



**WORLD GUTTER SYSTEMS
INSTALLATION MANUAL**



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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 GUTTER



- * 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



Tools Required:

- * Tape Measure
- * Metal Scribe
- * Cutting Tools (this could consist of combination of many things such as-)
 - * Green and/or Red Tin Snips also Know 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 utility knife with a curved or “Hook Blade” as it’s known to help scrape off the burrs)
 - * Slate and Copper’s 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 $3/4''$, max overlap is what ever you want it to be. 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. The $70.5''$ is the dimension we need to cut one of our 10' gutter sections to. 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 do 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 (or want to buy or rent) 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 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 22 shows 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 27 we 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



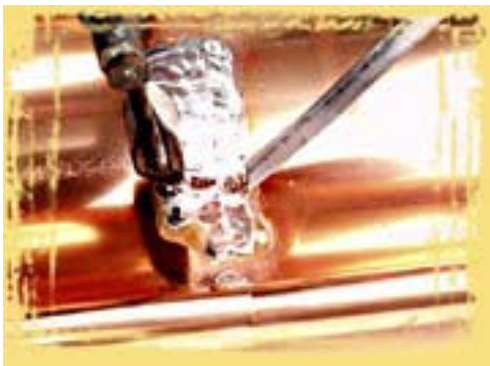
step 32

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

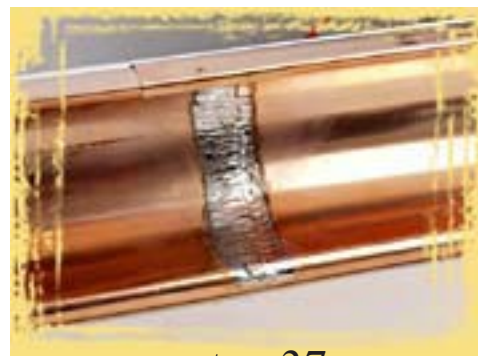
When soldering copper gutter seams you will typically use more solder. Why? Because we want to make sure our soldered seam never leaks. It will end up helping us in the long run because with expansion contraction over time this type of seam will outperform any sweated type seam for sure. If you take 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 he 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 37 the 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.

INSTALLING SPHERICAL END CAPS

Tools Required:

- * Green and/or Red Tin Snips also known as Left and Right Handed Tin Snips Respectively
- * 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



step 2



step 3



step 1



step 4

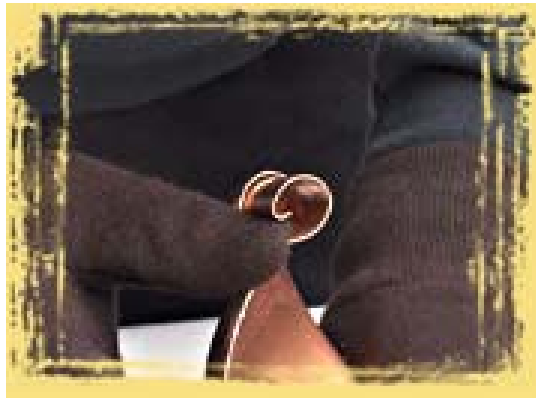
Spherical end caps are a universal end cap, and can be used on either end of the copper gutter.

PART 1

Installing the Spherical End Cap:

First part- straighten tabs of end caps

If you notice in picture Step 2 the tabs are curled in slightly. We need to straighten them out so the spherical end cap can fit onto the end of the gutter properly. In pictures Step 3, Step 4, Step 5, & Step 6 we used our finger to straighten the installation flange slightly.



step 5



step 6

PART 2

Second part- cutting the end cap to fit onto the end of the gutter.

In picture Step 7 we need to determine what side of the gutter we are installing the end cap onto, and what is the front and back side of the end cap.



step 7

Once we know what flange is going to be on the backside of the gutter we need to cut it. Picture Step 8 shows all the tools we need to be able to put our spherical and cap on. Just below picture Step 8 we show a pair of Vice Grip "C" Clamps a very useful tool for this installation. Take a pair of tin snips and cut about a 1/2" or so tab (see pictures Step 10 & Step 11). We made our cut at the top of the radius on the installation flange all the way back to the bead on the end cap.



step 8



step 9

Now make another cut as shown in pictures Step 12, Step 13, & Step 14 back to the bead on the end cap. Now cut the excess pieces off of the installation flange as shown in pictures Step 15, Step 16, & Step 17 till we have a tab that looks like in picture Step 18.



step 10

PART 2



step 11



step 15



step 12



step 16



step 13



step 17



step 14



step 18

PART 3

Third part- installing the end cap onto the end of the gutter.

Now that we have cut the installation flange and have our tab piece we can install the end cap onto the end of the gutter. In picture Step 19 we are lining up the spherical end cap to slide right onto the end of the gutter. The tab piece we cut needs to go on the outside of the back of the gutter. First start to slip the front installation flange into the front bead of the gutter (see picture Step 20). Continue to slide the spherical end cap onto the end of the gutter till it fits properly like in picture Step 21 & 22. Notice the soldering flange is on the inside of the gutter. We want to make sure the end cap is properly and securely fit onto the end of the gutter, so we used C clamps to hold the spherical into position for riveting. Pictures Step 23& Step 24 show the clamps on the gutter holding the spherical end cap into position.



step 20



step 21 & 22



step 23



step 19



step 24

PART 4

Fourth part- rivet end caps into place.

Now we have the end cap on the end of the gutter we can rivet it into place. First drill and rivet the front bead as shown in pictures Step 25, Step 26, & Step 27. Before we install the rivet on the back of the gutter we want to make sure the end cap is fitted onto the end of the way we want it (see picture Step 28). Now we can drill and put a rivet through the tab piece we cut earlier (see pictures Step 29, Step 30, Step 31, & Step 32). In picture Step 33 we show the spherical end cap installed onto the end of the gutter with 2 rivets. In pictures Step 33, Step 34 and Step 35 we show what the spherical end cap looks like once installed onto the end of the gutter. Notice that the spherical end cap sits a little bit below the back of the gutter, this is how it's supposed to fit onto the end of the gutter.



step 25



step 26

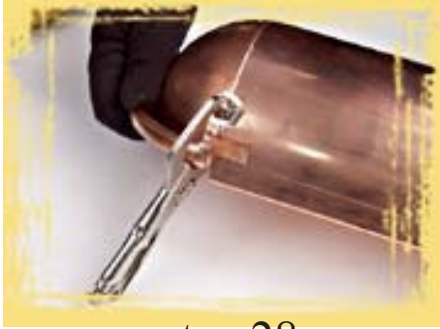


step 27

The reason for this is because once the gutter is installed into the gutter hangers the back of the gutter actually set's a little bit higher than the front of the gutter. Why? Because if the gutter ever becomes so clogged with leaves or debris the water will spill over the front of the gutter (desired) and not the back.

Now that we have the spherical end cap installed and riveted, we can solder it to the gutter.

PART 4



step 28



step 32



step 29



step 33



step 30



step 34



step 31



step 35

PART 5

Fifth part- flux and solder the spherical end cap onto the gutter.

In picture Step 36 we are applying flux with a flux brush all the way around the inside of the gutter on the soldering flange of the end cap.

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.

In pictures Step 37, Step 38, Step 39, Step 40, Step 41, & Step 42 we are soldering the end cap into place. If you are using a hand held torch to solder, then you will not need as many tack solder points- 3 to 4 would do.

Since we used a soldering iron as you can see in picture Step 38 we made many tack solder points. This many tack points is going to make our soldering job easier.



step 36



step 37



step 38



step 39

PART 5



step 40

In picture Step 39, the craftsman shows his perfectly completed soldering job on the inside of the gutter.



step 41

In pictures Step 40, Step 41, and Step 42 we see a little bead of solder all the way around the end cap. That little bit of solder is just what we are looking for. This means we did a good job.



step 42

INSTALLING FLAT END CAPS

Tools Required:

- * Green and/or Red Tin Snips also Know as Left and Right Handed Tin Snips Respectively
- * 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



step 1



Slate and Copper's World Gutter System flat end caps come as a left end cap, or a right end cap. How do you determine what is a left or a right end cap? This is easy, if you are facing the front of the gutter (bead side) and the end is on the left, then it requires a left end cap. The end cap we are installing in picture Step 1 is a left end cap.

PART 1

First part- we need to trim the end of the gutter to get the flat end cap to fit properly.

Fit the end cap onto the end, and if you notice in picture Step 2 the back of the end cap is going to run into the back of the gutter. We need to know where this point is, so we can trim it off to get the end cap to fit on properly. Pictures Step 3, Step 4, & Step 5 show one way we can notch the end of the gutter, with basically two straight cuts. Another way we can notch the back of the gutter is at an angle, like picture Step 10 shows.



step 3



step 4



step 2



step 5

PART 2



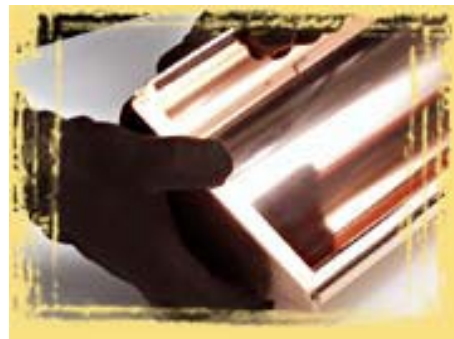
step 6



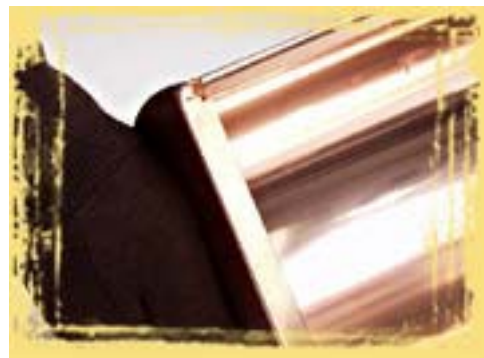
step 7

Second part- fit the end cap onto the end of the gutter.

It is a little easier if you fit the end cap onto the front bead first, then push the back of the gutter in slightly to get the end cap on (see pictures Step 6, Step 7, & Step 8). Picture Step 9 shows what the inside of the gutter looks like after the flat end cap is put on. Now we can solder in into place.



step 8

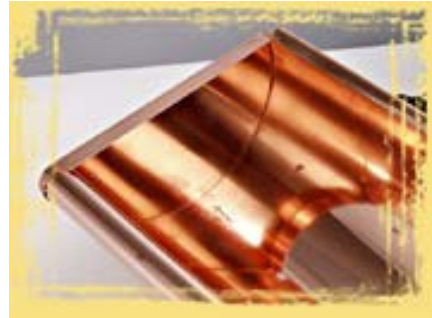


step 9

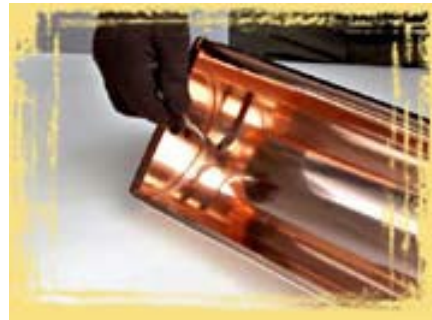
PART 3

Third step; flux and solder the flat end cap onto the gutter.

In picture Step 11 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. In pictures Step 12, Step 13, Step 14, & Step 15 we are soldering the end cap into place. If you are using a hand held torch to solder, then you will not need as many tack solder points 3 to 4 would do. Since we used a soldering iron as you can see in picture Step 13 we made many tack solder points. This many tack points is going to make our soldering job easier. In pictures Step 14 & Step 15 the craftsman is filling in-between his tack points with solder on the back half of the end cap. In picture Step 16, the craftsman shows his perfectly completed soldering job on the inside of the gutter. In pictures Step 17, Step 18, & Step 20 we see a little bead of solder all the way around the end cap. That little bit of solder is just what we are looking for. This means we did a good job.



step 10



step 11



step 12

PART 3



step 13



step 17



step 14



step 18



step 15



step 19



step 16



step 20

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.

INSTALLING STAR DROP OUTLET

Tools Required:

- * Cord or Cordless Drill (3/8" size drill is perfect)
- * Large Drill Bit for Drill (at least 1/2" bit)
- * Cutout Template for the Hole (use a compass to make a circle)
- * Something to Trace Around Template (sharpie pen works)
- * Green and/or Red Tin Snips also Know as Left and Right Handed Tin Snips Respectively
- * Pair of Pliers (just about any kind, but larger vice-grips will work better)



step 1

In picture Step 1 we show all the basic tools and materials needed for installation of a Star Drop Outlet. As you will see in our demonstration the basic installation of the Star Drop Outlet requires no riveting or soldering.



step 2



step 3



step 4

PART 1

First part- installing outlet onto gutter

First thing is first, lets see how the Star Outlet is actually installed onto the gutter. On the front of the Star Outlet there is a lip, and this lip is designed to interlock into the front bead of the gutter (see pictures Step 2& Step 3). Once the Star Outlet is hooked onto the gutter at the bead rotate the piece into proper position (picture Step 4).

The next step is to bend down the tabs on the back of the Star Outlet down into the back of the gutter (pictures Step 5, Step 6, Step 7, & Step 8).

The last step secures the Star Outlet to the gutter. Picture Step 9 shows how the Star Outlet is contoured to the bottom profile of the gutter once installed.



step 5



step 6



step 7



step 8



step 9

PART 1

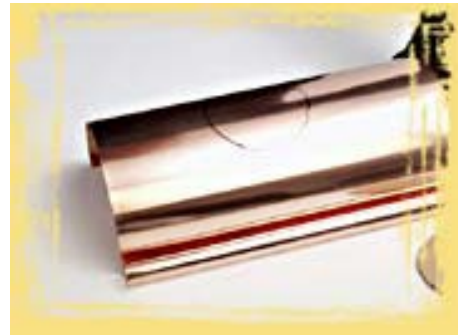
Now that we have our tools, and we know how the Star Outlet fits onto the gutter we can get ready to install our Star Drop Outlet.

First we must determine where we want to install our Star Drop Outlet on our gutter. For this demonstration we are installing our Star Outlet near the end of the gutter, since this is where most outlets end up being. After we know where our outlet is going, then we can get to the installing it.

You must make a template proportional to the size pipe you are using, and the best tool for this is a compass. If you are using 3" Downspout you need to make a 2 1/2" circle template. If you are using a 4" downspout you need to make a 3 1/2" circle. Turn the gutter upside down and center the template over the center of the bottom of the gutter, then use something to trace around the template (picture Step 10& Step 11).



step 10



step 11



step 12



step 13

PART 1

Next take the drill with the large drill bit, and drill a hole in the center of the traced out circle (picture Step 12).

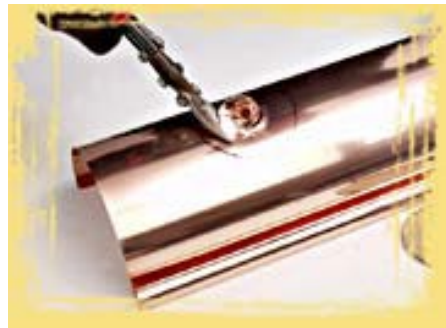
Then take a pair of tin snips (we used Red Tin Snips) and cut in spiral circles till you cut to the traced out line (see pictures Step 13, Step 14, Step 15, Step 16, & Step 17).

Now we need to bend down a 1/4" to 1/2" lip or flange with the pliers all the way around the hole (see pictures Step 18, Step 19, Step 20, & Step 21). We can now install our Star Drop Outlet over the center of the hole (Step 22& Step 23).

Lastly we can install the Heavy Duty Wire Strainer in our freshly cut hole (pictures Step 24& Step 25).



step 14



step 15



step 16



step 17

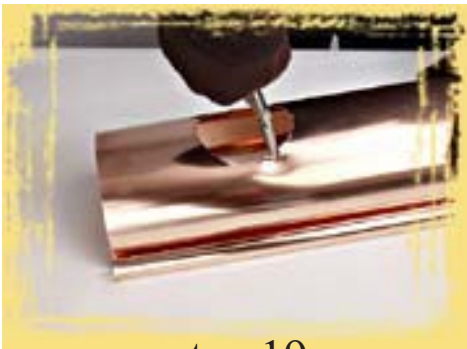
PART 1



step 18



step 22



step 19



step 23



step 20



step 24



step 21



step 25

INSTALLING PLAIN DROP OUTLET

Tools Required:

- * Cord or Cordless Drill (3/8" size drill is perfect)
- * Large Drill Bit for Drill (at least 1/2" bit)
- * Something to trace around the inside of plain drop outlet (sharpie pen works)
- * Green and/or Red Tin Snips also Know as Left and Right Handed Tin Snips Respectively
- * 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



step 1

The plain cup style drop outlet is used for water drainage from the gutter. The plain drop outlet is installed directly into the bottom of the gutter with solder. The outlet sticks out of the bottom of the gutter, and is used if the star outlet is not. The plain drop outlet can certainly be used inside of the star outlet, and a true craftsman would most likely do so.

Before we can begin to install the plain cup style drop outlet we must first determine where we want to install our drop outlet on the gutter. For this demonstration we are installing the plain drop outlet near the end of the gutter, since this is where most outlets end up being.

PART 1, 2 & 3

First part- Positioning outlet

Turn the gutter upside down, and position the cup outlet over the center of the bottom of the gutter (see picture Step 2). Now take a metal scribe or sharpie pen and trace on the inside of the cup outlet all the way around the outlet (see pictures Step 3 & Step 4).



step 2

Second part- Drill

Take the drill with the large drill bit and drill a hole in the center of the traced out circle (see picture Step 5).



step 3

Third part- Cutting outlet hole

Take a pair of tin snips (we used Red Tin Snips) and cut in spiral circles till you cut to the traced out line (see pictures Step 6, Step 7, & Step 8). Remember when cutting the hole, it is easier to cut a little bit off, but it is much harder to add it back on. We want to make as good and as clean of a cut as we possibly can. The drop cup outlet is meant to be as tight fitting as possible.



step 4



step 5

PART 4

Fourth part- Take and fit the plain cup style outlet inside of the hole (see pictures Step 9& Step 10).

We may need to trim a little bit of metal off around the hole to get the drop outlet to fit properly. After fitting the drop cup outlet into the hole if needed; you can take a hammer and tap all the way around the soldering flange on the inside of the gutter to get the soldering flange to fit a little better. Once the hole is cut and the plain drop outlet fit's the way we want it, we are done with this step.



step 8



step 9



step 6



step 10



step 7



step 11

PART 5

Fifth part- After the plain cup style drop outlet fits properly we can flux and solder the outlet into place.

In picture Step 11 we are applying flux with a flux brush all the way around the soldering flange. 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.

In pictures Step 12 & Step 13 we are soldering the outlet into place. If you are using a hand held torch to solder, then you will not need as many tack solder points 3 to 4 would do. Since we used a soldering iron as you can see in picture Step 12 we made many tack solder points. This many tack points is going to make our soldering job easier.

In picture Step 13 the craftsman is filling in-between his tack points with solder. In pictures Step 15 & Step 16, the craftsman shows his perfectly completed soldering job.



step 12



step 13



step 14

PART 5

And because he took his time and trimmed and re-trimmed a few times to get the drop outlet to fit perfectly, as you can see in picture Step 14 no solder bleeds down onto the drop outlet.

But trust me, there are a few areas around that drop outlet where the solder is peaking through, and this is not a bad thing. That little bit of solder is just what we are looking for. This means we did a good job.



step 15



step 16



step 17

INSTALLING DOWNSPOUT

Tools Required:

- * Tape Measure
- * Metal Scribe
- * Cutting Tool- this could consist of combinations of many things (and here are two)
 - * 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 utility knife with a curved or “Hook Blade” as it’s known to help scrape off the burrs)
 - * Slate and Copper’s Gutter Cutting Blade (gives you that factory cut every time, effortlessly).

Tools Required if Riveting the Downspout together:

- * Cord or Cordless Drill (3/8” size drill is perfect)
- * 1/8” Drill Bit for Drill
- * Pop Rivet Gun
- * 1/8” Diameter Copper Rivets



Slate and Copper’s Plain Round Seamless Downspout sections are very easy to install. How you ask? Because much like the elbows the downspout is flanged on one end, so they slide right into each other making installation easier.



PART 1

Part 1-joining two pieces of downspout

Picture step 1 shows the two pieces of downspout we are joining together, but it wouldn't matter if they were longer pieces it's just as easy. Simply line the downspout up, and insert it into each other (pictures Step 2 & Step 3). The only thing left to do is to put a rivet on each side of the downspout to lock the two pieces together. You do not need to solder the seam since there is sufficient overlap. If you wanted to make the pipe a solid one piece unit by soldering it together, then you certainly could if you wanted to. We also recommend lining up the welded seams on any overlapped downspout sections so they are facing the wall, making it the back of the downspout.



step 1

In reality cutting a downspout to length, and/or joining two downspouts together to make a taller downspout is a little more involved. Firstly; we have the easy issue, the overlap of downspout into another downspout, or downspout into a downspout connector consideration to account for on tall downspouts.

PART 1

Depending on what size downspout is being used, and whether you are joining into the top flange of the downspout, or into a downspout connector into a small cut section of downspout, they each have different overlap dimensions and you need to know them. So keep this in mind when measuring, and before you cut any downspout to length. To figure the overlap do the following; securely slide the bottom of the downspout into a downspout connector, or the flanged end on the top of a piece of downspout, and make a mark on the side of the downspout where the two pieces join together. When making a mark on the side of the downspout make it small but visible, and use a metal scribe or a nail will work for this too. Secondly; unless you are fortunate enough to always be using two top sections of downspout (flanged ends) every time to join together to make taller downspouts, then the smaller cut section of downspout will need to have a downspout connector installed at some point.



step 2

For example; if we have two downspout locations (11' and 15') that are taller than one 10' section of downspout we need to cut one piece of downspout to use as a short section to join into the full piece of downspout to make our taller downspout. As long as the two locations equal less than or right around 30' we would use 3 full pieces of downspout total, 2 full pieces, and the third to make our two cut sections. One of our cut sections of pipe will be utilized for its top flange. For the other cut section we will need a downspout connector to be able to join it into the bottom of a full downspout piece.

PART 1

A few last things to take into consideration before cutting the downspout to length; are you draining the bottom of the downspout onto the ground, are you draining the bottom of the downspout into a drainage pipe, or are you using an inline cleanout at the bottom of the downspout. If you are draining the bottom of the downspout onto the ground, then you have a little more freedom with the measurement. Remember, an elbow is typically installed at the bottom of the downspout to kick the water away from the building. If you are draining into an underground drainage pipe at the bottom of the downspout, then you will need to account for a couple of inches of overlap down into the drainage pipe sticking up out of the ground. If you are using an inline cleanout at the bottom of the downspout, then you need to take those overlap measurements into consideration as well. One last thing to remember before cutting the downspout to length; it is easier to cut a little bit off, but it is much harder to add it back on. The natural overlap of the pieces into each other allows for a little bit of play or movement if needed.

To be able to correctly measure for the height of the downspout we need to have our downspout brackets installed and our elbow offset built. Why? Because in order to figure out our elbow offset we need to know what our distances and measurements are. In order to build the elbow offset we need to know how far off the wall the downspout is going to be, and how far up or down the wall our elbow offset is going to put us.



step 3

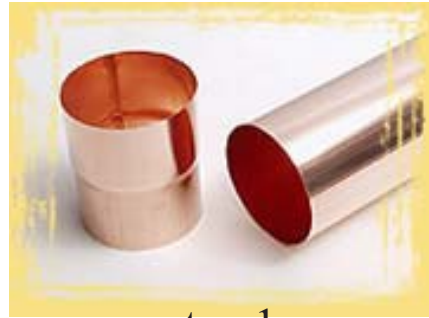
INSTALLING DOWNSPOUT CONNECTOR

Tools Required:

* Downspout Crimping Tool also known as just a crimping tool

If Riveting the Downspout Connector onto the Downspout:

- * Cord or Cordless Drill (3/8" size drill is perfect)
- * 1/8" Drill Bit for Drill
- * Pop Rivet Gun
- * 1/8" Diameter Copper Rivets



step 1



step 2

The downspout connector replicates the top flange on a full piece of downspout. The flared out flange at the top of Slate and Copper's plain round seamless downspout makes it easier to join another piece of downspout and/or an elbow into it. The downspout connector is used when you are trying to join two cut sections of downspout together, and neither of the pieces have a flanged end. The most common use of the downspout connector is when you need to cut small sections of downspout for in-between elbows to get back to the wall on eave depths greater than the elbows put together (see Step 1).

Downspout connector installation is fairly straight forward, and in the future it will be even easier. This piece requires no crimping if being installed into a piece of 18 ounce or less copper downspout. But because Slate and Copper stocks all 20.44 ounce copper downspout, the downspout connector needs to be crimped in one place on the piece to get it to slide down inside of a cut end of a piece of downspout. Slate and Copper is working to have this piece modified so this crimping process is eliminated.

PART 1

Take a standard downspout crimping tool and in one place on the piece, not right on the seam, make a crimp (see pictures Step 2, Step 3, Step 4, & Step 5). You want to make a crimp on the skinnier side of the piece, because this is the end that will slide down inside of the downspout. After making the crimp insert the downspout connector into a cut end of a piece of downspout (see pictures Step 6 & Step 7). Insert the downspout connector in as far as it will go, it may or may not slide all the way down inside of the cut end of the downspout, depending on how large of a crimping tool you used on the DS connector. Not to worry; you can rivet it on either side of the downspout, and use it as is, if you really wanted to, but the correct thing to do would be one of the following. Either use a hammer to tap the downspout connector into place, or use the downspout as a hammer to drive the downspout connector into place. If you have a hammer and a couple pieces of scrap wood handy, then you can do the following.



step 3

Take a scrap piece of plywood, cardboard, or carpet for padding on the ground; also find a scrap 2 X 4, position the downspout upright so the bottom is on the bottom padding, and the DS connector is on top, lay the 2 X 4 across the top of the downspout connector, now take the hammer and knock the top of 2 X 4 to drive the downspout connector down in as far as it will go. When the downspout connector is driven all the way down into position it should look like picture Step 8.

PART 1

Depending on how big the piece of downspout is you are trying to put the downspout connector into, you can also turn the piece of downspout upside down, so the downspout connector is facing the ground, and use the ground to pound the downspout connector up into the downspout. If you are doing it this way, then you will need a hard ground surface and a scrap piece of wood, cardboard, or carpet for padding on the ground. Once the downspout connector is slid all the way into position (see picture Step 8), then you can rivet the downspout connector on either side of the downspout to fully secure the two pieces together. Because the downspout connector is such a tight fitting piece you do not need to rivet it to the downspout if you do not want to.



step 4



step 5



step 6



step 7



step 8

INSTALLING DOWNSPOUT BRACKETS

Tools Required:

- * Cord or Cordless Drill (3/8" or 1/2" size drill)
- * Drill Bit for Drill
- * Vice Grips or Crescent Wrench
- * Level



step 1



step 2

The downspout bracket is used to hold the downspout to the wall. The downspout bracket is a two piece part (see picture Step 1); a bolt screw which goes into the wall, and a hinged collar piece that attaches to the end of the bolt screw. The hinged collar piece is the actual downspout bracket. The bolt screw goes into the wall and is threaded on one end so the collar piece of the bracket can be screwed onto it. The shank (non threaded portion) of the bolt screw is right around 3/8" in diameter, and the overall length of the bolt screw is about 4 1/2". About 3/8" of that overall length is the threaded end of the bolt screw, so the collar piece can be screwed onto it. The collar piece is hinged on one side, and the other side has a eyelet screw to tighten the bracket together (see pictures Step 2, Step 3 & Step 4). On the back of the downspout bracket it has a threaded hole, so the downspout bracket can screw onto the threaded end of the bolt screw (see pictures Step 1 & Step 5).

PART 1

There are many different ways to install the downspout bracket depending on the type of application (wood, stucco, or masonry). We will break down a few general guidelines depending on the type of application. But before we do, just some things you should know first. With this type of downspout bracket the back of the downspout can be held off the wall anywhere from; pretty much flush, to about 3" max off of the wall. You will need to determine what kind of spacing you want behind the downspout before installation can begin. We recommend a happy medium 3/4" to 1 1/2" off the wall is perfect. When hanging a piece of downspout it is best to use 2 downspout brackets for a downspout that is 10' to 15' tall. On shorter downspouts just one downspout bracket can be used just as well as two. On taller downspouts more downspout hangers will be needed depending on the overall height of the downspout. Typically, a 20' to 25' tall downspout can use 3 downspout hangers. No matter how tall the downspout is, place the downspout brackets equally spaced from the top and bottom on the downspout. Uniformity and consistency will visually look the best.



step 3

Anywhere from 1' to 4' spacing from the top and bottom of the downspout is perfect on downspout bracket location, and the spacing is all dependent on the overall height of the downspout. Once the bolt screw and downspout bracket is installed into the wall; It would be beneficial and helpful to build the elbow offset at the top of the downspout first, so a more exact measurement of the height of the downspout can be made.

PART 1

The bolt screw portion of the downspout bracket does not need to be used if you can't or don't want to. You can buy a stainless steel screw and plastic anchor to fasten the downspout bracket to the wall. If you are going this route, then the screw you buy needs to be long enough and small enough to fit through the threaded hole on the back of the downspout bracket collar piece, and into the wall. This method can be used with just about any type of application.



step 4



step 5

A couple of useful tips; first tip, before you drill your holes in the wall make sure the holes are going to be lined up vertically with a level. Install a couple of downspout brackets with the bolt screws onto a piece of downspout in the approximate location where they need to be. Hold the downspout in place on the wall, now take a level and make sure the downspout is straight up and down and not past vertical. Once vertical is found make a couple of marks on the wall where the downspout brackets are. Second tip, is for drilling into the wall to anchor the bolt screw. On your drill bit make a mark with a black sharpie pen to the depth you want your hole to be. You can also use a piece of tape to wrap around the drill bit to set a depth.

PART 1

Wood Application:

If using the downspout bracket into a wood surface, then you will need to drill a hole into the wood, so the downspout bracket can be hung. First determine where on the downspout the hangers need to go, and how far off the wall you want to be. You will need a drill bit slightly smaller than the bolt screw going into the wall (about 1/4" bit). Reason; if the hole is too big, then a filler or anchor of some sort is needed for the bolt screw. On a wood application we can simply use the bolt screw to fasten right into the wood after a hole is drilled. Once the hole is drilled into the wall, fasten the bolt screw into the hole using vice grips or a crescent wrench to the desired depth. Then fasten the collar to the bolt screw. A small bead of caulk can be put around the bolt screw to make the hole more watertight.

Stucco and Masonry Applications:

For applications where no wood is present to fasten into behind the stucco or masonry, then one of the following applications can be used. If you can find a plastic anchor to fit the bolt screw, then you can use the anchor in the hole in the wall, and fasten the bolt screw into the anchor. Another alternative, find a drill bit and wooden dowel rod that are the same diameter (1/2" drill bit and dowel rod, or even a 3/4" drill bit and dowel rod will do). Take the drill with the drill bit, and drill the hole/s into the wall where they need to be, make sure to ream out the hole slightly so the dowel rod can fit into the hole. Take the wooden dowel and cut it to length to the depth of your hole. Insert the dowel rod into the hole in the wall, and pre-drill a 1/4" hole into the center of the wooden dowel rod. Once this is all done fasten the bolt screw into the hole using vice grips or a crescent wrench to the desired depth. Then fasten the collar to the bolt screw. A small bead of caulk can be put around the bolt screw to make the hole more watertight.

INSTALLING INLINE CLEANOUT

Tools Required:

- * Tape Measure
- * Metal Scribe

Tools Required for Riveting the ILCO to the Downspout:

- * Cord or Cordless Drill (3/8" size drill is perfect)
- * 1/8" Drill Bit for Drill
- * Pop Rivet Gun
- * 1/8" Diameter Copper Rivets

The installation of the inline cleanout is one of the easiest pieces to install. In picture Step 2 we show a small downspout section and the ILCO. The top of the cleanout is flanged, like the top of the downspout, to make it very easy to slide a downspout section of any length into it (see picture Step 3). Picture Step 4 shows the inline cleanout installed at the bottom of a downspout section. The only thing left to do, is to put two rivets on each side of the ILCO to secure the cleanout to the downspout.



step 1

The inline cleanout (ILCO) is used as a leaf and debris catcher, and helps keep most of the leaves and debris from entering into the underground drainage system. The ILCO can be installed anywhere inline with the downspout as an easy access clean out bin. Typically, they are installed at/ or near the bottom of the downspout because this is one of the easiest access points to open the trap door (see picture Step 1).

PART 1

Four things to keep in mind when installing this piece:

1. Before cutting the downspout to length make sure to account for the correct height of the ILCO. Since we are basically replacing a piece of downspout with the inline cleanout.

2. Make sure to account for the overlap of the downspout into the ILCO. To do this: securely slide the ILCO onto the bottom of a piece of downspout, and make a mark on the downspout where the two pieces join together see arrow in picture Step 4Arrow. When making the mark on the downspout use a metal scribe, a nail will work for this too. Make the mark small but visible in a inconspicuous place on the downspout near the welded seam since the welded seam should be the back of the pipe anyway. Take the ILCO off the downspout and measure from the bottom of the downspout to the mark. What ever that measurement is you will need to add that number to the downspout before you cut the downspout to length.



step 2



step 3

PART 1

3. Make sure to account for the overlap at the bottom of the ILCO down into your drainage pipe coming up out of the ground. Typically, newer underground drainage systems are a PVC material, and there is a pipe that comes up out of the ground so a downspout pipe can be slid down inside of it for drainage. Normally, downspout can either be slid down inside the PVC pipe a couple of inches, or a cap piece can be put over the pipe and a hole is drilled into the cap piece so the downspout or ILCO can slid down inside of the cap piece. If you notice at the bottom of the ILCO there is a ring, and this ring is designed to slide down into and rest on top of a capped piece of pipe. Provided of course, a hole the size of the downspout is drilled or cut out of the cap, so a pipe or ILCO can slide down inside of it.

4. Before you secure the ILCO to the downspout with rivets, install the ILCO in such a way so the trap door can be open completely for cleaning out the debris. Keep in mind any landscaping that may conceal any drainage pipes sticking up out of the ground and/or future overgrowth of the landscaping preventing you from opening the ILCO fully.



step 4



step 5



