//METSTAR®
STUNNING ROOFING THAT LASTS
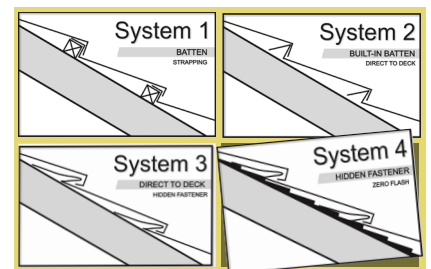
System 4
HIDDEN FASTENER
ZERO FLASH

Compatible With:

//METSTAR®
SLATE PLUS

//METSTAR®
SHAKE PLUS

*This guide covers the smooth and stone coated profiles

System 4: Hidden Fastener
Zero Flash

INSTALLATION GUIDE

| System 1 BATTEN STRAPPING | System 2 BUILT-IN BATTEN DIRECT TO DECK |
| System 3 DIRECT TO DECK HIDDEN FASTENER | System 4 HIDDEN FASTENER ZERO FLASH |

An innovative and patented method of installation that is economical, ecological, and effective. Zero flash means Zero Waste and Zero extra cost to you. System 4 is only availble in select markets with select, experienced contractors. Please talk to a Metstar representative before you commit to a System 4 job to see if you qualify.

Metstar... *Metal Roofing Simplified*

NOTICE

Installation of Metstar roof panels must comply with these installations instructions, and the applicable local building codes. The instructions and drawings included here are intended only as a guideline for the installation of Metstar roof panels with battens on wood decks. Information regarding alternative situations not covered in these instructions can be obtained by contacting Metstar. The information in these instructions is for practices in North America and can be changed without notice. Check our website for most up to date information. International applications may be similar, but may differ in some ways, so please contact us for specifics.

Liability

This manual provides suggested application techniques only and is not to be substituted for any local building code. Metstar panels are covered by a lifetime limited warranty, but it does not cover damage due to improper handling, installation, maintenance or damages caused by other trades. Metstar assumes no liability for incorrect installation, leaks, other installation defects or personal injury that may occur as a result of installing its products. It is the responsibility of the installer to adhere to local building codes.

Scope of Work

The installer (independent contractor) is responsible for all equipment and labor necessary to complete the installation of the Metstar roof panels including all flashings, valley, ridge, hip, roof-to-wall, and etc.

Safety

Adhere to recommended safe roofing practices. Safety equipment should be worn during the installation process. Always wear appropriate clothing and use safety equipment (i.e. soft-soled safety shoes, protective eyewear, safety harness, protective gloves and so on.). Use proper tools and keep the roof clean of debris as you work.

Tools

Metstar panels may be cut using shears, metal snips, nibblers or a circular saw using metal-cutting blades. Do not use a grinder to cut panels, the high speed will cause corrosion. A mechanical or hand bender is recommended to bend the panels when needed.

GENERAL INFORMATION

All Stone Coated Metstar roof panels are produced from Aluminum- Zinc alloy coated steel complying with ASTM A792. They are Corrosion resistant. The Aluminum- Zinc alloy coated steel, is preformed then stone coated, cured and shipped as prefinished, metal panels.

Fire Classification
Metstar roof panels are Class A roof assemblies, and are fire resistant in accordance with Standard UL2218.

Hail Resistance Grade
Metstar roof panels are Class A roof assemblies, and are CLASS 4 Hail Impact resistant in accordance with Standard UL2218. Metstar roof panels are also TDI approved for hail, Texas Department of Insurance.

Allowable Negative Wind Pressures
Metstar roof panels must be installed where the negative design wind pressure, determined in accordance with Section 1609 of the IBC or Section R301.2.1 of the IRC, as appplicable, does not exceed the allowable negative wind pressure specified in Table 1 of this Installation Guide.

Severe Weather Conditions
If the area is prone to high wind, water, severe snow or ice, additional measures may be required. Ice and Water shield, reinforcement or snow guards may be recommended. Follow local building codes. All fasteners used should be corrosion resistant. Also, panels along the perimeter and directly along the hips and gables must be secured with more fasteners than normal.

Preparation
Water run-off from other materials (such as copper) can cause contamination of the roof panels. Special care must be taken, such as painting, removing or waterproofing such area, before Metstar products are applied.

INSTALLATION OVERVIEW

New Construction:

Structure: Roof rafters shall be spaced not more than 24 inches (610mm) on center. Roof panels must be installed over solid sheathing complying with the applicable code.

Slope: Metstar roof panels must be installed on roofs having a slope of 3:12 (25%) or greater.
Underlayment: High Temp (HT) underlayment is recommended. Underlayment must comply with Section 1507.53 of the IBC, or Section R905.4.3 of the IRC, as applicable.

Flashings and Openings: Valley flashings must comply with IBC Section 1503.2 and IRC Sections R905.4.6 as applicable. Roof openings must be flashed in accordance with IBC Section 1503.2 or IRC R903.2, as applicable. Openings through the roof vents, etc., must be waterproofed and supported by additional blocking or roof framing as required by the local building code. At gable edges, a continuous rake cap or gable cover of the same material as the panels, supplied by Metstar, must be installed in accordance with these published installation instructions.

Re-Roofing Applications:

Metstar panels can be installed over top of most existing roof systems. Metstar products are the only products that are designed to go directly over top of asphalt shingles. When re-roofing Metstar panels must be installed in accordance with Section 1510 of IBC and Section 907 of IRC. If tearing off the old roof, clean and prepare deck to meet the local building codes.

Structure: Roof rafters shall be spaced not more than 24 inches (610mm) on center. Roof panels must be installed over solid sheathing complying with the applicable code.

Slope: Metstar roof panels must be installed on roofs having a slope of 3:12 (25%) or greater.
Underlayment: High Temp (HT) underlayment is recommended. Underlayment must comply with Section 1507.53 of the IBC, or Section R905.4.3 of the IRC, as applicable.

Codes & Requirements
Refer to local building codes and METSTAR ICC-ES Report ESR- 3331. Add more.

Underlayment
Underlayment must comply with Section 1507.5.3 of the IBC, or Section R905.4.3 of the IRC, as applicable. It is required that one layer of underlayment be used before applying Metstar panels to a roof deck in new construction or if the existing roofing material is removed. If panels are installed over another roofing material, additional underlayment is not required unless specified by local code. All underlayment should be of a type and specification that is accepted by the local building code. Check local code requirements as ice and water shield and additional requirements may apply.

High Wind Zone
In areas prone to hurricanes and high winds, installation must meet local standards and codes. Panels along the perimeter and directly along the hips and gables must be fastened as specified in Table 1 of appendix A.
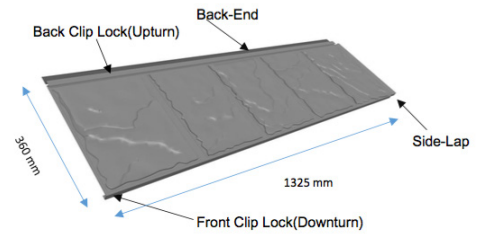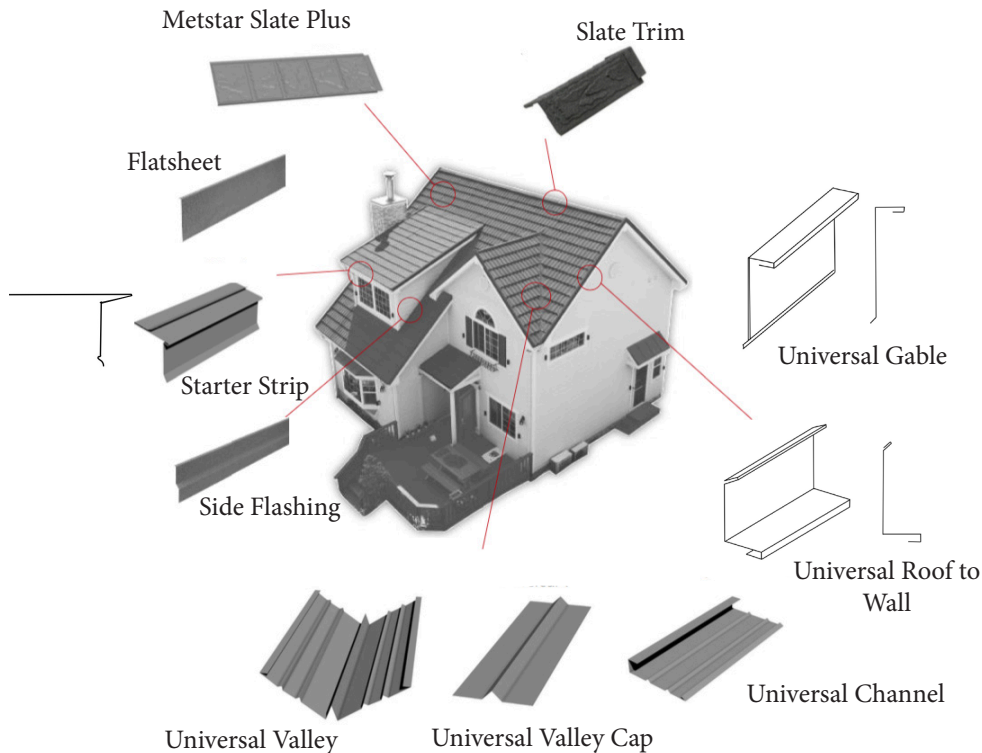
Freeze/Thaw
Use ice and water shield as specified in local codes for cold climate conditions.
The use of "snow guards" is recommended on our Smooth profiles only. Not necessary on the stone coated products.

Ventillation
Ensure proper attic ventilation as prescribed per local building codes.

TERMINOLOGY

Metstar Slate Plus

Slate Trim

Flatsheet

Back Clip Lock(Upturn)   Back-End

360 mm

Side-Lap

1325 mm

Front Clip Lock(Downturn)

Starter Strip

Universal Gable

Zero Flash
In this guide, we will go over our main reccomended accessories, and how to install them with our Direct to Deck, Hidden Fastener System (System 3). It is the roofers disrection to decide whether they will install new flashings, or save costs and use our System 4 method

Side Flashing

Universal Roof to Wall

Universal Channel

Universal Valley   Universal Valley Cap

Local trims may vary. Speak your Metstar rep if you're uncertain about your flashing options.

TOOLS & ACCESSORIES

You will need:
- Screwgun
- Screws
- Cutting snips
- Bender

- Touch-up kit (for Metstar Stone Coated products, must be stored above 5C/40F)
OR
- Touch up paint (for Metstar Smooth products, durable acrylic aerosol paint)

Other Options / Substitutions:
- For screwgun: hammer, drill, nailgun, or even a screwdriver
- For cutting snips: shear, circular saw, and any other metal cutting device (except grinders)
- For screws: you can use nails (spiral or ring shanked), but screws are prefered

Fastener details:
- For screws, we reccomend: #9 1/4" hex head, 1.5" length with the thread all the way to the head, but other exterior grade screws can be used at discretion of the roofer
  - Wood Screws must comply with ANSI/ASME Standard B18.6.1
  - Sheet Metal Screws must comply with ANSI/ASME Standard B18.6.4
  - Nails must comply with ASTM F1667

**Of course you need the following everyday roofing tools & accessories:**

Tape Measure
Chalk Line & Level
Extension Cords
Caulking/Sealant and application gun
Ventilation Material

Roof Boots
Expanding Foam
Butyl Tape
Snow Stops
T-Bar tool for opening crushed laps

* Grinders and alike speed is too fast, chews up coating, and heat affects the zinc.

ESTIMATING

Product	Calculations	How to Order
Metstar Slate Plus Stone Coated Panel	Panels = (Total SQs x 20) + waste OR Panels = (Total sq. footage / 5) + waste	To account for waste, add approximately 10-20% based on roof complexity (we can help!). *Round to the nearest 10 (10 panels per bundle) to get the total number of panels to order.
Metstar Slate Trim	Pieces = $\dfrac{(Hip + ridge) *12}{14}$	Calculate the total linear footage of all the hips, ridges and gables (if you choose to use the trim piece on the gable) (see section F*). Multiply total by 12 to get the number in inches. Then divide by 14 inches to get the number of pieces. Remember to add about 5% extra for waste.
Metstar Valley Caps	Pieces = Valley footage / 4	Calculate the total linear footage of all the valleys and divide the total by 4' to get the number of pieces needed.
Universal Valley	Pieces= Valley footage / 10 **Needs to overlap by minimum 6"	Calculate the total linear footage of all the valleys. Divide the total by 10' to get the number of pieces to order (for long valleys over 10' the pieces need to overlap by 6" minimum).
Metstar Flatsheets	18" x 52.75"	As needed for custom flashings.
Universal Gable	Pieces= Gable footage / 10 *Most common gable option	Calculate the total length of Gables/Rakes. Divide by 10' to get the number of pieces. (On gables longer than 10' the pieces should overlap by 2" minimum). Remember to order the same amount of Universal Channels as Universal Gable, as this is a 2 piece gable set-up.
Universal Starter Strip	Pieces= Eave footage / 10 *Used at the eave	Calculate the total linear footage of the eave, then divide by 10' to get the number of pieces. (There should be a 1" overlap on adjacent pieces)
Universal Channel	Pieces= (Sidewall/endwall footage) + (Rake/gable footage) /10'	Calculate the total linear footage of sidewall/endwall plus rake/gable applications and divide by 10' to get the number of pieces needed (on applications longer than 10' make sure there is a minimum 2" overlap). **If you are using Slate Trims on the gables you will need to divide the total gable footage by 10' to get the number of pieces of the Universal Channel to go under the gable slate trims and add this to the total.*
Universal Roof to Wall	10'	Once you have calculated the number of UNIVERSAL ROOF TO WALL needed for the sidewall/endwall (not gable!)
Screws	500 screws/bag	Calculate 6 fasteners per panel ordered and round up to the nearest 500 pieces.

* 1 roofing square = 100 square feet
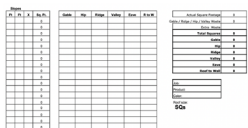
Visit our website for our easy to use, Interactive Estimating chart.

Zero Flash
Listed here are the baseline accessories that we reccomend when using the Slate Plus & Shake Plus panels. Selected roofers in selected areas will decide which of these to be used on the job.

UNDERLAYMENT

Roofing underlayment is always required with metal roofs, the roofer will chose the best suited underlayment for the job at hand, following the local building codes, and the location at hand.

High temp "HT" underlayments are always the preffered with metal roof systems. (depdning on local roofer and building codes). The best safeguard underlayment with metal roofs, is a high temp, waterproofing membrane (ice & water).

Existing asphalt shingles in good condition can be used as a very good underlayment. Ultimately that decision lies with local roofer, local building codes, and weather conditions in that area.

Zero Flash
While we reccomend using underlayment, with the zero flash system, the existing shingle can be used as a very good underlayment.

Reminder You can only use the zero flash method ontop of an asphalt roof that's in decent condition, and properly installed.

*This decision is to be done at the select roofer's discretion and must comply with local building codes.

THE EAVE
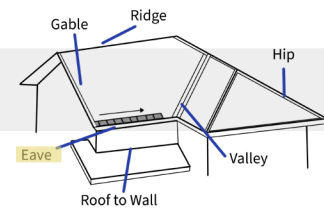
Once the roof deck has been prepared and the necessary underlayments have been installed, you can proceed to install the METSTAR accessories.
Begin with the Universal Starter Strips (D) around the entire eaves. When installing pieces beside each other please ensure a 1" overlap. Care should be used to ensure that the Universal Starter Strips are parallel to the Ridge.
 Things to remember:
- Overlap sides by 1"
- Keep the strips parallel to the ridge
- Fasteners should be installed closer to the eave to strengthen the eave.

Eave Cross Section Details

Using Starter Flashing

↱ Fastening Position, direction

PANEL

Starter Flashing

Underlayment

Plywood Deck

Rafter
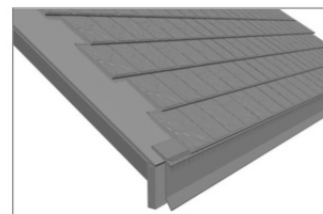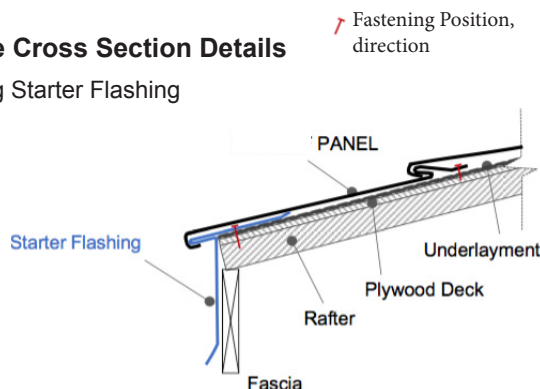
Fascia

At the eave, install the Starter Flashing on the deck and fascia. Install the first course Metstar panel, clipping into the starter.

Zero Flash
You can simply clip panel into existing drip edge. You will want to make sure to start as straight as possible. If it is not possible to be straight, shim the panel out to where it is square. Install Polebarn style screw in flat point of panel (figure 1) Or can drill hole through panel, and drip edge. Use a pop rivet if desired, for more low-profile look.

THE GABLE / RAKE
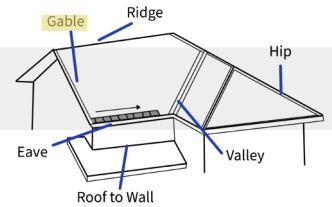
There are a few ways to instal the gable. Two of the most popular ways are to use are
1. The Universal Gable + Universal Channel *or* 2. The Universal Channel + Slate Trim

Install the Universal Channel with Drip (F) along all rakes/gables. When installing pieces above each other please ensure a 2" overlap by inserting the higher Channel into the lower channel.

Things to remember:
- Overlap by inserting the higher channel into the lower channel by 2"
- Make sure the bottom channel extends over the starter strip by 1"
- Fasteners should be installed down the fastener strip at the very inside of the channel

Universal Channel and Universal Gable Panel Cut and Fit
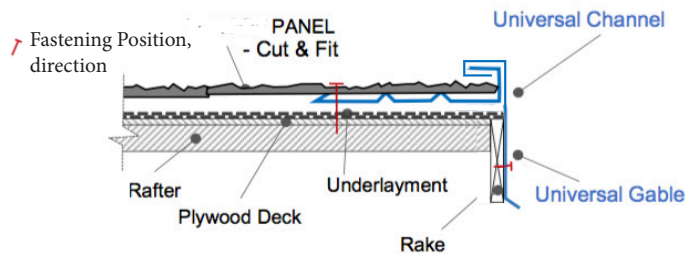
You can use either the Universal Gable + Universal Channel, **or** the Universal Channel + Slate Trim
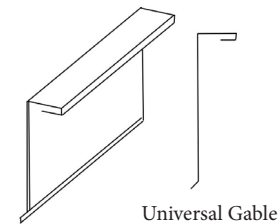
Universal Gable
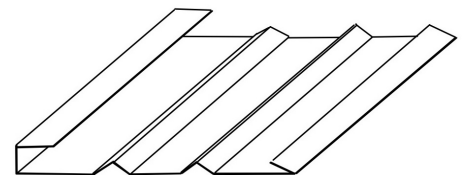
Rake flashings are installed first.
Universal Channel with Drip should be installed along the rake/gable edges.
At the corner of Rake which meets Eave, position the Universal Channel with Drip over eave starter.

Position and fasten the panels over the Universal Channel with Drip.
The edge of the panels must be cut to fit the channel.

Use the specified fasteners to secure them,
Seal around the fasteners head.

Universal Channel

Zero Flash
You can simply cut panel flush with existing drip edge. Panel can also be extended past the drip edge to keep wind driven rain out. What little water can get in, will drain out onto the next panel. Panel can also be bent/hemmed over existing drip edge. Strips/Outside Corner Caps for painted metal or Metstar Slate Trim Caps can be added.

Gable with caps

ROOF TO WALL

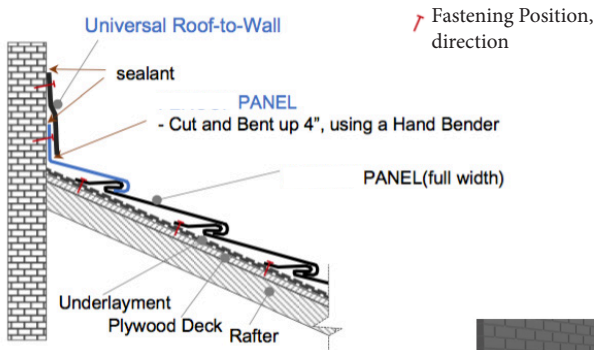Gable · Ridge · Hip · Eave · Valley · Roof to Wall
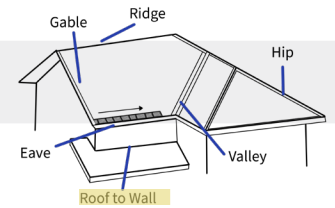
Install the Universal Channel (H) along all sidewalls. When installing pieces above each other please ensure a 2" overlap by inserting the higher Channel into the lower channel.

Things to remember:
- Roof to Wall/Sidewalls are anywhere a roof plane meets the 90-degree side of something. This could be the side of a wall, dormer or skylight. Sidewalls are always sloped.
- When a long sidewall requires more than one piece of universal channel, make sure you use at least a 2" overlap by inserting the higher piece into the lower piece. Use sealant to seal the overlaps.
- At the bottom of a side flashing application the flashing MUST exit on top of the roof panels and should extend a minimum of 2" on top of the roof panels. Use sealant to seal between the flashing and the panel. (It may be necessary to snip the clip lock of the roofing panel to ensure the flashing exits properly)

Roof to Wall Cross Section Details
Roof to Side Wall

Universal Roof-to-Wall
sealant
PANEL
- Cut and Bent up 4", using a Hand Bender
PANEL(full width)
Fastening Position, direction
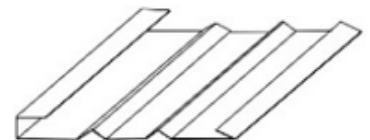Underlayment
Plywood Deck
Rafter

Once the Universal Channels have been installed, and the panel installation is complete in that area, the Universal Roof to wall flashing can be installed.

It may be necessary to add additional larger wall flashing depending on the situation.

Universal Roof to Wall

Universal Channel

At the roof to side wall, install the Universal Channel and Universal Roof to Wall.

Then install the panels to fit into the Universal Channel and fasten. Then install the Roof to Wall.

Seal against the wall with roofing grade sealant.

Zero Flash Headwall
If possible, cut, and fit panel to go under exiting head-wall flashing, as tight as possible to the wall. Additional counter flashing can be added.
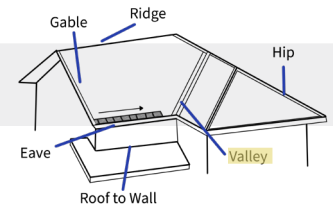
Zero Flash Sidewall
If possible, cut panel as tight as possible to the wall. You're already protected by the existing roof. Additional counter flashing can be added.

THE VALLEY

Universal Valley Installation
Install Universal Valley with fasteners spaced as evenly as possibly. Fasteners shall be positioned outside the last turn-up section (see diagram, refer to red fasteners).

Panels Installation
Valley panels are shaped by measuring and cutting to conform with roof geometry. After full panels are laid out in the field, cut panels are to be installed. If necessary, coat edge with a Metstar Touch up kit. *We always work from left to right. On the right, we start coming out the valley with a cut panel*

Install the Universal Valley (D) along all valleys. When installing pieces above each other please ensure a 2" overlap by inserting the higher Channel into the lower channel.

Things to remember:
  -Overlap by overlapping the higher valley into the lower valley by 6" minimum.
  -Ensure that 2 strips of sealant are used to seal the overlaps (see figure a)
  -Make sure the bottom valley extends over the starter strip by 1" on both sides. (see figure b)
  -Fasteners should be installed down the fastener strip at the very edges of the valley
  • Valley Cap (C) will be installed after the panels are installed into the entire valley

Valley Cross Section Details
↗ Fastening Position, direction

Valley Installation with Universal Valley and Valley Cap
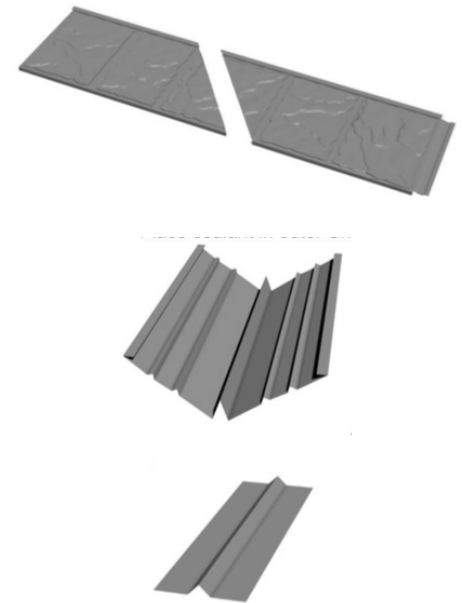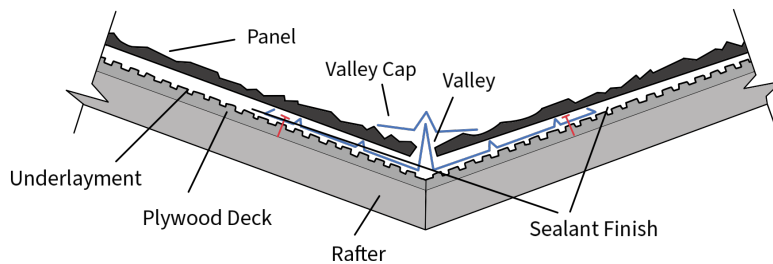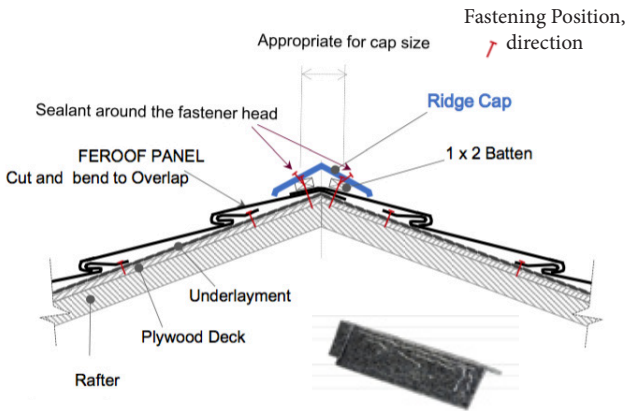

Zero Flash Valley
Simply cut the panel at an angle to fit tight, (Valley Step 1). Keep screws back min 12" from the center of the valley. Bring the other side of valley over, (Valley Step 2). Valley can be finished off with the Metstar Valley Cap (which should be instaled with a 1/2" sheet metal screw, not to penetrate valley material below panel.
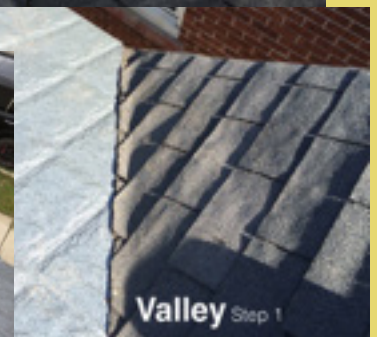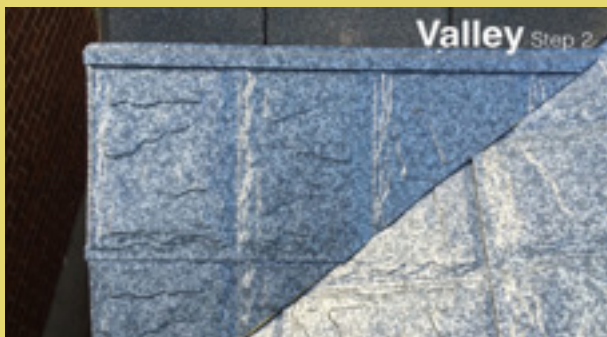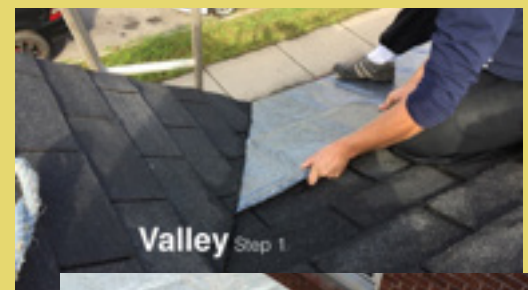
Zero Flash The valley is the most controversial area for Zero Flash. Please note in the pictures shown, there is Ice and Water, then a metal valley, then shingles "California valley" over the top of that. Most installers preferences will be to put down additional metal valley.

Ridge Cross Section Details

Appropriate for cap size

Fastening Position, direction

Sealant around the fastener head

Ridge Cap

FEROOF PANEL
Cut and bend to Overlap

1 x 2 Batten

Underlayment

Plywood Deck

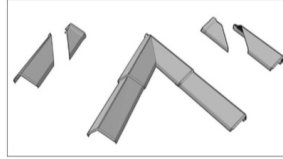Rafter

Panels Installation
At the ridge and hip, cut the panels to extend a minimum of 1" past the hip and ridge line. Use hammer to bend. The other side should be done the same way. Then instal the caps.

Slate Trim Caps Install
Install caps from the bottom upwards. Fasten on each side of the cap. #9 1 1/2 " long, 1/4" diameter head hex-head screws are used to fix cap, and one screw on each side.

When installing the Slate Trim, the first hip cap is assembled with the hip cap end according to the drawing. Instal it, then the second cap is added over the first cap, as so forth.
After finishing the rake installation, install the first ridge cap. Cut the ridge cap to fit the rake shape.
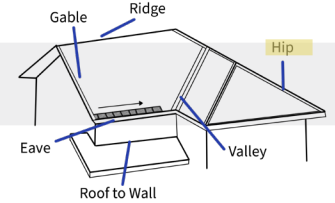
Ridge / Hip Intersection Cap Installation
Install hip caps from the bottom.
As hip caps meet, cut caps symmetrically to fit, and set them up.
At the intersection, cut as shown. After setting up, finish with sealant.

THE HIP

One of the most important things to focus on is keeping the Slate Trim Caps as straight as possible!

-If there are hips on the roof, install those trim first, starting from the bottom up.
-In most cases the first trim piece at the bottom will need to be cut and bent to hook firmly over the bottom edge.
-Install both hips completely so that they are complete to the ridge and mitred to fit tightly and repel water. (the ridge cap will be mitred in place on top of these)
-Don't be afraid to use a chalk line to ensure a straight install.
-Fasteners should be installed at the lip on the high side of each trim piece with the bottom hooking onto the trim below to secure it.
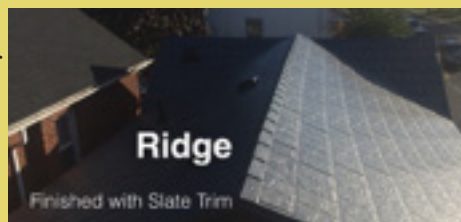
THE RIDGE

-In a non vented ridge scenario, ensure the panels are wrapped over each side and fastened securely. Installation of a strip of ice and water shield over the wrap can be used if needed.
-In a ridge vented scenario, ensure the opening to the attic is adequate, and install the ridge vent material before install the trims.
-Start at one end of the ridge and work towards the other. If you are on a ridge that intersects a hip, make sure the mitred trim is the first piece.
-Connect the trims across the ridge by hooking them to each other and putting the fasteners into the free end to secure.
-Keeping the trims straight is a critical detail so take your time.
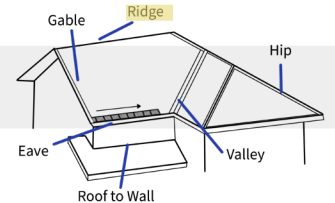
Zero Flash
Simply cut one side of the Hip &Ridge flush with the center of the Hip & Ridge. Overlap the other side 2"-3".
Using a rubber mallet, fold the metal over, install screws to hold down overlap.

If possible, the lapped area should be installed in a way that it is less noticeable from street. Finish off with Metstar Slate Trim or Painted Metal Cap. *If ridge vent for ridge ventilation is method of ventilation, *Zero Flash* will not be possible.

Ridge
Finished with Slate Trim

MISCELLANEOUS

Once you pick your starting section, panels will be laid from left to right and from the bottom up towards the ridge. Always work left to right, even if it means starting at a valley or out of a gable.

We reccomend a staggered look, so start your layout pattern you make sure to have a minimum 4" offset and do not rack up the panels so that the lines match up. This is for esthetic purposes only.

When fitting the panels together make sure that the clip locks are now nice and snug (see figure x and check)

Fasteners should be installed 5 per panel spaced evenly across the top. For high wind areas install 7 screws per panel along the eave rows and up the gables.
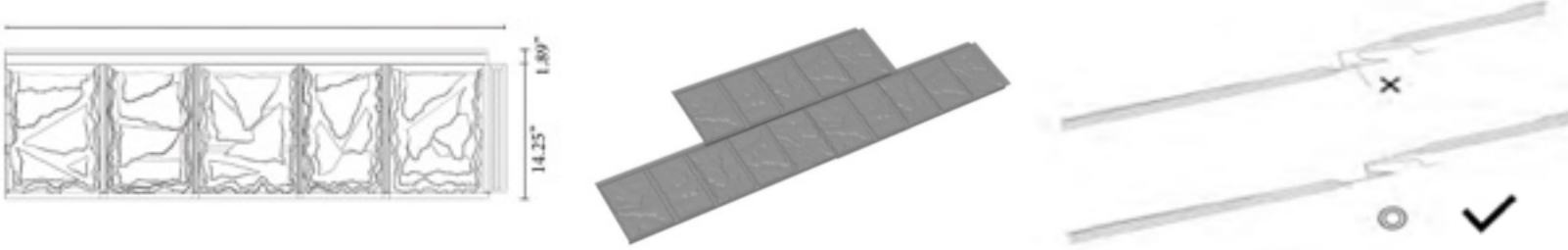
Fasteners
All fasteners must be corrosion-resistant. See page #* for details on what screws or nails can be used.

Put 5 fasteners at the back-end. Put a fastener about 1" from the edge on each side (left first, then right), then the remaining three evenly spaced. For high wind areas install 7 screws per panel along the eave rows and up the gables.
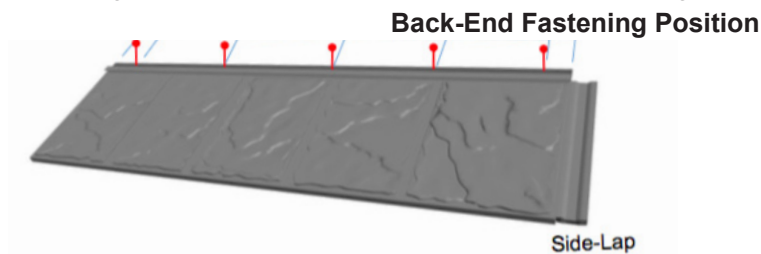

Fastening Panels to Deck

Fasteners specified above shall be installed through the panels, penetrating minimum 1-1/2" (38mm) into, or completely through deck.

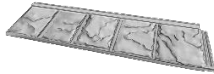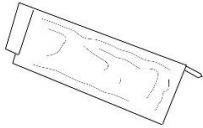Care must be takens while fastening to avoid striking the finished panel surfaces.
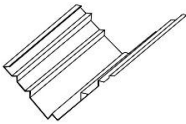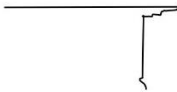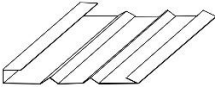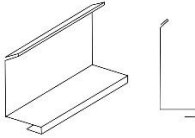Damaged surfaces can be refinished by using a Metstar Finsihing Kit, or a Metstar Touch-up Kit.
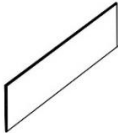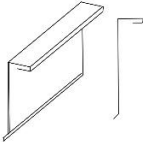
First course is set by overlapping panels side to side. Next course is set by overlapping over the first course. Fasteners on the lapped losition is marked in red.
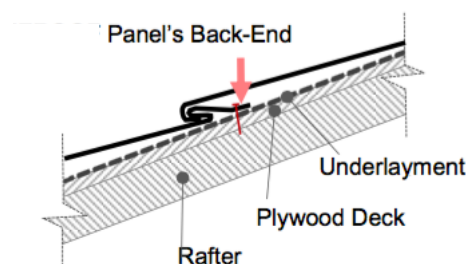
METSTAR SLATE PLUS SMOOTH

ORDER FORM

Product	Photo	Description	Available Colours		Order Quantity
Metstar Slate Plus Smooth Panel *(A)*		14 5/16" x 50 3/8" *Smooth Metal* 20 panels per square 10 panels per bundle	Mixed Black Solid Black Mixed Brown Solid Brown Galvalume Solid Slate Gray		_____ **bundles**
Metstar Slate Trim *(B)*		14" *Smooth Metal*	Mixed Black Solid Black Mixed Brown Solid Brown Galvalume Solid Slate Gray		_____ **pieces**
Metstar Universal Valley Caps *(C)*		4.4' *Smooth Metal*	Mixed Black Solid Black Mixed Brown Solid Brown Galvalume Solid Slate Gray		_____ **pieces**
Universal Valley *(D)*		10' *Stock Paint* **Needs to overlap by minimum 6"	Black Coffee Brown Dark Brown		_____ **pieces**
Metstar Flat Sheet *(E)*		18" x 52.75" *Smooth Metal*	Mixed Black Solid Black Mixed Brown Solid Brown Galvalume Solid Slate Gray		_____ **pieces**
Universal Gable *(F)*		10' *Stock Paint* *Most common gable option	Black Coffee Brown Dark Brown		_____ **pieces**
Starter Strip *(G)*		10' *Stock Paint* *Used at the eave	Black Coffee Brown Dark Brown		_____ **pieces**
Universal Channel *(H)*		10' *Stock Paint*	Black Coffee Brown Dark Brown		_____ **pieces**
Universal Roof to Wall *(I)*		10' *Stock Paint*	Black Coffee Brown Dark Brown		_____ **pieces**
Screws *(J)*		#10 x 1.5", ¼" hex drive 500 screws/bag *These fasteners do not have a washer	Black Brown Clear		_____ **bags**

METSTAR. Metal Roofing, *Simplified*!