



# SAFETY INFORMATION

- Be sure to work from secure and safe platforms and ladders
- Secure area underneath your work space to make sure nobody gets hurt in case you drop something
- Edges of cut copper are sharp; be sure to wear proper gloves when handling cut gutter
- When cutting copper, be sure to wear approved safety goggles
- Never install or work on damaged roof material or structure
- When you install gutters, make sure the collected water can run off without causing damages
- Never modify parts without consulting a professional or Slate and Copper's technical support team
- Dispose of leftovers and off-cut safely and in accordance with best practices
- Never leave any parts or tools unsecured on your roof, they might fall down causing serious damage or injury
- Never do installation work alone- always work in a team
- Check for power lines
- Never install on icy or slippery roofs or in windy conditions

**-IF YOU DO NOT FEEL YOU CAN COMPLETE THIS WORK SAFELY, CALL A LOCAL CONTRACTOR**

## WARNING:

Copper is a sharp metal and will bite you if you let it. Firmly and securely hold all pieces when working with them. Do not slide your hands or fingers along any straight or finished edges. This is partly the reason why we wore gloves in our demonstration. Wearing gloves will also help minimize the fingerprint marks on the gutter system. The best gloves to use especially for grip are ones with the palm and fingers coated with a rubber or latex material.

# INSTALLING MITERS

How do you determine what is an inside or outside miter? If the corner of the roof forms a valley, then it requires an inside miter (see house diagram 1). If the corner of the roof forms a hip, then it requires an outside miter (see house diagram 1).

## Tools Required:

- \* Tape measure
- \* Something to make a mark with (metal scribe or a sharpie pen will work)
- \* Cord or Cordless Drill (3/8" size drill is perfect)
- \* 1/8" Drill Bit for Drill
- \* Pop Rivet Gun
- \* 1/8" Diameter Copper Rivets
- \* C Clamps (optional but very useful)
- \* Soldering Equipment and Flux (do not use the pre-tinning flux)
- \* Soldering Iron of some sort (many styles to choose from)
- \* Mapp Gas Tank (yellow tank) with an Adjustable Flame Torch Head Nozzle

**NOTE:** The instructions and installation are the same for both Inside and Outside Miters.



step 1

Slate and Copper's World Gutter System miters come as an inside or an outside miter. Both inside and outside miters come as a one piece seamless miter. The only seams the miter will have are the two straight sections you use to join into them. If joining two straight sections into a miter, then one miter requires 4 rivets. Two rivets on each side of the miter. Rivets are placed in the same place as when you join two straight sections of gutter together.



diagram 1

# PART 1

**First step- determine what the overlap of the gutter into the miter will be, and make 3 - 4 marks on the end of each side of the miter to the overlap distance.**

Before we can begin to install the miter we need to determine the measurements of the straight sections joining into the miter, and what the overlap will be on the miter. On overlap of gutter into gutter, gutter into miter, or miter into gutter, then the minimum overlap should be 3/4", max overlap is what ever you want it to be. We suggest that 1 1/2" overlap is perfect. For the miter installation demonstration we used the minimum 3/4" of overlap. Also, in our installation demonstration we are simply showing how easy it is to join a miter onto the end of a gutter section whatever the length.



step 2



step 3



step 4

In picture Step 1 we made 3 marks, one on the top of the front bead of the gutter, one in the middle of the bottom of the miter, and one on the back lip of the miter. Once we know what overlap we want; measured in from the end that distance on both sides of the miter, and make marks on the miter to the distance, we are done with the first step.

## PART 2

**Second step; line the gutter and miter up like in picture Step 2, then rotate the gutter as in picture Step 3 until the bead of the gutter slides into/onto the bead of the miter.**

After connecting the gutter onto the bead of the miter line the bead of the gutter up to the mark you made on top of the bead of the miter, then rotate the gutter down into position (see picture Step 4). Finally, lock the back of the gutter up under the back lip on the back of the miter as in pictures Step 5 & Step 6. Make sure the gutter is lined up to the marks on inside of the miter. The only thing left to do is rivet, flux and solder the gutter sections and the miter together the same way the gutter sections are done.

Pictures Step 7, Step 8, Step 9, Step 10, Step 11, & Step 12 show installation of a straight gutter section into an inside miter using the minimum 3/4" overlap. Notice how nice and clean the miter and the gutter fit together.



step 5



step 6



step 7



step 8

## PART 2

### Suggestion-

Before riveting and soldering the gutter sections onto/into the miter to make a solid unit, take and dry fit the gutter sections with the miter attached into the gutter hangers. Why? Because if the building is not square at the corner, then the gutter sections connecting into the miter may need to be adjusted (tweaked) to get it to fit the corner, and into the gutter hangers correctly.

If you want to install the rivets after dry fitting the gutter sections into the miter inside of the gutter hanger you may do so. If you rivet the gutter sections into the miter before you dry fit it into the gutter hangers, then this can be done as well. If you need to adjust the miter gutter section at all, then the rivets can easily be drilled out through the center of the rivet, and the rivet holes can easily be filled with solder if necessary.



step 9



step 10



step 11



step 12

## PART 2

The next step of overlapping the gutter into the miter can certainly be reversed, and the miter can be installed (overlapped) into the gutter sections. We suggested the gutter into the miter because this way if hangers are installed on each side of the miter in the corner, it will help support and hold the miter in place (see house diagram 1), then the hangers will hide the seam better.

Typically, it is easier to take and make measurements if an inside or outside miter can be installed into a couple of gutter hangers right at the corner location as in house diagram 1. And if you do it this way, then the miter will not only be supported well, but it can actually hide the underside seam of the miter if the gutter hangers are installed right at the ends of each side of the miter with a little bit of overlap. By doing it this way you can then measure from the miter to the end, or from miter to miter. Be sure to account for overlap, and/or how much past the end of the roof you want to go.

One last thing concerning the outside miters, if you notice in picture Step 1 the outside miters have a radius in the back of the miter. On a fascia board fascia hanger application the outside miter needs to be modified in the back to be able to fit right up against the fascia board because of the radius. The roof hanger application holds the miter away from the fascia board, so the outside miter does not need to be manipulated. There are several different ways to get the outside miter to fit up against the fascia board on a fascia mounted application. One way is to take a hammer and tap right in the middle of the radius to make an indentation. Sometimes this is enough to get the miter to fit better on the corner. Another way is to shave off some of the fascia board with a wood file or wood rasp right in the area where the outside miter is hitting the fascia board.

## PART 2

One last (and probably best) way- find the middle of the radius on the back of the outside miter and make a mark, measure 1/2" or so on either side of the mark and make two more marks, now take a pair of tin snips and remove a small "V" notch in the radius about 1/2" or so down into the back of the miter. After the "V" notched material is removed, take a pair of hand brakes and bend both sides straight like the rest of the back of the miter is, now find a scrap piece of copper cut it and bend it to cover the "V" notched area that was removed. Rivet and solder the small cover piece you made out of a scrap piece of copper to the miter. This last way removes a small enough piece of the radius to get the miter to fit square against the fascia board.