Nu-Ray Metals

Steel Roofing & Siding Products

Steel Roofing & Siding

INSTALLATION GUIDE

YOUR AUTHORIZED DEALER IS:

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Notes to the Installer

The information contained in this installation guide is intended to be an aid and does not depict all situations. Modifications are the responsibility of the designer/user and should take into account climate conditions such as wind and snow. Where possible, panels should be lapped away from prevailing winds.

SUBSTRATES
These details show the roofing panels over solid ⅝″ plywood substrates. Many of our systems can be installed over spaced support members. Please consult a Nu-Ray representative for more information.

SLOPE REQUIREMENTS
All panels described in this book require a 3:12 or greater roof pitch except the Series 2000 system that can be used on roof pitches down to ½″:12″.

UNDERLAYMENTS
Prior to panel installation a minimum of 30 lb felt (or two layers of 15 lb. felt) should be installed per the felt manufacturer's recommendations. The underlayment should be lapped with all flashings in a shingle-like manner. When a premium underlayment is required, a self-adhering, cold-applied rubberized asphalt membrane should be specified. Granulated ice & water shield is not an acceptable underlayment and will void your warranty.

DRAG LOAD SCREW
Panels must be drag loaded at the top of the panel to resist "drag" caused by the weight of the panel, live loads, and snow loads. The intensity of the drag load is a function of slope, the loads involved, and length of the panels.

EXPANSION & CONTRACTION
Both the panels and the flashings must allow for expansion and contraction of the materials, especially where long lengths are used.

Notes to the Installer *continued*

OIL-CANNING
Flat metal surfaces will display waviness commonly referred to as "oil-canning". This is caused by the steel mill tolerances, variations in the substrate and roofing underlayments. Oil canning is a characteristic, not a defect, of panels manufactured from light-gauge metal. Panels are factory "corrective-leveled" to minimize oil canning. Oil canning is not a cause for panel rejection.

WARRANTY
Nu-Ray Metals offers a 40 year transferable paint warranty on all Kynar, Nu-Shield and SMP products. ***This warranty is only valid when registered within terms of the warranty.*** Please contact a Nu-Ray representative for more information.

Recommended Tools & Equipment

SCREW GUN
Clutch type screw gun allowing for variable torque settings with depth locating nose piece is recommended to insure proper installation of the screws. The following bits are required for proper installation:

- ¼″ hex driver
- #2 Phillips screw driver bit

SNIPS
For cutting miscellaneous panels and flashing, three pair of compound snips will be required for left edge, right edge, and center line cuts.

ELECTRIC SHEARS
Use of electric shears can be used for general cutting such as the hips and valleys.
Note: Some installers prefer to use circular power saws with abrasive metal cutting blades. While the use of power saws may be faster, there are some disadvantages that must be considered. Please talk with a Nu-Ray Metals representative prior to using a circular saw.

Recommended Tools & Equipment *continued*

CAULKING GUN
For miscellaneous caulking and sealing to inhibit water infiltration.

POP RIVET TOOL
Used for miscellaneous flashing and trim applications.

LOCKING PLIERS
Standard and "Duck Bill" styles for miscellaneous clamping and bending of parts.

CHALK LINE
Used to assist in the alignment of panels, flashing, etc.

MARKING TOOLS
Indelible markers, pencils or scratching tools.

STRING LINE
Used for general alignment and measurements.

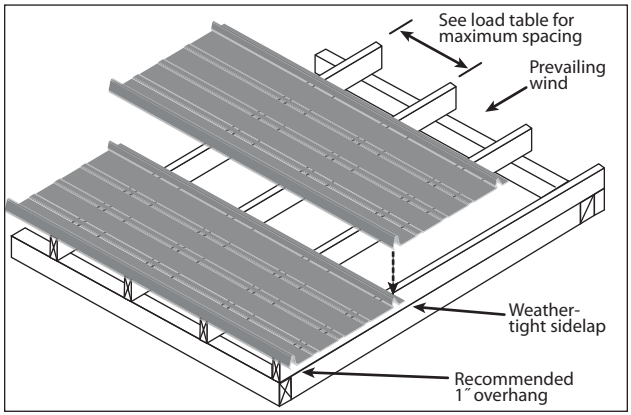
TAPE MEASURE
25-foot minimum. A second 50-foot tape measure is useful.

SAFETY GOGGLES
Always use approved safety goggles.

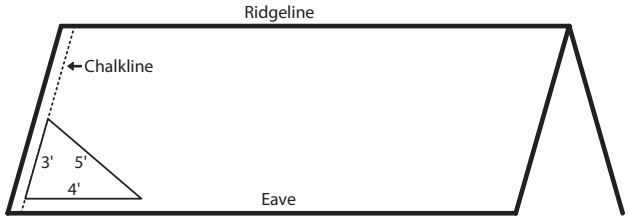
STANDING SEAM SYSTEMS
Nu-Ray Series 1000, 2000, 3000, 5000 and 6000 Panels

How to Begin

- **Determine quantity and size of panels needed**.
- **Determine quantity and number of flashings and accessories**. *Roof pitch is required for fabrication of some flashings.*
- **Install vapor barrier**.
- **Check for squareness** (see illustration on next page).
- **Determine prevailing wind direction.**
- **Roofing and siding should be started vertically** at the end of the building opposite the prevailing wind direction and checked for squareness.
- **For proper sidelap application**, see lapping and flashing detail on pages 10 and 11.
- **Maximum panel overhang** is 2″ from the finished edge (see illustration below).
- **Wall girt spacing** should be no more than 36″ for normal sidewall application.
- **Roof purlin spacing** should be no more than 24″ for normal roof applications.



How to Square Your Roof



To square up your roof, the easiest method to use is the 3-4-5 triangle. This size triangle works in smaller areas. In larger areas use multiples of 3-4-5 to increase the size and square up longer panels.

Note: Always square up from the eave.

1. Measure in from the gable 1″–3″ and make a mark on the eave.
2. Measure 4′0″ farther into the roof on the eave and make another mark.
3. From the first mark, measure up the roof 3′0″ and make a mark.
4. Measure from this mark to the mark you made 4′0″.
5. This measurement should be 5′0″. If not, adjust the 3′0″ side until this measurement equals 5′0″.
6. After producing the 3-4-5 triangle, snap a chalk line up the roof off the left side of the triangle (3′0″side).
7. This chalk line is your square line to start paneling.

Order of Installation

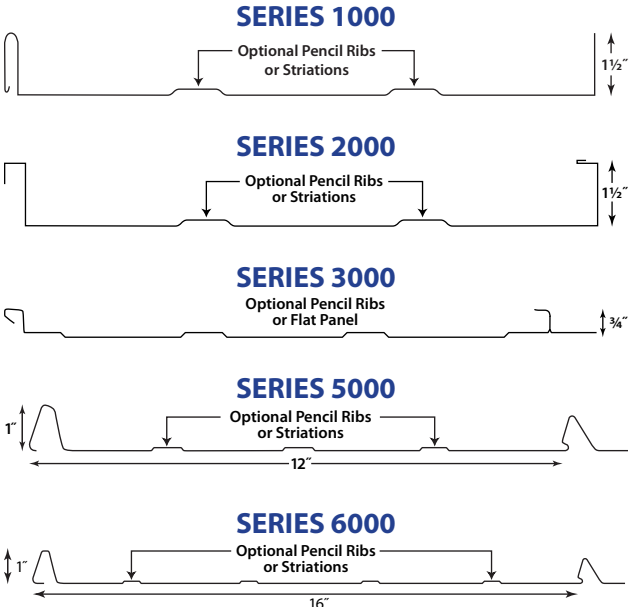
1. Eave or drip flashing
2. Valley flashing
3. Prow and gable flashing
4. Back pan
5. Pre-cut panels
6. Cut hips and valleys as required
7. Gable trim, sidewall, closure strip, endwall and ridge cap

Lapping & Fastening Detail

Wind Direction



☛ **Lap with the wind**

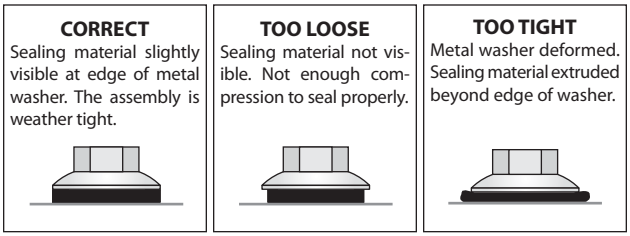


NOTES

- ☛ **For valley applications**, the panels should overlap downhill.
- ☛ **Protective coating (peel coat):** Some products may have a peel-off plastic coating over the painted surface to prevent damage during manufacture and shipment. If such a coating is present, avoid exposing the peel-coated materials to sunlight and remove the coating prior to installation.

Fastening

Use only fasteners with washers designed for roofing and siding application. Fasten the outside edge first, then the center. This will prevent spreading or creeping of the panels. DO NOT OVERDRIVE the fastener so as to dimple or distort the panel. Washers should be in firm contact with the panel.



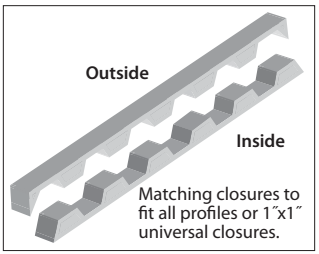
Screws

Screw fasteners have been proved to have two to three times the holding power of nails. Screws should have a minimum penetration of ⅝″ into wood. Generally, 1″ screw fasteners are placed in the flat area of the panel at 24″ on-center along the length of the panel, and next to each rib approximately ½″ from the rib. If purlins are placed over 24″ apart, stitching screws are recommended on the lapping rib between purlins.

Nails are not recommended!

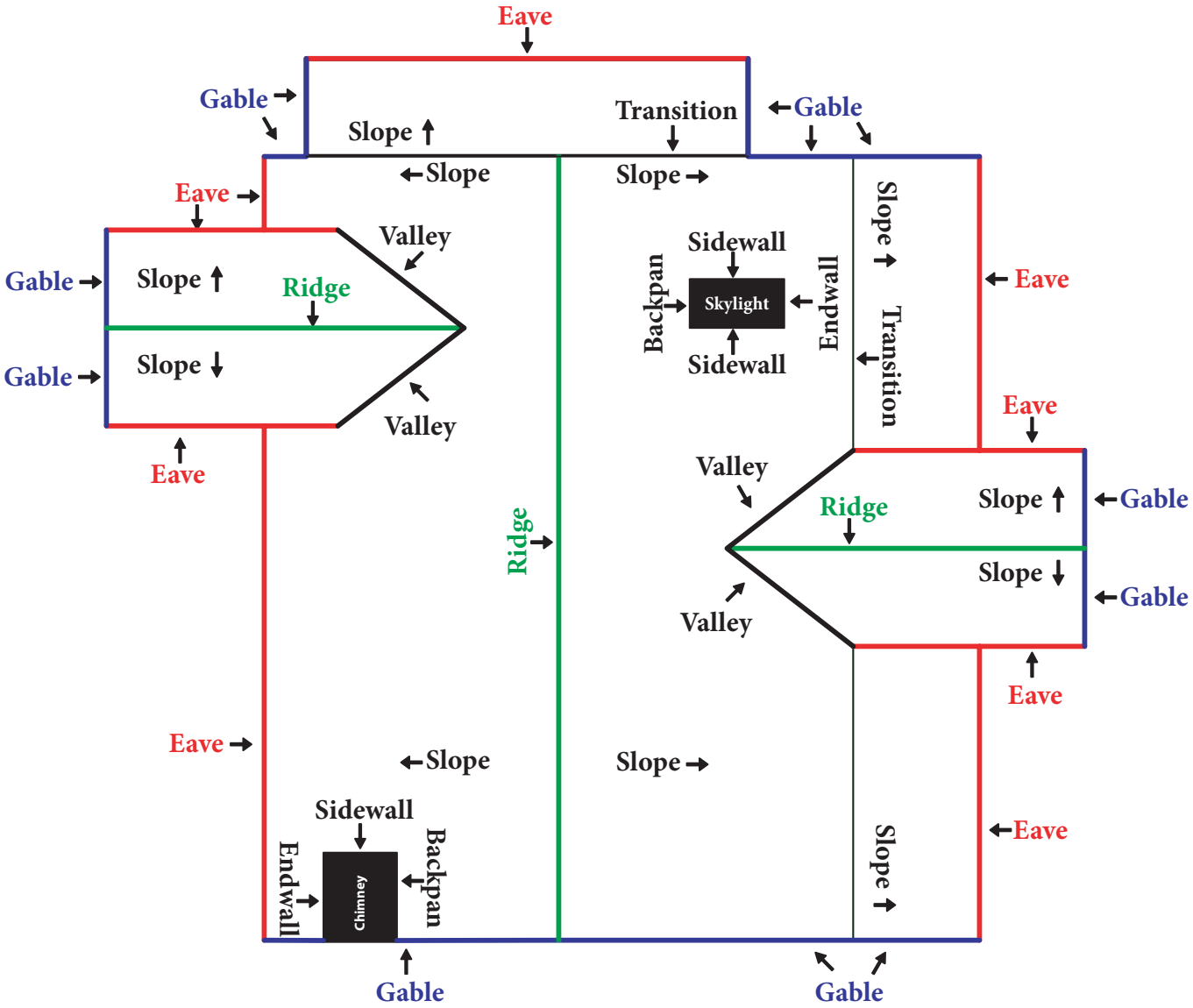
The use of nails to fasten panels is NOT recommended and will void the Nu-Ray warranty.

Closures



Matching or universal closures are available for all panel profiles. Closure application is recommended under the ridge caps, endwalls and panels at eave ends, unless ridge venting is required. Applied to the top and bottom of closures, sealant will assist in keeping the closures in place.

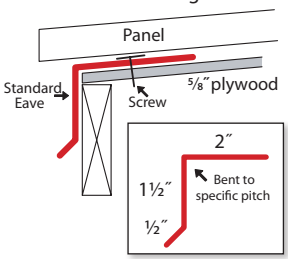
Roof Plan Showing Typical Flashing Locations



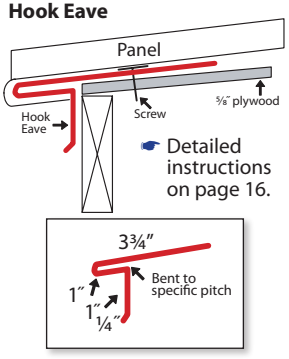
Standing Seam Systems

Flashing Installation Detail

Standard Eave
For enclosed structures, apply closure strip under panel at eave before fastening.

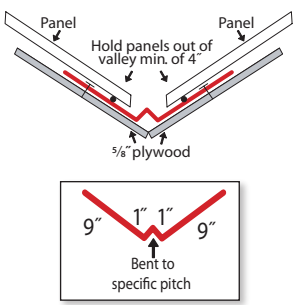


Hook Eave

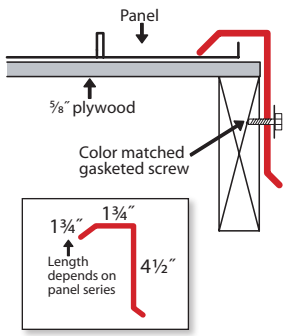


Detailed instructions on page 16.

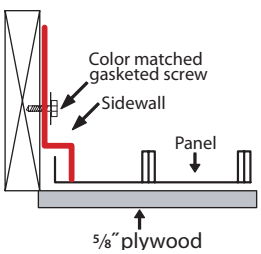
Standard W-Valley
Prior to installing roofing panels, install W-Valley. Apply two rows of silicone sealant or butyl mastic parallel to the valley, onto the valley flashing. Apply sealant approx. 6″ and 8″ up from the center of the valley. Install roofing panels a minimum of 4″ from the center of the valley. (Distance may vary for sealants and roof panels due to location.) Install fasteners through the farthest run of sealant from the center of the valley. Install fasteners in the flat areas of the panel, between the major and minor ribs.



Standard Gable Trim
Apply gable trim to both roof sheeting ends. Install fasteners every 24″ into gable trim board on the side.



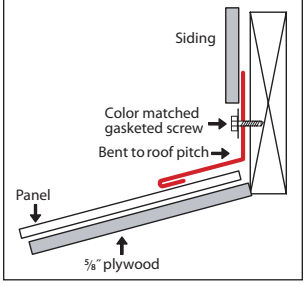
Sidewall
Fasten the vertical leg to the wall at 24″ intervals.



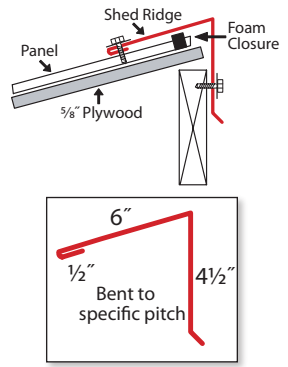
Standing Seam Systems

Flashing Installation Detail

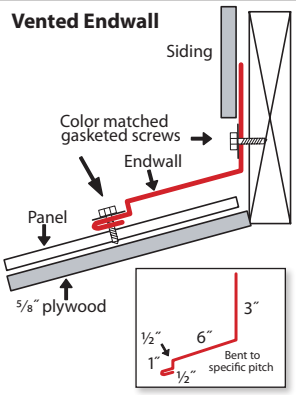
Standard Endwall
Secure upstanding leg to the wall at 24″ intervals.



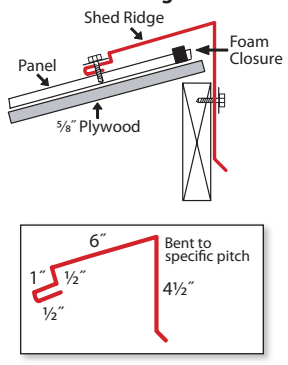
Standard Shed Ridge



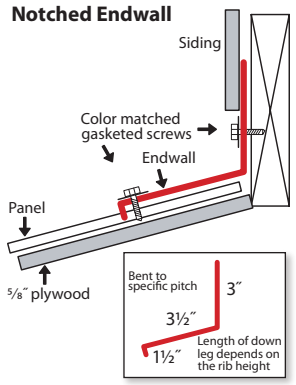
Vented Endwall



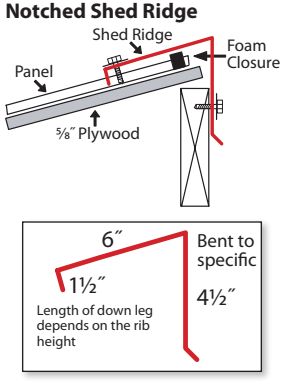
Vented Shed Ridge



Notched Endwall



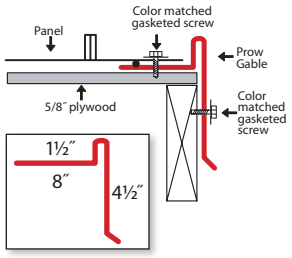
Notched Shed Ridge



Flashing Installation Detail

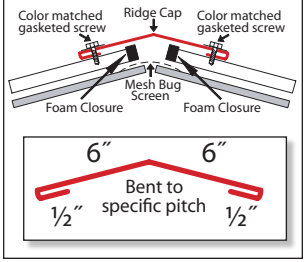
Prow Gable Trim

Apply gable trim to both roof sheeting ends. Fasten at top and sides at intervals of 24″ o.c. Install prior to ridge cap.

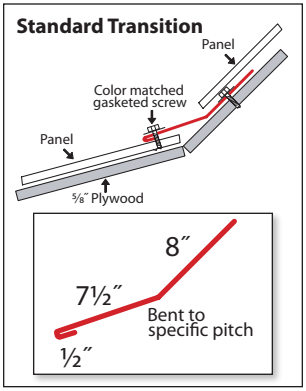


Standard Ridge Cap

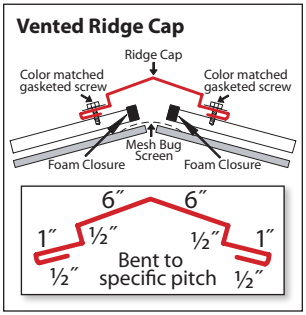
Apply ridge cap as shown, fastening through the ridge cap and roofing at every rib. Ridge cap fastens over gable trim.



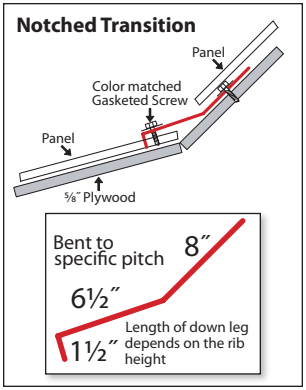
Standard Transition



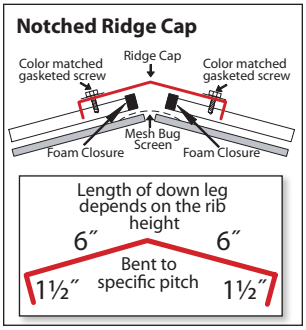
Vented Ridge Cap



Notched Transition



Notched Ridge Cap

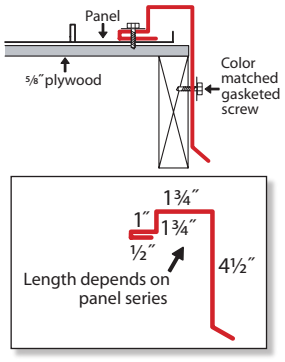


Flashing Installation Detail

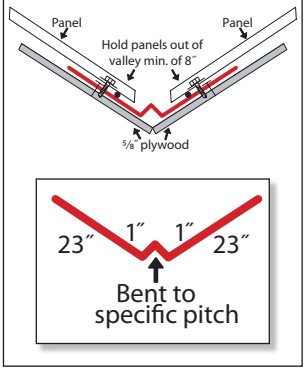
Snow Flashing

In areas where snow is more prevalent, the use of specially designed flashing is recommended. The weight of snow affects flashing on the perimeters of the roof. Please consult with a Nu-Ray representative.

Snow Gable

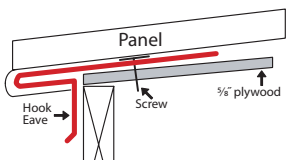


Snow Valley



Hook Eave Detail

Panel slides onto hook eave →



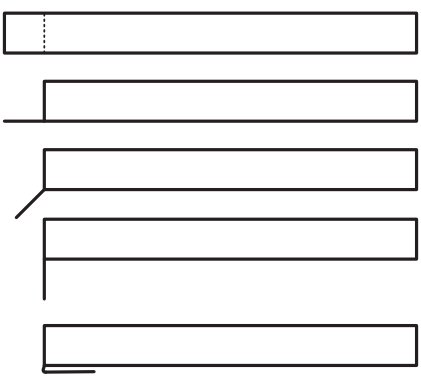
Mark ribs 1″ back from end of panel →

Cut away both ribs leaving panel face exposed →

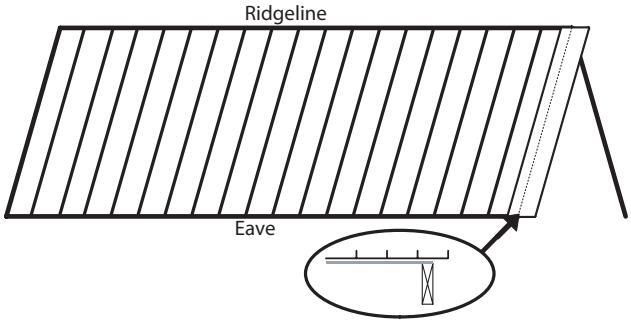
Using panel bender start bending exposed area →

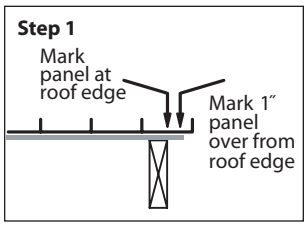
Continue bending exposed area →

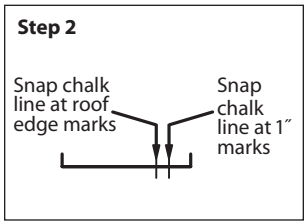
Fold exposed area tightly underneath panel →

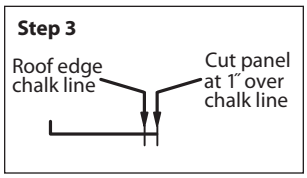


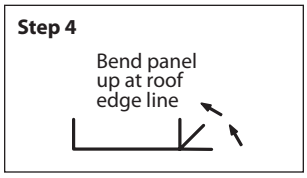
Last Panel Termination Detail











In case the last panel in a run does not end exactly at the edge, follow these steps to ensure a proper installation:

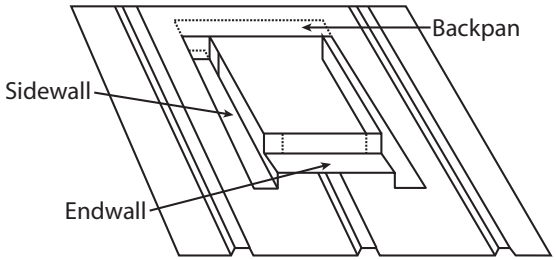
1. Before installing the last panel, measure the distance from the 2nd to last panel and the roof edge.
2. Mark the last panel at the top and bottom at the measurement from step #1.
3. Snap a chalk line from top to bottom where the marks were made.
4. Now, measure 1″ farther over on the panel and mark top and bottom and snap a line.
5. Cut the panel to the width of the second line.
6. Using metal benders, bend the panel up 90 degrees on the 1st line creating a false rib.
7. Install panel and cover false rib with flashing.

Chimney & Skylight Flashing

Installation of a chimney or skylight requires layering flashing to provide a weather tight roof. The following steps illustrate one way to flash a chimney or skylight. Job site conditions may require alternate dimensions or installation techniques.

Required Skylight Flashing:

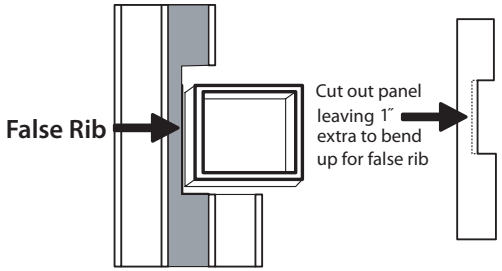
- 1 ea. backpan flashing
- 2 ea. sidewall flashing
- 1 ea. endwall flashing



☛ **Prior to trim installation**, cut the roofing panels as close as possible to the left, right and downhill sides of the curb. Cut the uphill side panels 6″ up from the curb. Do not fasten down the panels within 18″ uphill from the skylight.

STEP #1

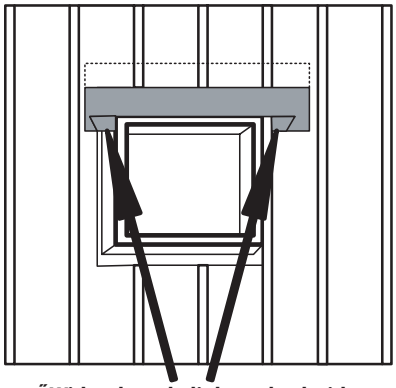
Install panels around chimney or skylight, leaving out panels above. Where the panels running into the skylight are deeper than needed, cut the panel opening 1″ deeper than necessary (see Last Panel Termination Detail on page 20) and bend up creating false rib. Do not install panels directly above skylight.

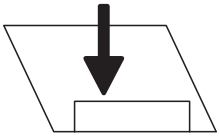


Chimney & Skylight Flashing

STEP #2

Install backpan flashing above skylight. When cutting to fit leave a minimum of 4″ to either side wider than the skylight. Install panels above skylight, when cutting panels leave 6″–8″ short of skylight. Apply sealant under panels where the panels lap the back pan flashing. Continue paneling past skylight.



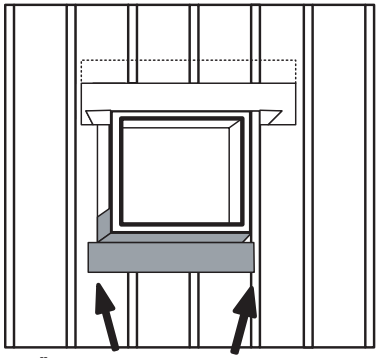


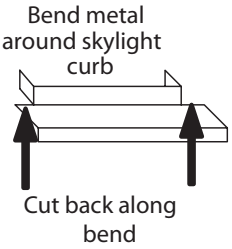
Sealant must be applied where metal overlaps.

4″ Wider than skylight on both sides

STEP #3

Install endwall at the downhill side of the skylight. Cut the flashing to the width of the skylight plus 2″ on each side (sidewall typ. 2″ wide). Then cut back along the bend 2″ on each side and bend the metal around the curb as shown.



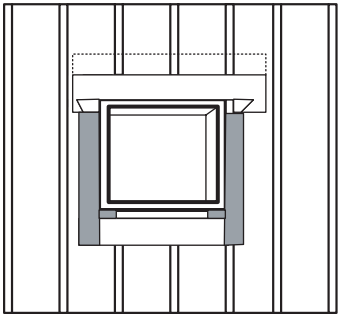


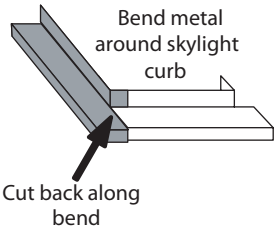
2″ Wider than skylight on both sides

Chimney & Skylight Flashing

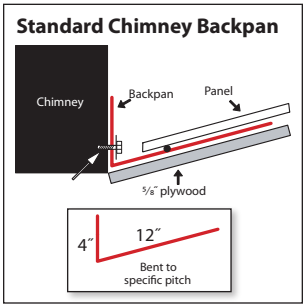
STEP #4

Install sidewall flashing by cutting back the top leg a minimum of 2″ and folding around front of curb. Do this for both sides of skylight.



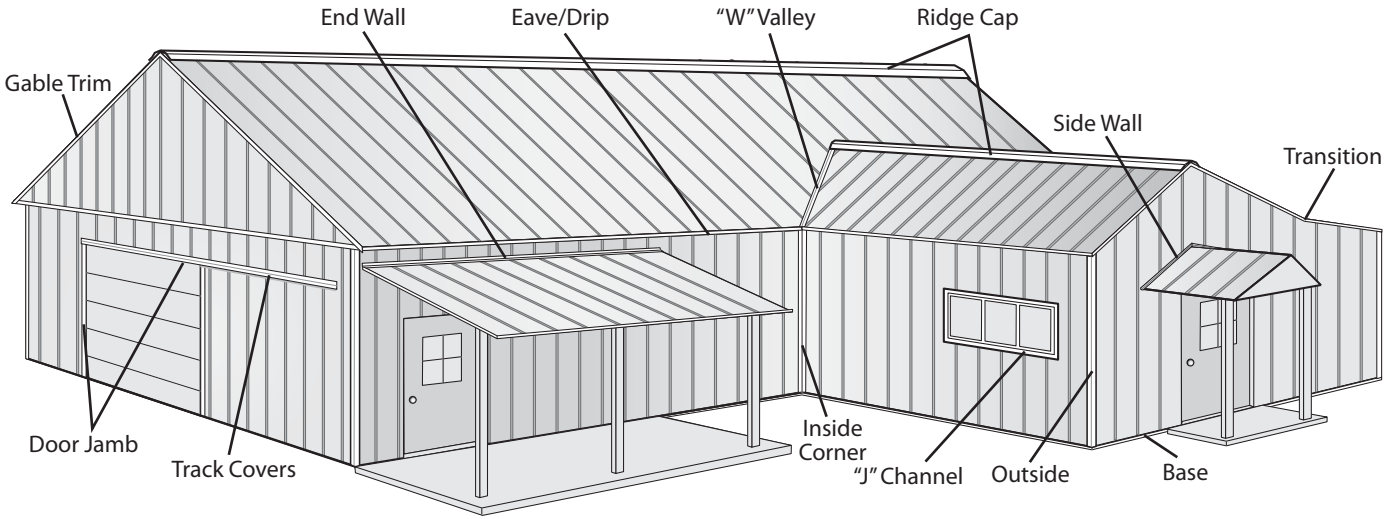


Sealant must be applied where metal overlaps.



Both Systems

COMPONENTS and APPLICATIONS

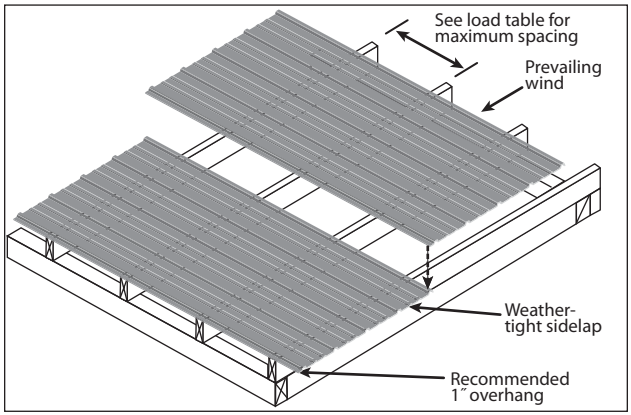


Exposed Fastener Systems

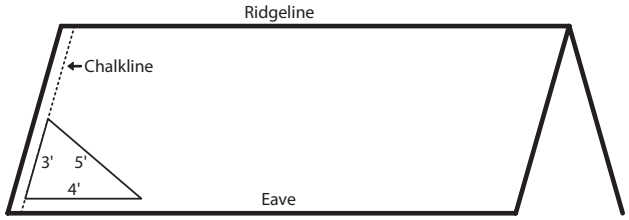
EXPOSED FASTENER SYSTEMS
Nu-Ray Series 4000 and 7000 Panels

How to Begin

- **Determine quantity and size of panels needed**. Note: End-lapping of Nu-Ray Series 4000 and 7000 panels is ***not recommended***. Panels should be ordered and run in full lengths. If end-lapping is unavoidable, consult your Nu-Ray dealer for the proper procedure.
- **Determine quantity and number of flashings and accessories**. *Roof pitch is required for fabrication of some flashings.*
- **Install vapor barrier**.
- **Check for squareness** (see illustration on next page).
- **Determine prevailing wind direction.**
- **Roofing and siding should be started vertically** at the end of the building opposite the prevailing wind direction and checked for squareness.
- **For proper sidelap application**, see lapping and flashing detail on pages 10 and 11.
- **Maximum panel overhang** is 2″ from the finished edge (see illustration below).
- **Wall girt spacing** should be no more than 36″ for normal sidewall application.
- **Roof purlin spacing** should be no more than 24″ for normal roof applications.



How to Square Your Roof



To square up your roof, the easiest method to use is the 3-4-5 triangle. This size triangle works in smaller areas. In larger areas use multiples of 3-4-5 to increase the size and square up longer panels.

Note: Always square up from the eave.

1. Measure in from the gable 1″–3″ and make a mark on the eave.
2. Measure 4′0″ farther into the roof on the eave and make another mark.
3. From the first mark, measure up the roof 3′0″ and make a mark.
4. Measure from this mark to the mark you made 4′0″.
5. This measurement should be 5′0″. If not, adjust the 3′0″ side until this measurement equals 5′0″.
6. After producing the 3-4-5 triangle, snap a chalk line up the roof off the left side of the triangle (3′0″side).
7. This chalk line is your square line to start paneling.

Order of Installation

1. Eave or drip flashing
2. Valley flashing
3. Prow and gable flashing
4. Back pan
5. Pre-cut panels
6. Cut hips and valleys as required
7. Gable trim, sidewall, closure strip, endwall and ridge cap

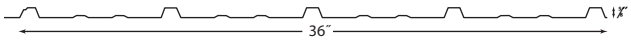
Lapping & Fastening Detail

Wind Direction

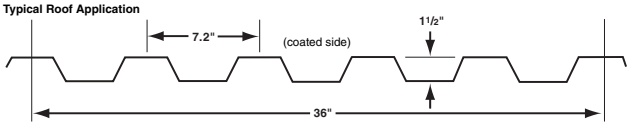


☛ **Lap with the wind**

SERIES 4000



SERIES 7000



NOTES

- ☛ **For valley applications**, the panels should overlap downhill.
- ☛ **Protective coating (peel coat):** Some products may have a peel-off plastic coating over the painted surface to prevent damage during manufacture and shipment. If such a coating is present, avoid exposing the peel-coated materials to sunlight and remove the coating prior to installation.

Panel Cutting Procedure

- ☛ Panels should be cut with tin snips, metal shears or an abrasive metal cutting blade.
- ☛ Panels should be turned upside-down and held securely while cutting.
- ☛ ALWAYS WEAR SAFETY GOGGLES WHEN CUTTING METAL PANELS.
- ☛ It is imperative to clean metal particles from panels after cutting, to prevent pitting and rusting.

Fastening

Use only fasteners with washers designed for roofing and siding application. Fasten the outside edge first, then the center. This will prevent spreading or creeping of the panels. DO NOT OVERDRIVE the fastener so as to dimple or distort the panel. Washers should be in firm contact with the panel.

CORRECT	TOO LOOSE	TOO TIGHT
Sealing material slightly visible at edge of metal washer. The assembly is weather tight.	Sealing material not visible. Not enough compression to seal properly.	Metal washer deformed. Sealing material extruded beyond edge of washer.
		

Screws

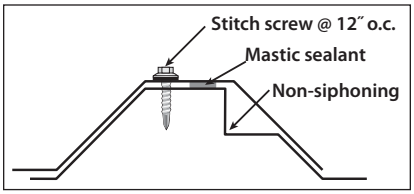
Screw fasteners have been proved to have two to three times the holding power of nails. Screws should have a minimum penetration of ⅝″ into wood. Generally, 1″ screw fasteners are placed in the flat area of the panel at 24″ on-center along the length of the panel, and next to each rib approximately ½″ from the rib. If purlins are placed over 24″ apart, stitching screws are recommended on the lapping rib between purlins.

Nails are not recommended!

The use of nails to fasten panels is NOT recommended and will void the Nu-Ray warranty.

Lap Sealants

Side-lap sealant is recommended on any roof pitch of 3:12 or less. For complete waterproofing, caulk all side and end laps regardless of pitch. Caulk side laps at the top of the rib. Caulk end laps across the width of both top and bottom panels, below the point of fastening, 1″ to 2″ above the end of the overlap.



Lapping Requirements

Slope	End-Lap Length	Sealant	
		Side	End-Lap
3/12 or less	Not recommended	Recommended	Not applicable
> 3/12	12″ minimum	Optional	Required
Sidewall	4″ minimum	Not required	Optional

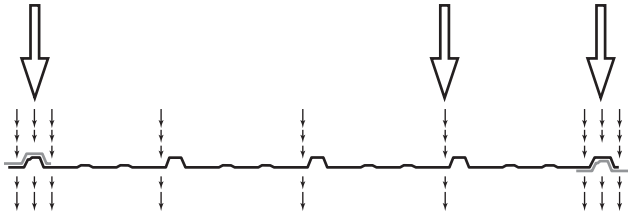
Recommended Screw Schedules

Series 4000

- Screw fasteners with integral sealing washers are recommended.
- Allow rib height plus 1″ minimum for wood penetration.

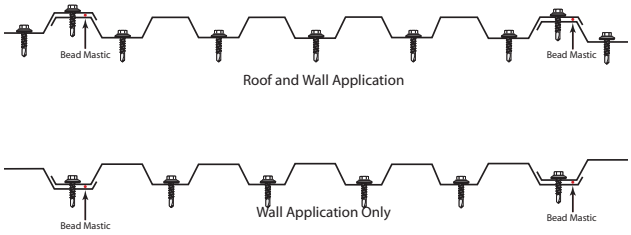
Stitch screws recommended at all side laps of roof only.

Fasteners recommended at one side of major ribs.

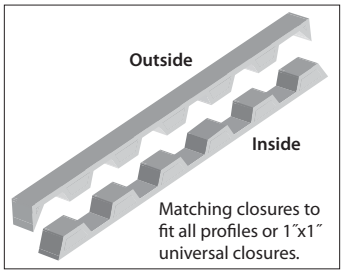


Series 7000

- Lap panels away from prevailing wind/weather.



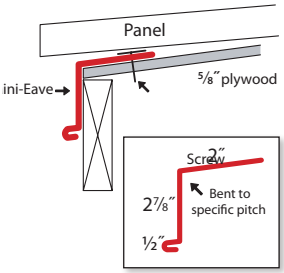
Closures



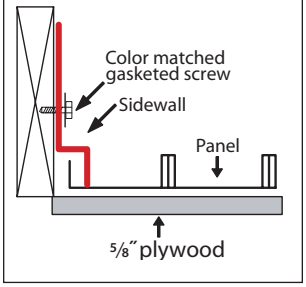
Matching or universal closures are available for all panel profiles. Closure application is recommended under the ridge caps, endwalls and panels at eave ends, unless ridge venting is required. Apply sealant to the top and bottom of closures to assist in keeping the closures in place.

Flashing Installation Detail

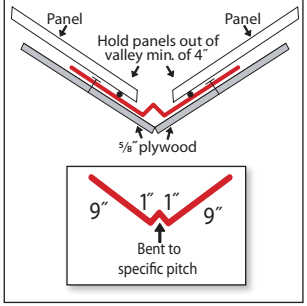
Standard Mini-Eave
For enclosed structures, apply closure strip under panel at eave before fastening.



Side Roof to Wall
Fasten the vertical leg to the wall at 24″ intervals.



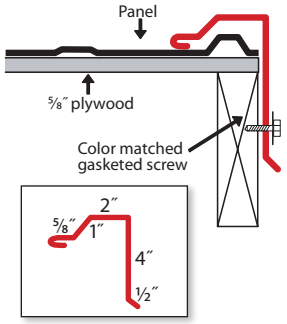
Standard W-Valley
Prior to installing roofing panels, install W-Valley. Apply two rows of silicone sealant or butyl mastic parallel to the valley, onto the valley flashing. Apply sealant approx. 6″ and 8″ up from the center of the valley. Install roofing panels a minimum of 4″ from the center of the valley. (Distance may vary for sealants and roof panels due to location.) Install fasteners through the farthest run of sealant from the center of the valley. Install fasteners in the flat areas of the panel, between the major and minor ribs.



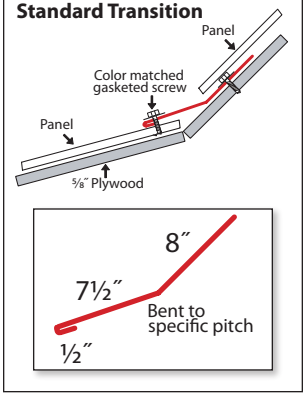
Exposed Fastener Systems

Flashing Installation Detail

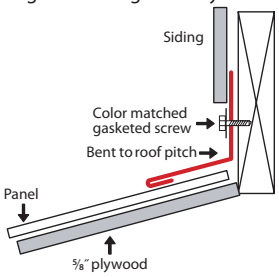
Standard Mini-Gable (4000)
Apply gable trim to both roof sheeting ends. Fasten at top and sides at intervals of 24″ o.c. Install prior to ridge cap.



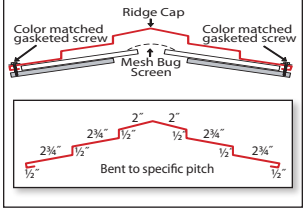
Standard Transition



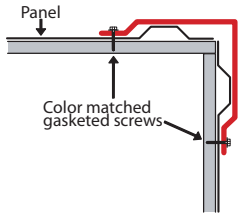
Standard Endwall
Secure upstanding leg to wall by fastening at 24″ intervals. Then fasten through lower leg near edge of flashing on every rib.



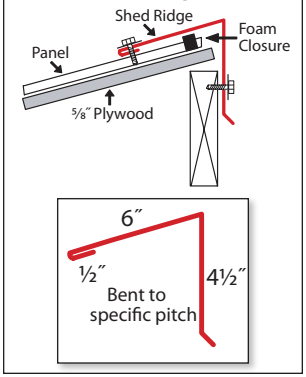
Ridge Cap (4000)
Apply ridge cap as shown, fastening through the ridge cap and roofing at every rib. Ridge cap fastens over gable trim.



Outside Corner
Fasten both outside edges at 24″ o.c.

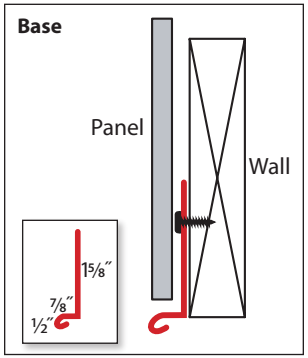


Standard Peak Cap

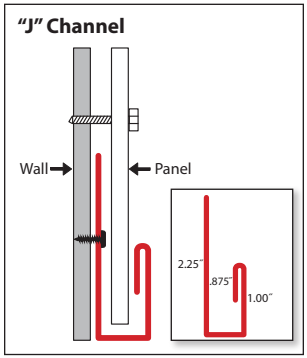


Flashing Installation Detail

Base



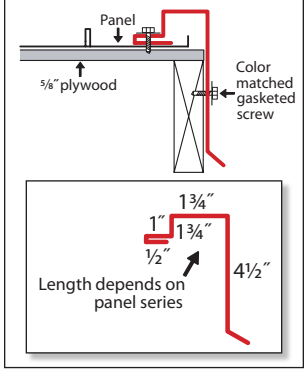
"J" Channel



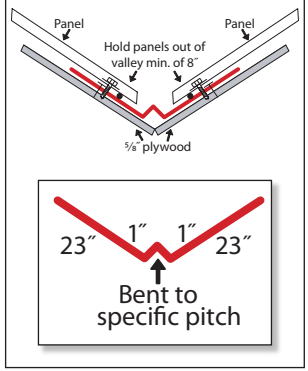
Snow Flashing

In areas where snow is more prevalent, the use of specially designed flashing is recommended. The weight of snow affects flashing on the perimeters of the roof. Please consult with a Nu-Ray representative.

Snow Gable

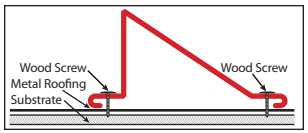


Snow Valley



Snow Break Application

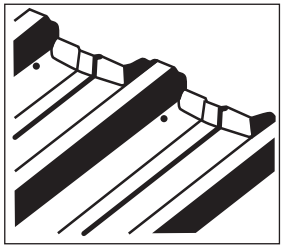
Apply to top of ribs with 1½″ long (minimum) standard wood screws or type "S" (type of substrate will determine the proper fastener type). Install first row of snow breaks 18″ from the eave. Foot traffic, length of run, pitch of roof and geographical location will determine how many rows are necessary.



Please note: These details are suggested only. Design and load resistance are the responsibility of your design engineer. Nu-Ray Metals assumes no responsibility.

Panel Dams

To keep moisture from blowing under ridge cap, endwalls and pitch changes in high wind areas or on flat-pitched roofs, panel dams should be formed. If possible, crimp the panels after they are applied to prevent spreading of ribs.

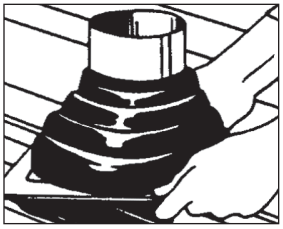


Pipe Flashing: Flexible On-Site Customization

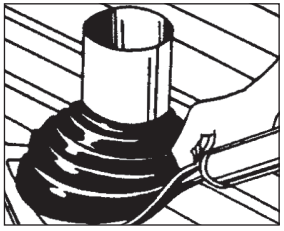
Step One: TRIM
Trim opening to 20% smaller than pipe diameter.



Step Two: SLIDE
Slide down over pipe.



Step Three: SEAL
Apply silicone sealant between pipe flashing.

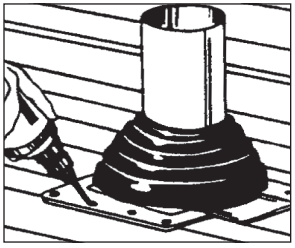


Step Four: FORM
Press down, bending flashing to fit irregularities. Use large slot screwdriver to press into tight angles.



Step Five: FASTEN

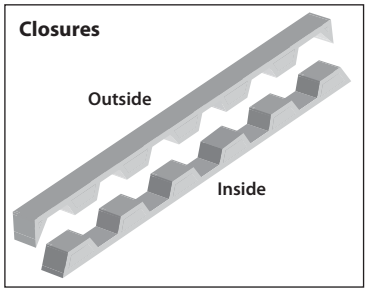
Use fasteners to finish sealing as shown at right.



Accessories

Nu-Ray offers the following accessories which are used with both Standing Seam and Exposed Fastener systems. Please contact Nu-Ray for details and pricing.

- **Ice & water shield**
- **Fasteners**: woodgrips, Neoteks and panel screws
- **Sealants**: Sikaflex® Solar Seal 900 and butyl mastic solid caulking
- **Touch-up paint** in spray cans
- **Fiberglass**: inquire about standard lengths and colors
- **Closures**: Die-cut ¾″ x 1½″ x 10′ closed cell, outside and inside, in 36″ lengths
- **VersaVent™** Ridge Vent Material



Closures



Sikaflex®



VersaVent™

Both Systems

CAUTION: KEEP DRY

Store the panels in a dry, well-ventilated area. Elevate one end of the bundle so that any moisture that may exist, can run off. Make sure that air can circulate freely around the panels to avoid any build-up of moisture between the panels. Moisture trapped between panels will cause paint to bubble and white rust to form on unpainted panels. Do not store the panels in direct contact with the ground. Nu-Ray Metals assumes no responsibility for materials improperly stored.

REGISTER TO ACTIVATE WARRANTY

Nu-Ray warranties are *not* implied. Registration is required for warranties to be put into effect. Please contact your Nu-Ray installer or representative, or visit our web site, for more information.

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