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 propper 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 Gutter

• C Clamps (optional but very useful)

C Clamps

• 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

Tools Required:

• Tape Measure
• Metal Scribe
• Cutting Tools- this could consist of a combination of many things such as:
- Green and/or Red Tin Snips- also known as Left and Right Handed Tin Snips respectively
- Hack Saw with new blade (preferably)
- Miter Box (handy for straighter cuts)
- Compound Miter Saw with either:
- Solid Carbide Metal Cutting Blade (this blade leaves burrs, so you will need a deburring tool)

Deburring Tool

- World Gutter Systems' Anything Cutting Blade (gives you that factory cut every time, effortlessly).
• Cord or Cordless Drill (3/8" size drill is perfect)
• 1/8" Drill Bit for Drill
• Pop Rivet Gun
• 1/8" Diameter Copper Rivets

Part 1

First Part- we must determine the length of the run, and cut the gutter to length.

For runs greater than a 10' or 18' length of gutter we need to cut and join two or more pieces of gutter together. When cutting gutter to make a longer run we also need to determine what the overlap of the gutter will be, and take this into consideration before we cut the gutter sections to length. The **minimum** overlap of gutter into gutter should be 3/4". We suggest that 1 1/2" overlap is perfect. When overlapping gutters to make longer runs keep in mind the way the water will flow, and/or if the gutter is being pitched to one end or the other. Why? Because to help with water drainage we want to overlap the higher gutter into the lower gutter, or in the direction of the flow of water toward the outlet.

Example, if we have a 25' - 3 1/2" (303.5") straight run that slopes from left to right, the outlet being on the right end. We can use 3 - 10' gutter sections, but remember when using 10' gutter sections they are actually 118 3/16" long, and not 120" long. To make it easy on ourselves we can basically forget about the 3/16" dimension, or use that as a little bit more on the overlap. Each gutter section at 118" equals 354" total without any overlap, and we need 303.5" of that. We take 303.5" minus 118" = 185.5 minus 118" = 67.5" now we take 67.5" and add 3" = 70.5". Why are we adding 3" to the 67.5" dimension? Because we have two overlapping seams, and each seam we want to overlap 1 1/2" each = 3" of total overlap. We need to cut one of our 10' gutter sections to 70.5". If we take 118" + 118" +70.5" we get 306.5" minus 3" for the total overlap gives us our 303.5" or 25' - 3 1/2" gutter section. We want to overlap the far left 118" gutter section inside of the other 118" gutter section, and the middle piece of gutter (the other 118" section) gets overlapped into the 70.5" gutter section on the end. You can use the short section anywhere you want, as the far left piece, as the middle piece, or as the far right piece.

Part 2

Second Part- Once we have our measurements and we have cut the gutter sections to length, we can install the gutter sections together to make our longer run.

First we need to determine the overlap, and for this installation demonstration we are using 1 1/2" overlap. In pictures Step 4, Step 5, & Step 6 we are marking the gutter with a metal scribe. You want to make at least 3 marks on the gutter just like the previous mentioned pictures show. Why you ask? The one on the front bead is going to help us line up better when we overlap at the bead, and the other two are also strategically located as well. After making the marks we need to bend up the back overflow lip on the back of the gutter up slightly. Why? Because if we don't, when we go to overlap the gutter sections into each other, the one overflow lip on the unbent gutter will not slip up under the back overflow lip on the other piece of gutter. If you don't have hand breaks, another method is to take a pair of tin snips and cut right on the mark we made on the back lip all the way to the top of the back lip.

step 4

step 5

step 6

Part 2

In pictures Step 7 & Step 8 we used a pair of 2” hand breaks right on the mark to bend the back lip up slightly. Notice in picture Step 8 we only needed to bend the back lip up this far. Now we take and line the gutter sections up like in picture Step 10. In picture Step 11 The gutter section on the left is going to be overlapped into the gutter section on the right. In picture Step 12 we rotate at the bead the gutter section on the left until we are able to slide the two front beads into each other. Once we are overlapped at the bead we want to line the gutter section on the left up to the mark we made on the top of the front of the bead of the gutter we are overlapping into. Once lined up at the bead we can rotate the gutter down inside of the other gutter section and lock the back lips together (see pictures Step 13& Step 14). Make sure you are lined up on all of our marks, and make any adjustments if necessary. Now we can rivet the gutter sections together to hold them into position for soldering. In picture Step 15 we are showing the area (in-between the fingers) where we want to install the rivet on the front bead of the gutter. watertight, and also to make the seam stronger.

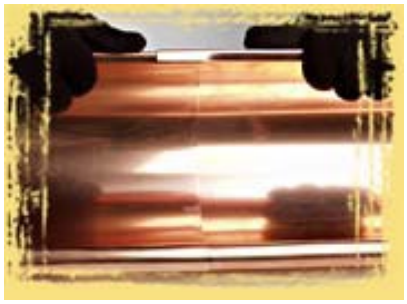
step 7 & 8

step 10

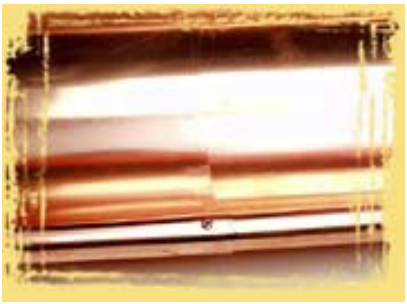
step 11

step 12

Part 2



step 13



step 17

step 14

step 18

step 15

step 19

step 16

step 20

Part 2

By putting the rivet here we are concealing the rivet so it will never be seen. In pictures Step 16, Step 17, and Step 18 we are installing the rivet in the front bead. In Picture Step 19 we are showing the underside of the gutter with just the one rivet installed, and if you notice we have a gap on the underside seam. We want to get rid of this gap before we drill for the other rivet on the back of the gutter. We take a pair of "C" clamps and first clamp onto the front of the gutter like picture Step 20 shows. Notice in picture Step 21 how we got rid of the gap on the front of the gutter just by using the one clamp. Picture Step 22shows by just using one clamp on the front now the back of the gutter is lower. This means our gutter has a tight fitting seam. In picture Step 23 we used another clamp on the back of the gutter. In pictures Step 24, Step 25, Step 26, & Step 27we installed the rivet on the back of the gutter. If we really wanted too we can take our hand breaks and bend the back overflow lip so it looks a little nicer as picture Step 28 is showing. Picture Step 29 shows the underside seam of the gutter section we just riveted together. Now the only thing left to do is to solder the gutter section together to make it

step 21

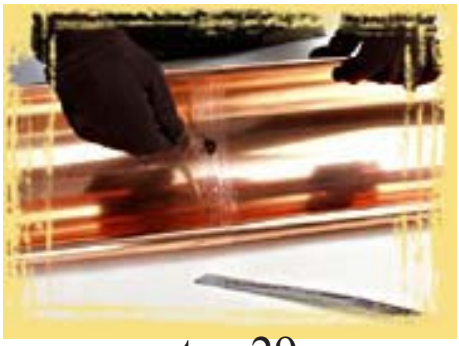
step 22

step 23

step 24

Part 2

step 25



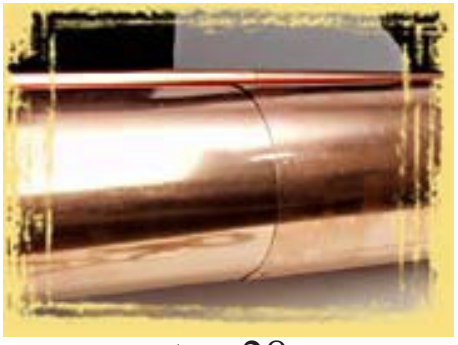
step 29

step 26

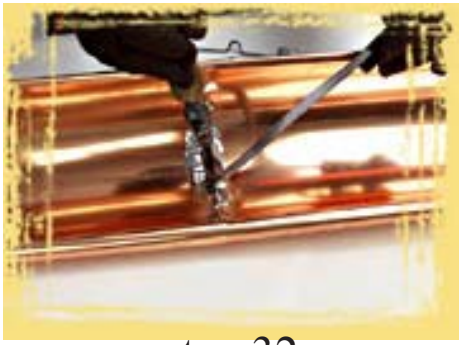
step 30

step 27

step 31



step 28



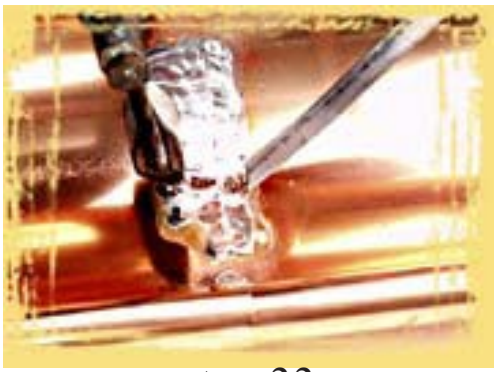
step 32

Part 3

Third part- flux and solder the gutter section seams together.

For our soldering installation demonstration we used a 3” overlap. No real reason why but just to do a 3” overlap, and we didn't use the "C" clamps. Picture Step 29 we are applying flux with a flux brush all the way around the inside of the gutter. We must apply flux to our seam, or the solder will not stick to the copper at all. If flux is not applied or gets dried out during soldering, then the solder will bead off like mercury. Simply apply or reapply some flux.

Pictures Step 30 through Step 37 we are soldering the copper gutter seam. If you are using a hand held torch to solder, then you will not need as many tack solder points 4 to 5 would do. Since we used a soldering iron as you can see in picture Step 31 we made many tack solder points. This many tack points is going to make our soldering job easier. In picture Step 30 a helpful hand was used to compress the metal together to get rid of a gap in the seam just until the craftsman who is soldering could tack solder that area. In pictures Step 32& Step 33 the craftsman is building up and filling in-between his tack points with solder.



step 33

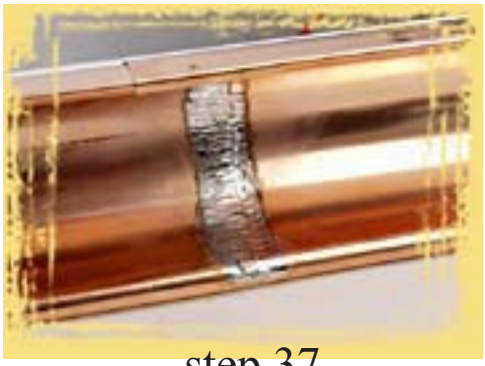
step 34

Part 3

When soldering copper gutter seams you will typically used more solder. Why? Because we want to make sure our soldered seam never leaks. It will end up helping us in the long run because with expansion contraction over time this type of seam will outperform any sweated type seam for sure. If you take notice in pictures Step 33 & Step 36 the craftsman is melting the solder with the tip of his soldering iron, and pulling the solder from the low side to the high side. By doing this his is actually pulling or drawing the solder into the overlapped seam. This is why the solder path is wider than any of the other solder seams you may have seen and/or read about in other parts of our installation manual. Solder will always flow to the highest temperature, and with the tip of the soldering iron being hotter than the surrounding copper the solder is sucked into the seam by doing this motion. Notice in picture Step 37the drag lines from the tip of the soldering iron, and also please note the clean, beautiful, and perfectly completed soldering job on the inside of the gutter.

step 35

step 36



step 37

There should be no solder that bleed through on the underside of the gutter. That absence of solder is just what we are looking for. This means we did a good job.