installing the pipe vent flashing: mark the top lock of the panel where the vent pipe flashing will rest.



Cut the top lock at the marks.



Fold the top lock back against the deck.

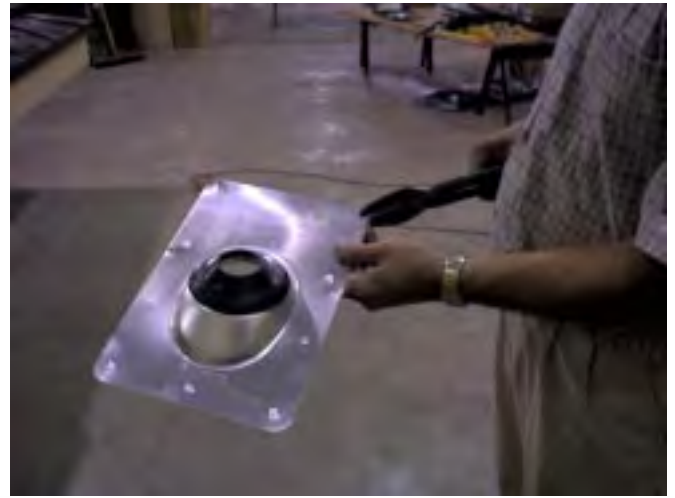


Pipe Flashing (Continued)

Form water-return flanges on the vent pipe flashing. Cut the vent pipe flashing to allow for the bend.

Note: Use only steel pipe boots with KasselShake.

With hand flangers, form the water-return flanges on the vent



pipe flashing.

The photo at right shows a properly formed vent pipe



flashing with water-return flanges.

Fill the gap between the panel and vent pipe with sealant.



Pipe Flashing (Continued)

Apply sealant on the panel where the vent pipe flashing will



rest to ensure a weathertight seal.
Slide the vent pipe flashing in place.



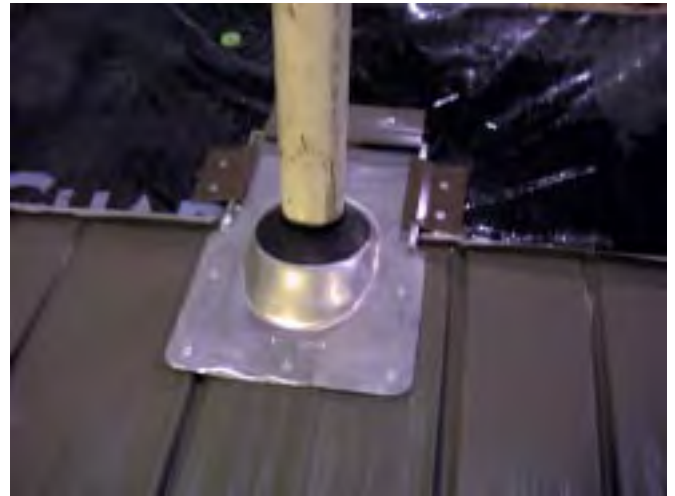
Fasten the vent pipe flashing to the roof deck using Nail



Pipe Flashing (Continued)

Clips.

Secure the flashing to the panel below it with sheet metal



screws.

Apply sealant over all exposed fastener heads.



A hole may need to be cut in the panel above the vent pipe



Pipe Flashing (Continued)

flashing. If this is the case, fill the hole with sealant.

Penetrations Greater Than 12":



Large Penetration Flashing

If a penetration on the roof is larger in diameter at the top than at the base, the flashing must be made in two pieces and lapped to provide a tight fit. This will occur with penetrations such as turbines, J vents, heat stacks, etc.

Install panels until the distance between the penetration and



the top of the panel is less than 12".

Form a flashing that is approximately 6" wider than the



Large Penetration Flashing (Continued)

penetration with a lock that will fit into the top lock of the course below. The flashing should extend past the back of the penetration. Form water return flanges on both sides of the flashing. Place it against the penetration and lock the flashing into the top lock of the panels.

Find the distance between the bottom of the penetration and the top lock of the panels below and mark this on the flashing.

Estimate the location on the flashing where it will meet



the sides of the penetration and mark it on the flashing.

To adapt the flashing, measure the diameter of the opening and divide by two in order to find the radius, which will then be calibrated on a compass.

Draw a semi-circle and then move the center point up 1" and



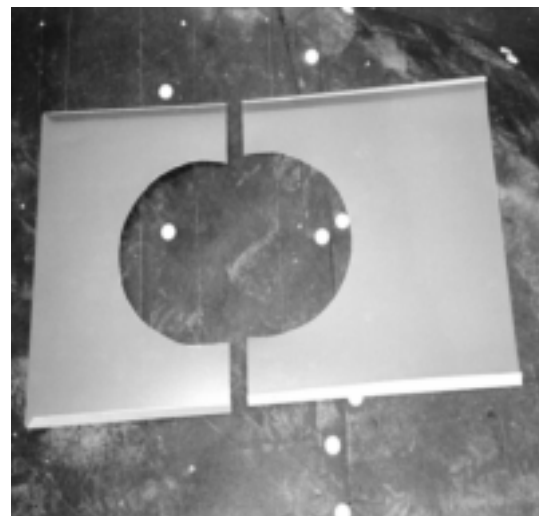
draw another semi-circle above that. This extra inch allows for a flashing lap. Be sure the first semi-circle intersects the marks made on the flashing.

Form an upper flashing in the same manner. To allow the upper flashing to slide into the lower flashing, make the upper flashing slightly narrower than the lower flashing.

These two pieces will surround the base of the projection.

Cut both of the semi-circles out of the flashing.

Lock the bottom flashing section into the top lock of the



Large Penetration Flashing (Continued)

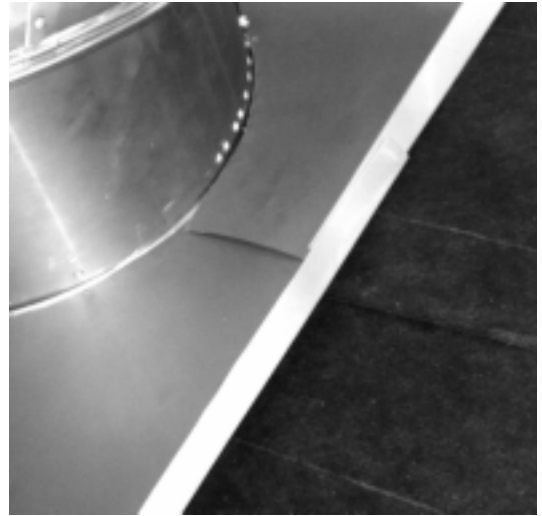
panel below.

Insert the top piece, pushing both pieces together so they fit



tightly around the base of the projection.

Once it is in place, fasten the flashing at the overlapped



areas.

Apply sealant to the perimeter of the penetration as well as any nail heads.

Insert a piece of underlayment under the underlayment above



Large Penetration Flashing (Continued)

the penetration and lap it over the top of the flashing. Use the compass with the preset radius or the removed portion of the base flashing to mark the circumference and cut the panel where needed.

When circular cuts are being made, the snips may cause a curvature in the panel. It may be necessary to straighten the panel back to its original configuration. Lock and fasten the panel into place.

Make sure the panel locks into place and that there are no large gaps around the penetration.



When more than one course needs cut, follow the same procedure as previously discussed.



Once all panels are locked and fastened into place, carefully seal around the perimeter of the penetration.

Fill the grooves in the shakes directly behind the penetration with sealant. This will prevent water from accumulating behind the penetration.



Review

It will take some trial and error to master the use of a brake.

Flashings must include $\frac{3}{4}$ " water return legs.

Some field-formed flashings must be utilized.

Employ diverters behind all large penetrations.

Chimney & Skylight Flashing

Brick Chimney Flashing - 7.2

Skylight Flashing - 7.10

Stone Chimney Flashing - 7.12

Review - 7.13

IMPORTANT: All detail work demands meticulous consideration.

Brick Chimney Flashing

Remove old chimney flashings only if they interfere with new flashings. Prior to installing the new flashing, inspect the chimney and make sure there are no loose bricks or missing mortar. Repair any loose bricks, missing mortar and cracks around the flue pipe and cap to keep water from entering the chimney (Refer to the Flashing Chart (6.3-6.5) for flashing details).

Note: If old flashing is a dissimilar metal, then it must be isolated from contact with new flashing. Use underlayment or roofing cement between the old and new flashings to prevent the flashings from coming into contact with each other.



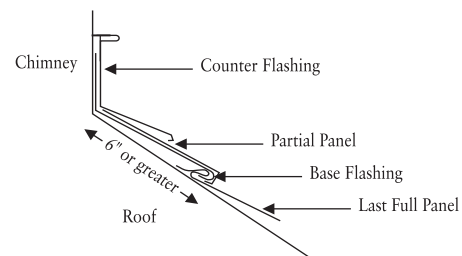
If a groove from previous flashings is not present, use a masonry blade to cut a ½" groove into the chimney. The groove should be about 6" above and run parallel to the roof deck. Be certain underlayment is installed up the sides of the chimney, being careful not to allow portions of the underlayment to trap water underneath themselves.

Install the panels under the chimney. Trim the panels so they are within 1" of the chimney.



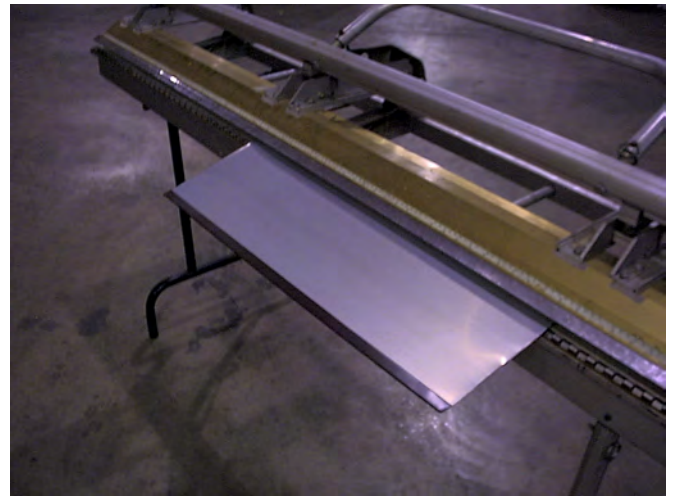
If the panel top lock falls less than 6" from the face of the chimney, a single front flashing is required.

If this condition results in the top lock falling 6" or more from the face of any projection, install a base flashing, a cover panel, and then a front counter flashing.



Brick Chimney Flashing (Continued)

Using a hand brake, form a front flashing so that it covers the top of the shake and any existing chimney flashing. Form a ½" lip to insert into the masonry cut. When mak-

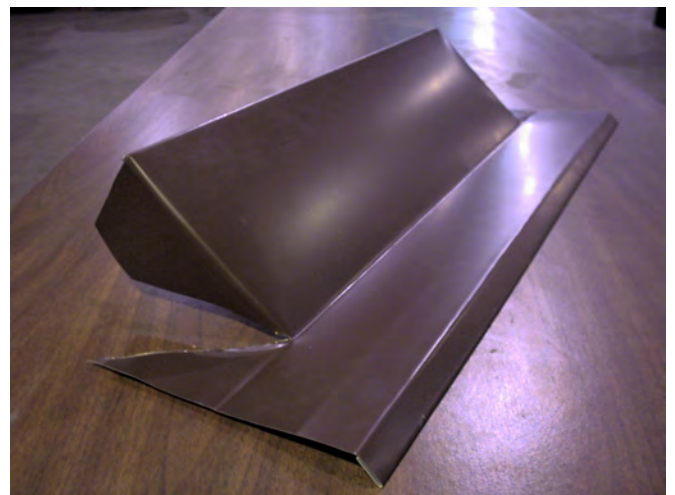


ing this flashing, be sure it is long enough to extend 3" past each side of the chimney. The photo at right shows a flashing bent to the correct



angle with drip hem and masonry-cut lip.

Cut and remove the ½" lip 3" in on both sides. Make a V-cut in the flashing and bend tabs on each side of the



Brick Chimney Flashing (Continued)

flashing. Bend the front tabs down so they will rest flat against the deck.

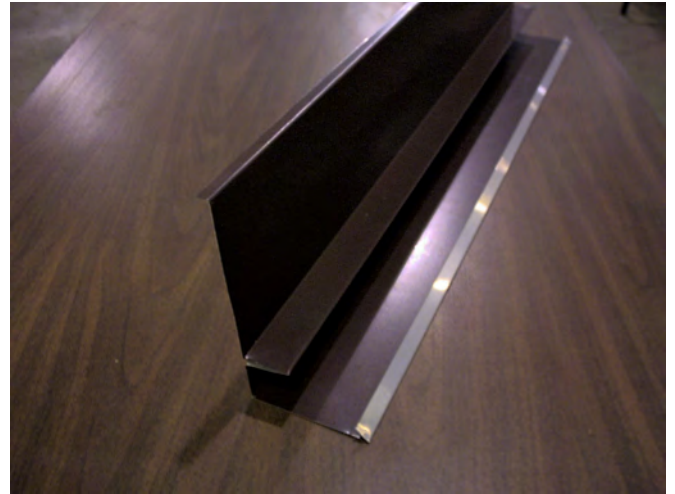


Set the flashing in position and fasten it in place.

Use 5029 Sidewall Flashing on the sides of the chimney. Be sure the Sidewall Flashing is long enough to extend 3" past both the front and the back of the chimney.

If the Sidewall Flashing is tall enough to reach into the masonry cut, form a lip on the top of the flashing that will fit into the cut.

A two-piece flashing should be used to cover any discolored bricks or existing flashing if the Sidewall Flashing is not tall enough to cover them. An "L" flashing should be



formed to fit existing masonry cuts (see page 6.4 for more information on these flashings).

At the top of the flashing, cut along the line where the



Brick Chimney Flashing (Continued)

sidewall and the front of the chimney intersect.

Fold the top back on itself, concealing the unpainted aluminum of the Sidewall Flashing. Remove any material



that extends past the bottom of the flashing.

On the upper end of the flashing, bend tabs that extend



around the back of the chimney.

Secure flashings to the front wall flashing with pop rivets



Brick Chimney Flashing (Continued)

or steel sheet metal screws, then cover the fastener heads with sealant.

On the lowest panel installed into the Sidewall Flashing, cut a drain slot where it covers the sidewall's water-return channel.

The drain is made by removing some of the panel's butt and bottom lock.

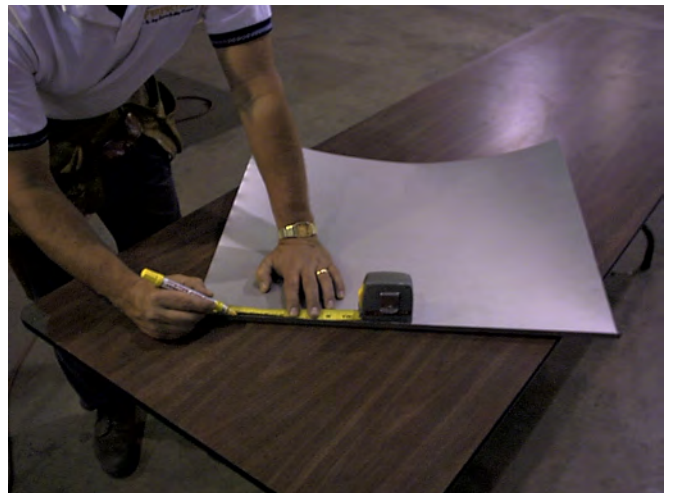


Install panels until the top lock of the course of panels is past the back of the chimney.

Using a hand brake, form a back flashing to extend up the roof at least 12" and up the back of the chimney at least 6",



Mark the flashing where it should be bent.



Brick Chimney Flashing (Continued)

or to the masonry cut. The flashing should extend 3" past each side of the chimney (see page 6.5 for more information



Form the flashing so it fits tightly against the base of the chimney.

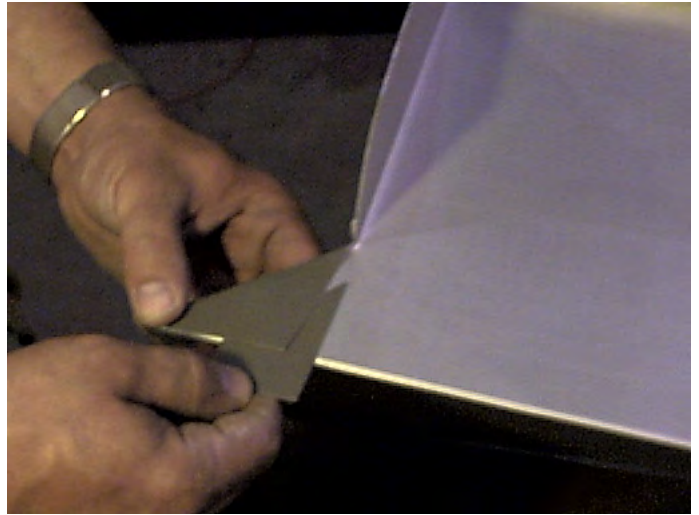


on these flashings).
Form a 1/2" lip that will fit into the masonry cut.



Brick Chimney Flashing (Continued)

Form tabs that will fit around the sides of the chimney.
Form dog ears on the ends of the flash to divert water around the chimney.



Insert small pieces of scrap material behind the dog ear to hide the unpainted metal that would otherwise be exposed.

Set the flashing in position and secure it to the the



Seal around the entire perimeter of the chimney where the flashing is inserted into the masonry cut to ensure a watertight joint. Be sure to use a sufficient amount of sealant to fill any voids or cavities.



Brick Chimney Flashing (Continued)

Sidewall Flashing with rivets or sheet metal screws. Seal the fastener heads and joints.

Continue running panels up the side of the chimney.

Install a course of underlayment over the flashing and under the course of underlayment above it. This will allow water to drain over the flashing and onto the lower courses of panels.

Remove the drip face from an Eave Starter Strip and install the modified Eave Starter Strip between the top locks of the courses of panels on both sides of the chimney.



The modified starter will be the lock for the full course of panels running past the top of the chimney.

Note: It is critical that diverters, such as crickets, be installed behind all projections wider than 2'. No diverter was installed in these photos, due to the chimney's narrow width.



Skylight Flashing

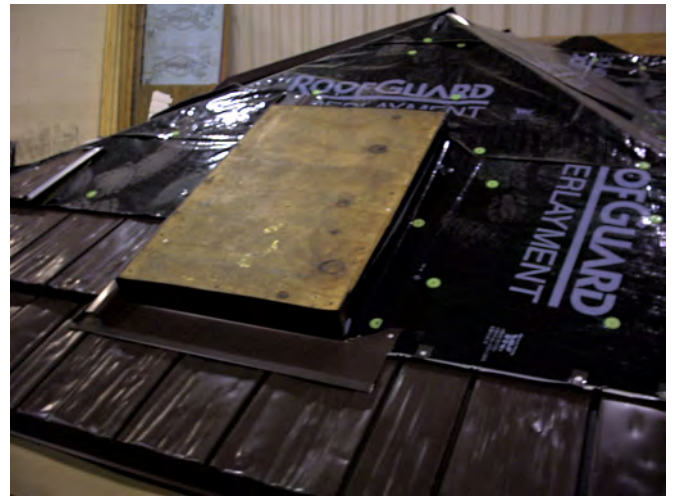
Refer to flashing illustrations on pages 6.3-6.5 for specifications concerning proper use of flashing. Refer to Roof Preparation (Section 2) for proper underlayment installation guidelines.

Remove any skylight dome from the top of the curb and safely set off to the side. Minimum curb height should be the greater of 6" or local code. Curbless Skylights must not be installed with the panels. It is critical that the skylight be installed with adequate curbing and above the flow of water.

Install the underlayment up the sides of the skylight curb. Install the first course of panels by cutting as required. Form the front flashing to extend 1" over the top of curb and 3" past both sides of skylight.

Install Sidewall Flashing (5029), securing it with the front flashing. Sealant must be applied between side and front flashing.

Install panels along the sides of the skylight. Make certain the courses of panels on both sides of the skylight maintain the same line as they are installed along the sides of the skylight to avoid any mismatched courses of panels at the top of the skylight.



Skylight Flashing (Continued)

The back flashing must be formed to extend up the roof 12" behind the skylight and to rest against the back curb of the skylight. This flashing should not exceed the height of the curb and should be extended into the water-return channel of the sidewall flashing on both sides of the skylight.

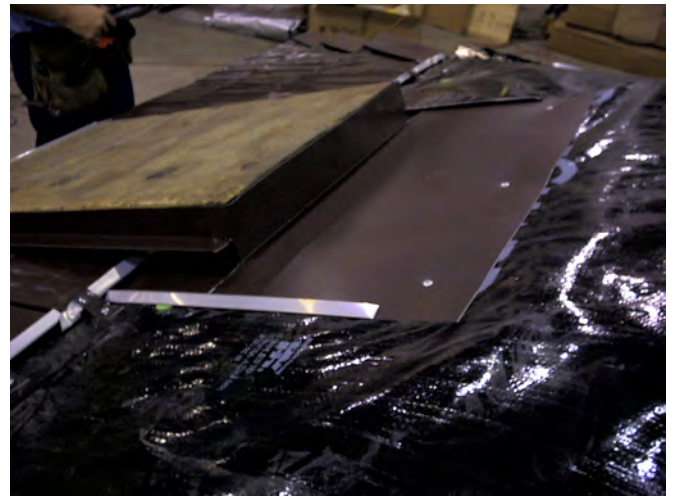
Form dog ears on the sides of the flashing to divert water away from the skylight.

Trim the excess metal, leaving a 1" tab to be bent and attached to the top of the curb. Fasten the flashing through the tabs. Use sealant to fill in the grooves in the panels where the sidewall flashing rests on top of the panels. This will divert water to the top of the panels and past the

sidewall flashing.

Apply sealant in all flashing joints.

When all flashing and sealing is complete, securely re-attach the skylight dome.



Stone Chimney Flashing

Refer to the Flashing Chart on pages 6.3-6.5 for flashing guidelines.

The stone chimney presents a unique problem due to the irregularities of a stone surface.

If a masonry blade will not fit into stone to make a cut, or if the stones are brittle, build a wood frame around the chimney that will provide a good medium to accept the flashing and fasteners.

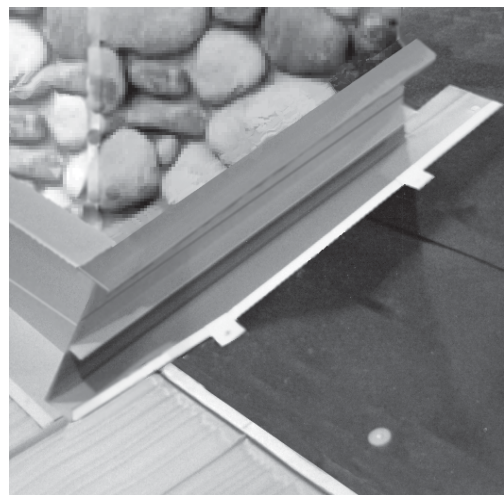


Form and install flashing around the perimeter of the wood frame in the same manner as the flashing is installed around skylights.



Once the frame is flashed, form a flashing that will rest on top of the wood frame. The top of the flashing should be equal to the greatest depth of the stone. Set a compass equal to the distance between the inside edge of the frame and the greatest stone depth. Place the flashing against the stone and and, holding the compass perpendicular to the stones, scribe along the top ledge of the flashing, following the irregularities of the stone. Trim the flashing along the scribe mark.

After the flashing is trimmed, fasten it to the wood frame and seal the perimeter of the flashing along the stones and any flashing joints.



Note: It is critical that crickets or saddles be installed behind all large protrusions.

Review

All detail work demands meticulous consideration.

Field-form flashings for the front and back of the chimneys and skylights.

It is critical that the skylight be installed with adequate curbing and away from the flow of water.

Crickets or saddles are required behind all large protrusions.

Upper flashings should rest on top of lower flashings.

Hip Treatment

Hip Treatment - 8.2

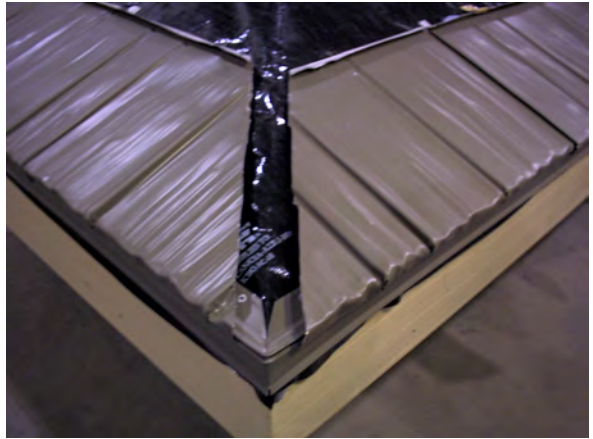
Mismatched Courses - 8.3

Review - 8.6

Hip Treatment

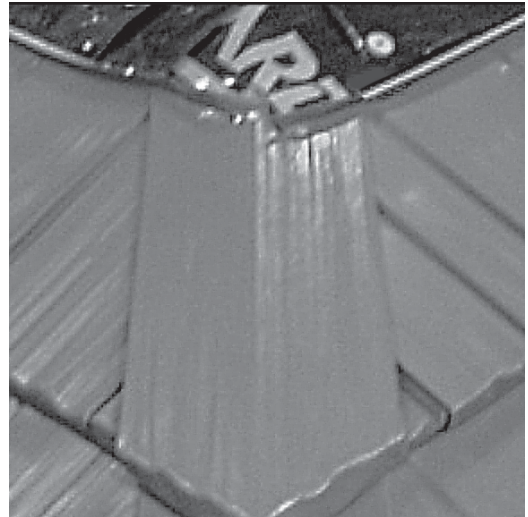
Lock a panel in place so it extends past the hip line.
Mark the top and bottom of the panel at the hip line.
Draw a line between the marks and trip the panel along the line. After cutting the panel, lock panel into position and fasten in place.

Note: When installing panels out of the hip area, remember to ensure a random appearance and stagger the courses.



Install Hip Caps (5008) as the course of panels progress up the roof. Avoid waiting until all the courses of panels are installed before installing the Hip Caps. Waiting until all the courses of panels are installed will make Hip Cap installation difficult. Snap a chalkline the length of the hip to help align the hip caps.

Slide the Hip Cap over the shingle. The bottom end of the cap should lock over the butt of the shingle. The upper end of the cap should rest under the top lock of the shingle depending upon the pitch. The Hip Cap may be too long; if this is the case, trim the top of the cap so it fits into the top lock. Bend the top locks back. Nail through the upper end of the cap, keeping the nail as close to the lock as possible. After the nails are driven into place, fold the top lock back into position. Drive two nails through the tab in the upper center of the cap.



At the hip/ridge intersection, trim the last cap on one side of hip to fit ridge intersection.

Place the opposing Hip Cap; mark where it overlaps, cut away the side of the cap, trim to fit, and securely attach.



Hip Treatment (Continued)

To ensure maximum wind resistance the Hip Caps can be installed as follows (this procedure is not shown):

Install the first course of panels and overlap past the hip line. Drive 3 nails through the panels on each side of the hip line. The Hip Cap will cover the nails.

Slit the top lock of the panels just enough to slide the full length of the Hip Cap through the top lock.

Install the next course of panels. Face nail through panels and Hip Cap below. The next Hip Cap will cover the nail heads.

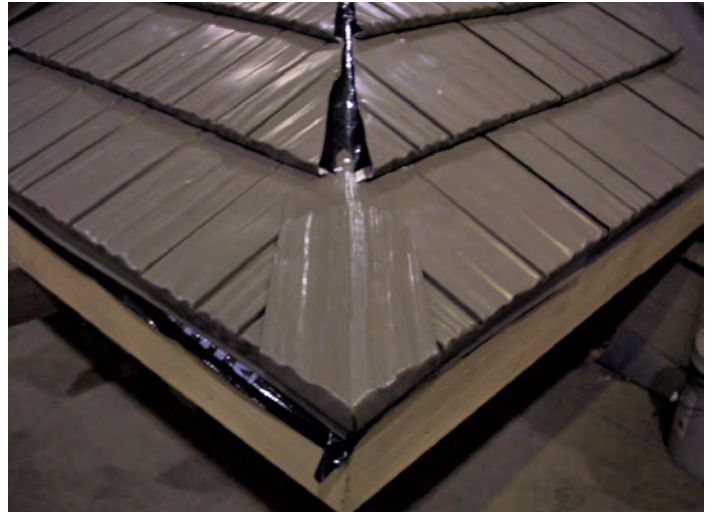


Mismatched Courses

Run the panels into the hip line, and on the first course, install a Hip Cap as described in this section.

When roofs of different pitches meet at a hip, the courses on the adjacent roof sections do not match at the hip line. It will be difficult to use Hip Caps to cover the hip line. Ridge Caps (5007) can be used to finish the Hip.

See section 9 for detailed Ridge Cap installation instructions.



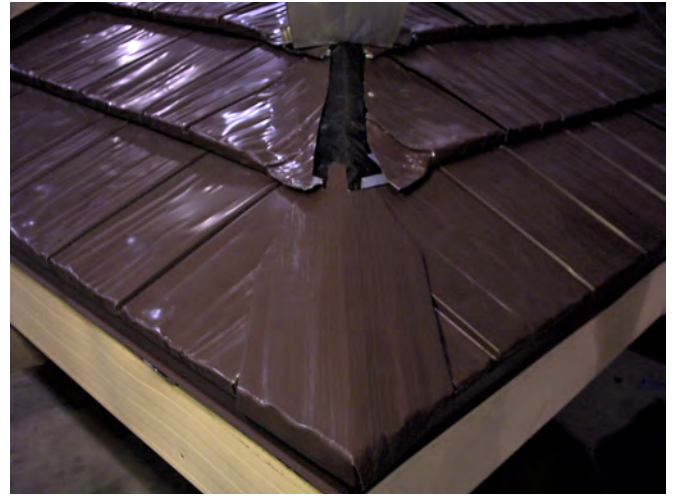
Note: In these photos, the courses are not mismatched, but the procedure for installing Ridge Caps on a hip is the same.

Near the hip line, flatten the panel butt edges. This will allow the Ridge Caps to lie flat on the panels.



Mismatched Courses (Continued)

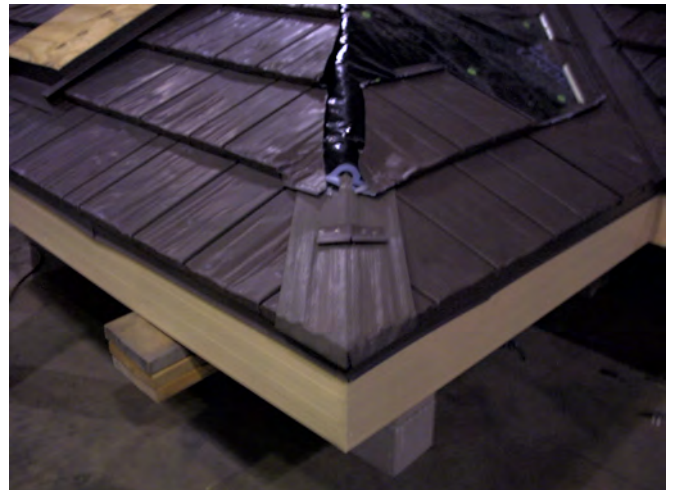
Flatten an area of the panel butts that is slightly wider than a Ridge Cap.



Measure up 12" on the Hip Cap and mark. This indicates the position to start installation of Ridge Caps.



Cut a Nail Clip in half. Attach one half of the clip to each side of a Ridge Cap. Fasten each nail clip with two nails.



Mismatched Courses (Continued)

Secure the butt of the first Ridge Cap over the clips. Use two halves of a Nail Clip to fasten the Ridge Cap. Be certain the fasteners are long enough to penetrate solid decking.



Review

Cut panels at accurate angles at hips.

When installing panels away from a hip, remember to stagger the courses to ensure a random appearance.

When attaching the hip cap, be sure the fasteners are concealed by the next hip cap.

Use Ridge Caps on roofs with mismatched pitches.

Ridge Treatment

Panel To Ridge Treatment - 9.2

Complex Hip-Ridge Situations - 9.8

Ridge Vent Installation - 9.9

Review - 9.11

Important: All detail work demands meticulous consideration

Panel To Ridge Treatment

The ridge must be covered with flashing prior to Ridge Cap installation.

There are two methods of covering the ridge, dependent upon the distance between the last course of panels and the ridge.

1. If the top of the panels is more than 6" from the peak, install an additional course of panels and cut the tops of the panels so they end at the point of the ridge. A ridge flashing will cover the tops of the panels.

2. If the top of the panels is less than 6" from the peak, use coilstock to form a two-piece flashing that locks into the top lock of the panels.

In either case, be sure there is sufficient pitch at the top of the roof for water to flow away from the ridge. If the panels are cut to less than 6", additional 1"x 2" lumber may need to be installed at the ridge to maintain proper pitch.

In this example a two-piece flashing is being installed.



Using a hand brake, form the ridge flashing consisting of two pieces.

Each piece should have a lock that will fasten into the top lock of the panels at the ridge. The flashing pieces should overlap at the ridge.

Note: This same flashing can be made in one piece but this will require greater dimensional accuracy.



Panel To Ridge Treatment (Continued)

Before installing the ridge flashing, apply a liberal bead of sealant to the top course, making sure that all vertical channels in the panels are completely sealed. This will prevent water from penetrating underneath the flashing.

Fasten the first flashing into place every 3-4 feet to hold it in position. Use nails that are long enough to penetrate the substrate. Install the second ridge flashing, ensure it laps over the ridge and onto the first flashing by at least 2" vertically. On longer ridges, overlap the flashing by at least 4" horizontally. Seal at flashing overlaps. At a valley, bend the end of the flashing over the valley's standing ribs and form the flashing so it conforms to the valley angle.

Ridge Caps are always installed beginning at a gable and ending in intersecting valleys.

Form the cap to conform to the angle of the ridge.

Field-form the butt edge of the first Ridge Cap so the lock on the butt will extend down into the Gable Channel.

Cut a Nail Clip in half and attach the halves into the lock of the Ridge Cap. Fasten the cap into place with two nails per clip. Be sure the fasteners are long enough to penetrate

solid decking.

Install consecutive Ridge Caps by engaging the butt lock into the end lock of the previously installed cap.

Continue installing Ridge Caps. Maintain a straight line for a neat appearance.

Note: In areas with high winds, it is best to install the Ridge Caps with their low ends facing into the predominant wind direction. This allows the wind to pass smoothly over the caps.



Panel To Ridge Treatment (Continued)

Ridge Caps With Center Termination:

It is possible to install Ridge Caps starting at each end of a gable roof and finishing at the center of the roof.



At the midpoint, the last full Ridge Caps should be installed.



Measure the distance between the opposing Ridge Caps and divide in half.



Panel To Ridge Treatment (Continued)

Transfer the measurement onto the last cap to be installed and remove the unwanted portion.



Position the trimmed Ridge Cap over the last full cap and face fasten with nails on both sides of the ridge.



Apply a bead of sealant along the joint where the two Ridge Caps overlap and seal the exposed nail heads. This will provide a symmetrical appearance to the ridge.



Panel To Ridge Treatment (Continued)

Where a ridge runs into intersecting valleys, mark the valley intersection on the last cap.

Allow for additional material on this cap to form end tabs. Trim the cap as required. Fold the tabs to conform to the valley angles. Apply sealant into the end lock of the last full Ridge Cap and the butt lock of the field-formed Ridge Cap.



Secure the cap to the valley with sheet metal screws or pop rivets.



Cover the exposed fastener heads with sealant.



Panel To Ridge Treatment (Continued)

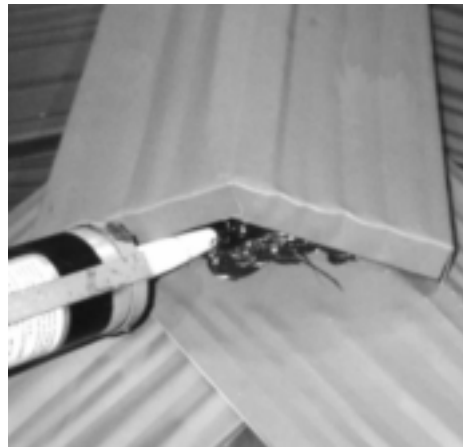
Ridge Cap Starting At A Hip/Ridge intersection:

To begin Ridge Cap installation, lock the first cap over the ridge flashing or over two Nail Clips.



Apply sealant under the butt edge of the first Ridge Cap at the Hip-Ridge intersection.

Continue installing Ridge Caps as needed. Secure the Ridge Caps by firmly engaging the locks.



Complex Hip-Ridge Situations

When a ridge runs into a hip, the panel butts normally will not match.

When this situation occurs, it will be difficult to install Hip Caps. Ridge Caps must be substituted. (See pages 8.3-8.5 regarding this hip treatment.)

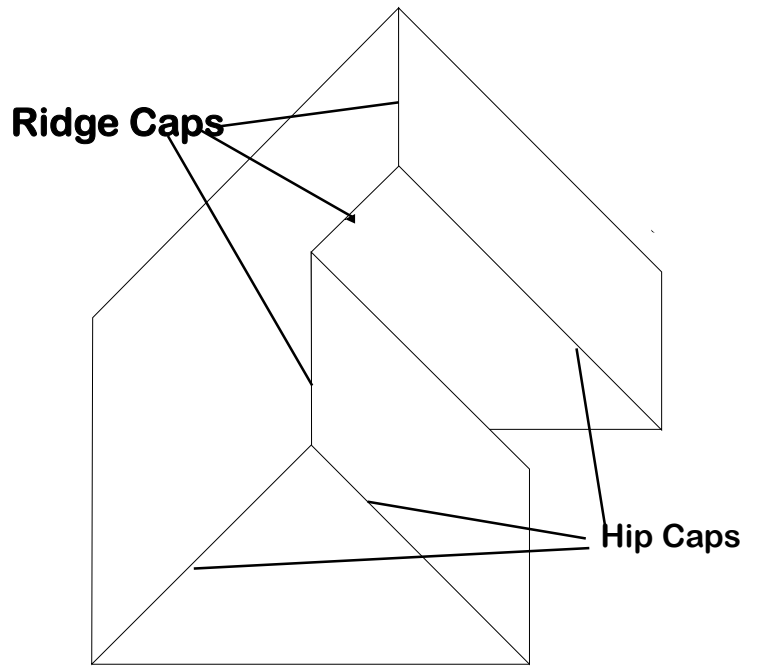
Field form ridge flashings over the panel locks as described previously and fasten the flashings into place.

Lock the first Ridge Cap into position as described previously. Always install Ridge Caps in a direction away from the hips.

Install succeeding Ridge Caps as previously described at ridge location.

Once the Ridge Caps have been installed, it will be necessary to seal any exposed fasteners

When installing Ridge Caps on a hip, install a field-formed flashing under the Ridge Caps. This flashing will not lock over the shingle butts. When forming this flashing, be sure it is narrow enough to be concealed by the Ridge Caps.



Perma-Vent Installation

For standard installations with KasselShake, the use of Z Channels is not required, as ventilation can occur through the deep grooves of these panels (Illustration 1). However, when maximum ventilation is desired, the Z Channels described in step #5 of the Installation Instructions are used (Illustration 2).

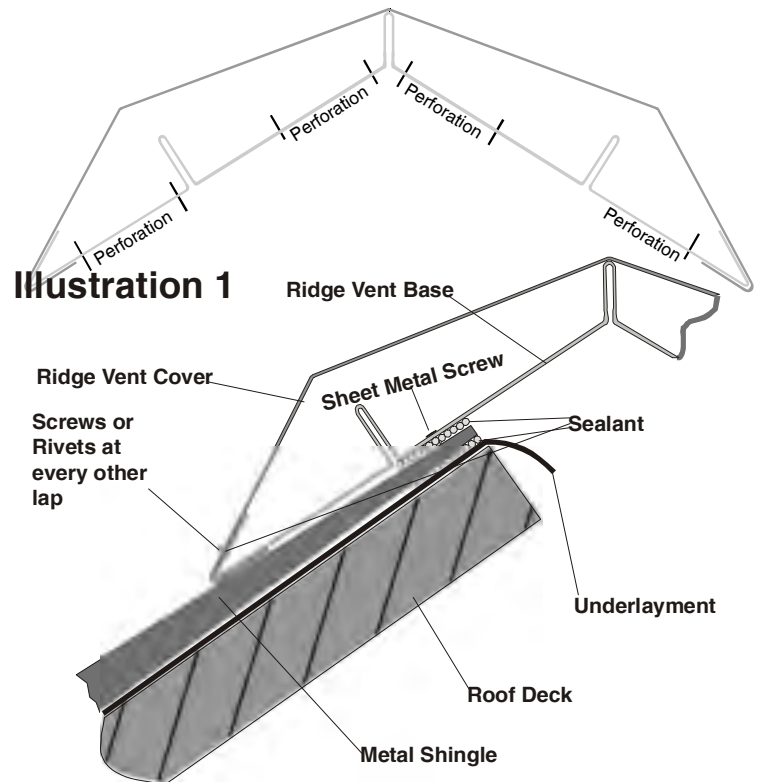
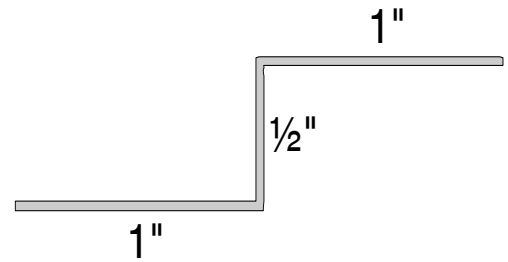
1) The roof should have a ridge opening of 3"-3 1/4" width.

2) Install underlayment, wrapping it into the ridge opening and tacking it to the edge or bottom of the decking.

3) Install the roofing panels to the ridge, cutting them as necessary to stop them at the opening. If the last course of shingles is exposed 4" or less, then either lay a 1" x 2" board under the uphill edge to raise its height or install custom-formed flat coilstock in place of the last course. In any event, place a 1/2" wide by 3/8" high bead of sealant between the last course (or custom-formed coilstock) and the underlayment or 1" x 2" board beneath it.

4) Place a 3/4" wide by 3/8" high bead of sealant on the last course of shingles (or custom-formed coilstock), starting at the ridge opening and extending downward 1". (Note exception to this in step #5 if Z Channels are to be installed.) This sealant must have a minimum thickness of 3/8" and should completely fill any deep grooves in the roofing panels. The bead of sealant should be level on its surface.

5) If desired, install Z Channels on either side of ridge by first laying the 1" bed of sealant 1" lower on the roof than described in step #4. Place the Z Channel with its top leg extending further uphill, out over the remaining 1" of roofing just below the ridge opening. Do not allow the Z Channel to obstruct airflow from the ridge opening. Fasten Z Channels to roof using sheet metal screws of adequate length to penetrate the roof decking by 1/2" 12" on center, down through the sealant. Place sealant on top of the screw heads.



Ridge Vent Installation (Continued)

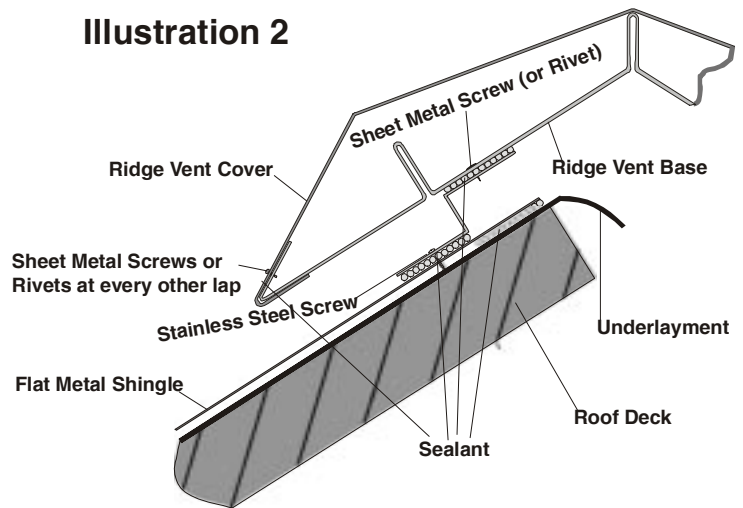
6) Place the Ridge Vent Base squarely over the opening (or over the Z Channels, if installed), pressing it down into the sealant. Fasten using sheet metal screws of adequate length to penetrate fully the roof decking on either side of the opening, 12" on center, down through the sealant. (If Z Channels have been installed, put a minimum 3/8" x 3/4" bead of sealant on the top legs of the Z Channels, place the Ridge Vent Base squarely over the ridge opening and the Z Channels, and use 1/2" sheet metal screws or rivets 12" on center to attach the Ridge Vent Base to the Z Channels.) Place sealant over the screw or rivet heads.

7) Install all subsequent pieces of Ridge Vent Base prior to installing Ridge Vent Cover. Ridge Vent Base pieces should be lapped by 4" by removing all three ribs and the outside returns from the upper pieces.

8) The Ridge Vent Cover is installed by snapping it over the Ridge Vent Base and ensuring that it is firmly locked into place on both sides. Subsequent pieces of Ridge Vent Cover should be overlapped by 4". The locks on either side of the top-lapped piece should be removed within this 4" area. Two beads of sealant, minimum 1/2" wide by 3/8" high, should be placed between the overlapped pieces. Secure the overlapped pieces at every other joint to each other and to the Ridge Vent Base with 1/2" sheet metal screws or pop rivets. Seal the screw or rivet heads with sealant.

9) Ends of ridge vent assembly should be closed with a custom-formed cap made from matching coilstock. Cut the cap to fill the opening, allowing for an extra 1/2" of metal on all sides to be bent 90 degrees toward the roof. Insert the cap so that the extra 1/2" is beneath the Ridge Vent Cover and above the Ridge Vent Base. Seal well between all pieces and use 1/2" sheet metal screws or pop rivets to securely hold the end cap in place. Seal the screw or rivet heads with sealant.

Illustration 2



Review

Do not leave the ridge exposed prior to installing Ridge Caps.

Apply sealant to the panels at ridge prior to flashing.

Always install ridge flashing or bend panels over the ridge.

Ridge caps start at gable or hip intersections and end at valleys.

Ridge caps can be installed from gable ends and terminate in the center of a roof to create a symmetric appearance.

Ridge caps can be used as hip treatments in complex situations.

Special Gable Treatments

Dutch Gable - 10.2

Review - 10.3

Important: All detail work demands meticulous consideration

Dutch Gable

A Dutch gable is an area where a hip and gable intersect (See Figure 1).

Under a Dutch gable where the roof intersects the fascia, if possible trim the fascia and slide the panel underneath the fascia to ensure a watertight fit (See Figure 2).

It may be necessary to remove the top portion of a panel where it meets the top wall. Nails should be placed in the grooves of the panels that have been cut to less than full height. Seal the nail heads.

Apply the front wall flashing. Refer to the Flashing Chart on pages 6.3-6.5 for flashing guidelines.

When working underneath an overhang, install the flashing in two pieces and overlap it in the center of the gable area. Trim the ends of the flashing so it fits underneath the overhang (See Figure 3).

Apply a liberal amount of sealant on the face of the panels and on the flashing lap and fasten into place.

If the front wall is stucco or some other material that will not hold a fastener, attach by drilling and nailing through the flashing and panel into the roof decking. Make sure to seal all edges and nail heads.

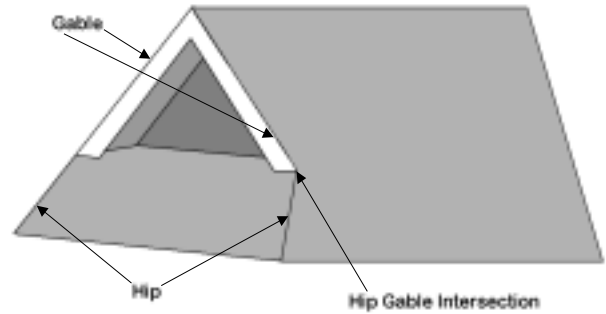


Figure 1

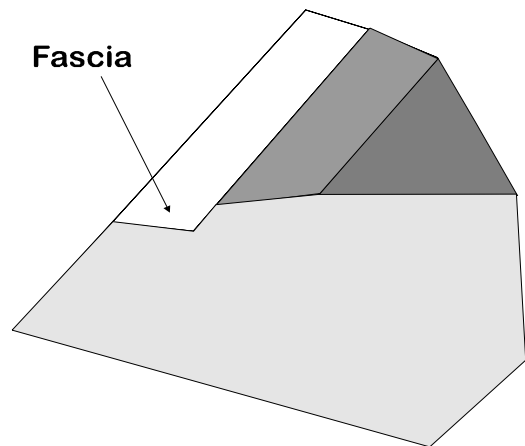


Figure 2

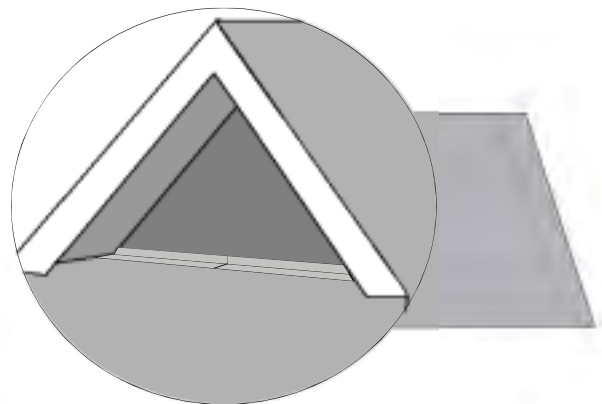


Figure 3

Dutch Gable (Continued)

Install panels and Hip Caps to the hip-gable intersection. Install the last Hip Cap and make sure it extends up the gable at least 2". On the portion of the cap that extends up the gable, trim the side of the cap so it is even with the edge of the gable. Trim the remainder of the Hip Cap so it fits neatly under the Gable Channel. Install the Gable Channel. The lower end of the Gable Channel should divert water away from the gable-hip intersection. Trim the drip leg of the Gable Channel so it provides a neat appearance.

Review

The panels and accessories may require some modification to meet particular roof configurations.

Uphill flashings, panels and caps should always be on top of downhill flashings, panels and caps.

Appendices

Damaged Panel Repair - 11.2

Measuring A Roof - 11.5

Installation Of Gravity Vents - 11.6

Starting Reference Lines - 11.6

Heavy Snow Areas And Snowguards - 11.7

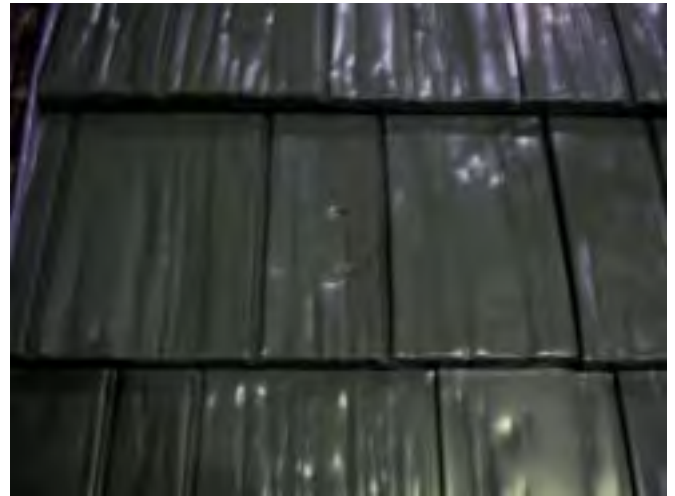
Special Installation Issues - 11.9

Installation Over Stress-Skin Panels - 11.9

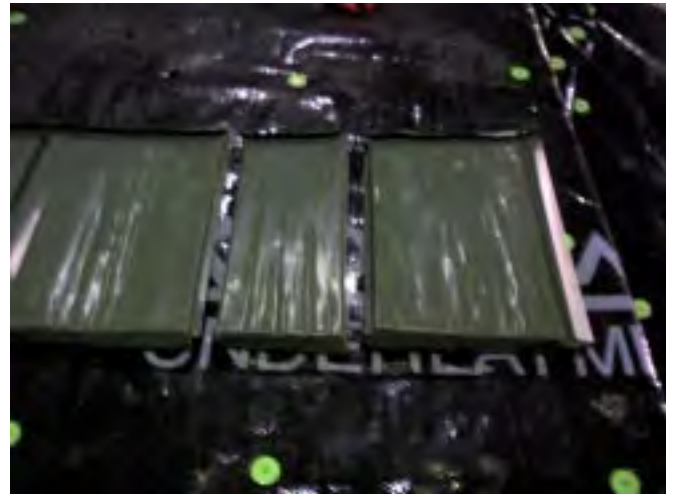
Damaged Panel Repair

Should a panel become damaged, in most cases it can be easily repaired.

Identify the individual damaged piece of panel.



Remove the panel section that corresponds to the damaged portion from a scrap panel.



Once the replacement section is removed from the rest of the panel, remove the top lock from the replacement section. Eliminate any burrs that remain at the corners of the panel.



Damaged Panel Repair (Continued)

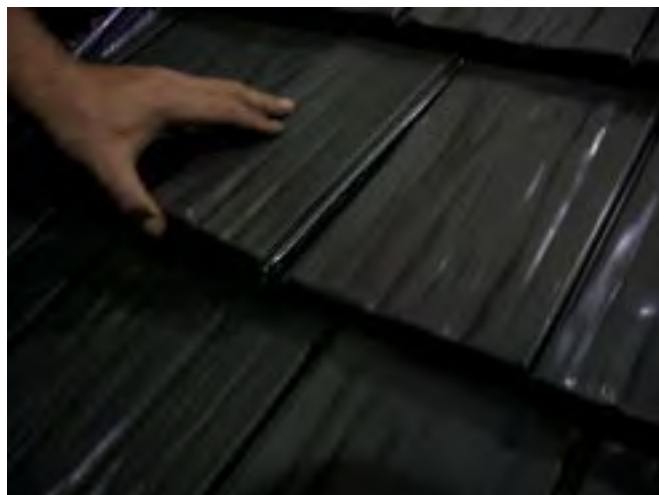
Remove some of the bottom lock.



Apply a bead of sealant around the entire perimeter of the damaged section.



Slip the replacement section over the top of the damaged piece.



Damaged Panel Repair (Continued)

Make sure this panel section nests securely in place to create a permanent seal.

Apply sealant in the deep grooves around the repaired section of the panel.



Smooth the sealant.



The photo at right shows the repaired panel.



Measuring A Roof

Figure 1

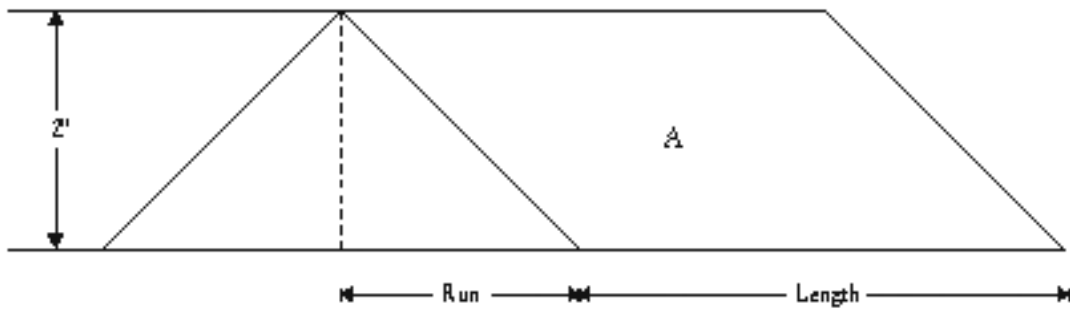
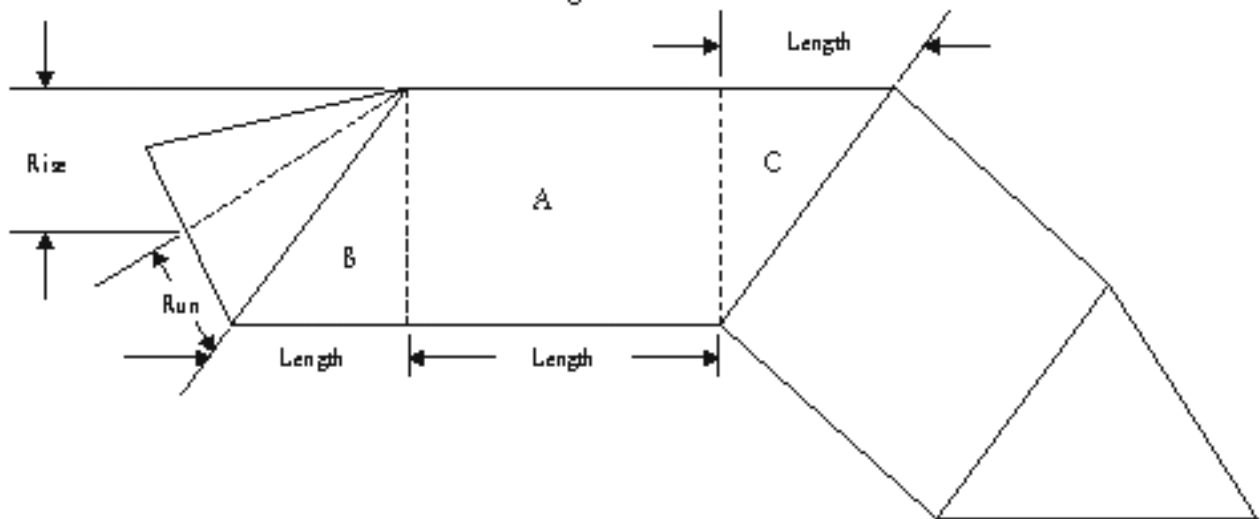


Figure 2



Roof Slope	“A” Straight Section of Roof	“B” Hip Section of Roof	“C” Valley Section of Roof
3:12	Run x Length x 1.031	Run x Length x 0.515	Run x Length x 0.515
4:12	Run x Length x 1.054	Run x Length x 0.527	Run x Length x 0.527
5:12	Run x Length x 1.086	Run x Length x 0.543	Run x Length x 0.543
6:12	Run x Length x 1.118	Run x Length x 0.559	Run x Length x 0.559
7:12	Run x Length x 1.160	Run x Length x 0.580	Run x Length x 0.580
8:12	Run x Length x 1.202	Run x Length x 0.601	Run x Length x 0.601
9:12	Run x Length x 1.250	Run x Length x 0.625	Run x Length x 0.625
10:12	Run x Length x 1.302	Run x Length x 0.651	Run x Length x 0.651
11:12	Run x Length x 1.358	Run x Length x 0.679	Run x Length x 0.679
12:12	Run x Length x 1.414	Run x Length x 0.707	Run x Length x 0.707

Installation Of Gravity Vents

Gravity vents of similar metal can be used in conjunction with KasselShake.

A vent can be installed in both new construction and re-roofing applications. In roof-overs, the existing vent opening needs to align with only one course of panels. Existing deck openings may need to be filled with plywood and surface material to compensate for the hole in the existing roof deck. In both situations, the new roof openings should be constructed before the installation of the corresponding course of panels.

Measure and cut an 8" square opening in the existing roof surface. Make sure not to cut existing roof structural members. Cut an identical hole in the panel.

The gravity vent may need modification to fit the panel. Position the vent over the opening. Trim the top of the base so it fits into the top lock of the panel. Bend two 90° angles at the bottom of the vent so it conforms to the configuration of the panel. Cut two ½" wide weep holes in the base.

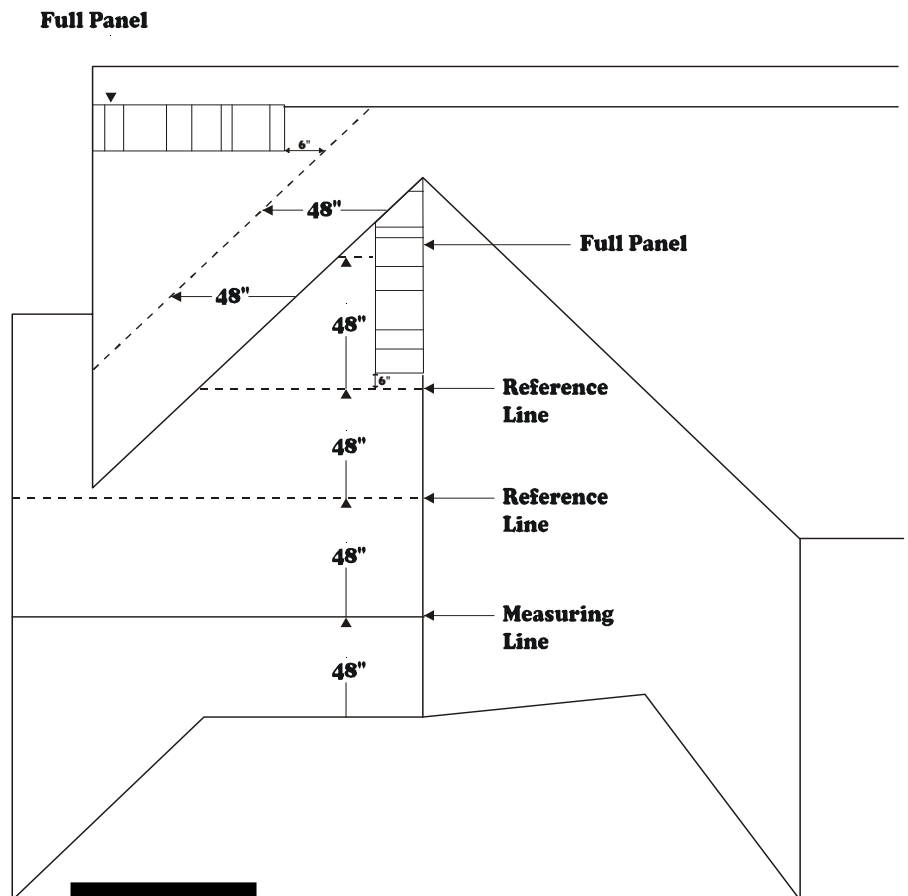
Apply a liberal bead of sealant around the cut opening and into the top lock of the panel.

The modified vent can now be set into the sealant bead and positioned into the top lock of the panel.

Starting Reference Lines

To avoid ending with small and difficult sections of panels, transpose lines from such areas as valleys and gables. Since panels install from left to right, transpose reference lines from right to left. To establish the starting point, measure from the ending location back toward the starting area at increments of 48". When installing the first panels, don't position the panels within 6" of the reference line.

Although this procedure will help to reduce the number of difficult panels to install, the stagger pattern is important and some small panels cannot be avoided.



Heavy Snow Areas And Snowguards

In areas where heavy snows are common, it is recommended to install the panels on roofs with pitches of 4:12 or greater. Seal all underlayment laps with roofing cement. Use at least five Nail Clips per panel. Additional clips are used to secure the panel along valleys, hips, eaves, gables and ridges.

Install Ice & Water Shield above all overhangs and extending 36" past the wall line, as well as in all valleys and over unheated areas, such as enclosed patios.

Use the Hip Cap installation method that calls for panels to lap over the hipline beneath the caps. See Section 8, "Hip Treatment" for more details on this installation procedure.

Rivet the panel to the fascia of the Gable Channel.

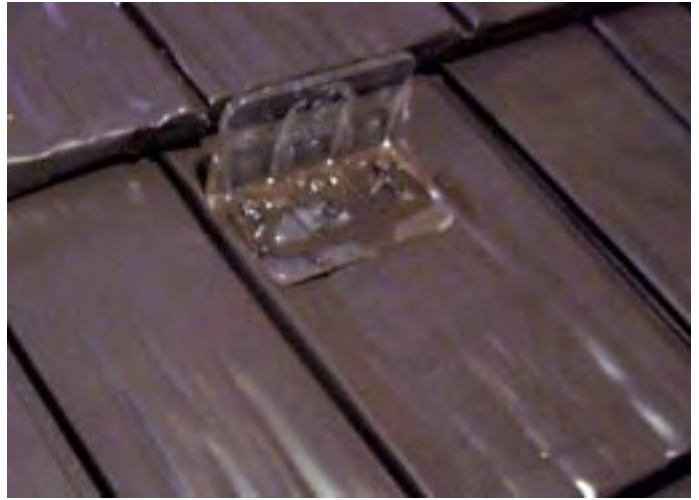
In areas subject to snowloads of 24" or more, install coil or flat stock over the eaves and up 10" past the exterior wall line. If coilstock is not sufficient to do this in one width, field-form a simple interlock between the courses of coilstock. The uphill edge of the coil should be lapped beneath the roofing underlayment. Remove the drip face from an Eave Starter Strip and install it near the top of the coil flashing to begin panel installation.



Heavy Snow Areas And Snowguards (Continued)

Snowguards:

Radiant heat passes through the snow, strikes the panels and is reflected back outward, melting the snow from below. This tends to make the snow slide off in mass, bringing about the need for snowguards.



Install snowguards in areas where falling snow is undesirable (over doors, walkways, landscaping, etc.) as well as on areas where snow would fall onto lower sections of roof. Snowguards can be staggered over the second and third panel courses from the eave and can be spaced between 12" and 36" apart. Stagger the courses of snowguards so the snowguards on the third course are half way between the snowguards on the second course.

Do not install the snowguards directly in line with the snowguards of the course below.

When installing Polycarbonate Snowguards (SH-556), cover the base with sealant. The sealant will prevent water from entering any fastener penetrations. Position the snowguard on a section of the panel that is wider than the snowguard. Avoid placing it over any deep grooves in the panel. Drive screws through the snowguard, sealant, panel and into the decking. It is important to use screws that are long enough to penetrate and extend through the decking.

Note: When installing polycarbonate snowguards, the sealant is not meant to be used as an adhesive. Screws are required to secure the snowguards to the roof. The sealant prevents moisture from entering the penetrations made by the fasteners.

Special Installation Issues

Before doing any installation, be sure to check the local code requirements. Some local codes may require special installation procedures to meet fire ratings, wind uplift requirements, or a number of other particular requirements. This manual provides basic installation procedures and does not attempt to describe every installation procedure for every local code requirement. Please contact the manufacturer for technical assistance when any of these special installation requirements are encountered.

Installation Over Stress-Skin Panels

There are concerns with installing roofing over structural insulated panels or other construction methods that result in a non-vented insulated space directly beneath the roof decking. Roofs constructed with structural insulated or stress skin panels are the most common occurrence of where non-vented insulated space exists beneath a roof system. Stress skin panels are composite structural panels usually made of expanded polystyrene (or other foam) sandwiched between two pieces of laminated wood sheets. The wood sheets are usually oriented strand board also known as OSB.

We have found moisture produced in the living space of a home travels up through the structural panels and condenses against the underside of the underlayment. This moisture collects and causes the roof deck to rot from the bottom side.

Some stress skin panel manufacturers have designed their products with air channels or grooves to allow outside air to circulate over the panels to help keep them dry and prevent the wood from rotting.

Please call the factory if you would like more information on installations over stress skin panels.