



Euracraft Copper Gutter System

Installation Information

Product Selection and Site Preparation

HANGER SELECTION GUTTER

In deciding which hanger style is most acceptable, please consider such things as appearance, expected life, ice loading, size of gutter, material and expansion. When fascia board is less than 2" thick, the hanger fasteners must be driven into the rafter ends. In areas subject to snow slide, coordinate the front edge elevation of the gutter with the extended roofline. Snowguards should also be used in areas where snow and ice could be a factor.

RECOMMENDED GUTTER HANGER SPACING

Gutter hangers should be spaced at a maximum of 24" on center. In areas where ice and snow are long lasting, hanger spacing should be reduced to 18" on center, and snowguards should be installed.

RECOMMENDED GUTTER PITCH AND POSITION ON THE EAVE

There are two factors that go into determining gutter position on the eave, the pitch of the gutter and the roof slope. Gutter pitch of 1/16" or greater per foot allows for proper drainage. The minimum pitch should be ¼" in every 10'. If possible, gutters should be placed below the extended roofline so that snow and ice can slide clear. Steeper pitches require less clearance. Berger snow guards should be used to protect the gutter from avalanching slides. Contact Berger for snow guard details and recommended layout at 800-523-8852.

Fascia Hangers

Tools Required:

- Tape measure
- Cordless screwdriver/cordless drill
- Chalk line

First Step: To ensure that the hangers are straight and pitched properly, snap a chalk line on the fascia. Drop the line ¼" for every ten feet on the side the downspout will be placed.

Second Step: Install the hangers no more than 2' apart on center using brass screws. Try to screw into the rafter boards wherever possible.

Third Step: After the gutter is placed in the hangers, fold the front and back tabs down inside the gutter to hold it in place.



Roof Hangers

Tools Required:

- Protractor
- Hanger bending tool
- Cordless screwdriver/cordless drill

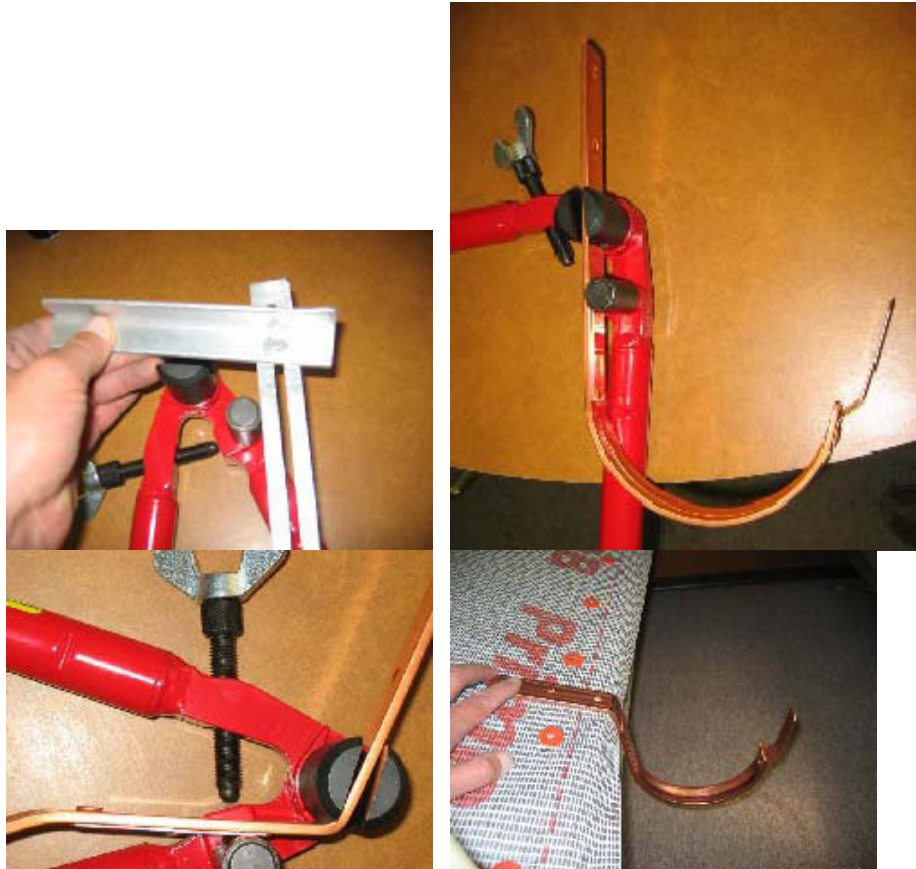
First step: Use the protractor to find the pitch of the roof. Set the hanger bending tool to match this angle.

Second step: On the high side of the gutter, mark the hanger where the bend should go. Bend the hanger using the hanger bending tool. Bend all of the hangers in the same fashion, keeping in mind that each hanger will hang a little lower as it pitches toward the downspout.

Third step: Install the hangers a maximum of 2' on center using brass screws.

Fourth step: After the gutter is placed in the hangers, fold the front and back tabs down inside the gutter to hold it in place.





Gutter/Miter Installation

Tools Required:

- Tape measure
- Metal scribe
- Locking c clamps
- Soldering equipment
- Hand brakes or pliers

First Step: Determine how much overlap you will have and mark the bottom gutter. Minimum overlap should be 1", and there is no maximum. If the overlap gets to be too much, though, it is harder to work with and does not look as good. Mark the gutter with the scribe on the front bead and the back lip to help line things up. The bottom gutter is determined by the way the water flows, the water should flow from the higher gutter to the lower gutter.



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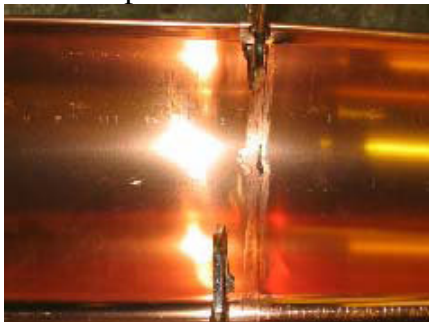


Second step: Using a hand brake or pliers, bend the back lip slightly, only as far the mark that was made. The top gutter will slip under this lip.

Third step: Slide the beads together, with the top gutter going over top of the bottom gutter. Slide these to the mark, and then rotate the sections together until the back lip of the top gutter fits under the lip of the bottom gutter. The hand brakes can be used to bend the back lips together.



Fourth step: There will almost certainly be a gap at the front of the gutter. A locking c-clamp will easily close this gap. The seam can now be fluxed and soldered using standard soldering techniques. Be sure to hold the majority of the iron over the overlap in order to draw as much solder as possible into the seam. Clean the seam after soldering.



Riveting is a good option to hold the gutter together while soldering. One rivet should be put into the front bead, and a second rivet can be put in the back, just under the back lip. Rivets should be a 3/16" diameter. Make sure the copper rivets you use have solid copper, bronze, or brass pins, and not a copper, bronze, or brass coated steel pins. If you do use copper rivets with the steel coated pins, then the pins will eventually rust out and can potentially cause leaks depending on where the rivets are used.



The miter and gutter lock together exactly the same way.



Installation of the Spherical End Caps

Tools Required:

- Tin Snips
- Soldering Equipment and Flux (do not use the pre-tinning flux)

Optional:

- Locking c clamps
- Pop rivet gun
- 1/8" diameter copper rivets (tinnings rivets)
- Drill
- 1/8" drill bit

First Step: Spherical end caps can be used on both ends of the copper gutter. Notice the tabs are curled in slightly. Straighten them out so the spherical end cap can fit onto the end of the gutter properly. Use a finger to straighten the installation flange slightly.

Second step: The end cap must be cut to properly fit onto the gutter. Determine what side of the gutter the end cap will be installed on, and what is the front and back side of the end cap. The flange on the back side of the gutter will need to be cut. Take a pair of tin snips and cut a 1/2" tab. Make the cut at the top of the radius on the installation flange all the way back to the bead on the end cap. Now cut the excess off of the installation flange.

Third step: The end cap can now be installed onto the gutter. The cut tab piece 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. Slide the end cap onto the end of the gutter till it fits properly. Notice the soldering flange is on the inside of the gutter. Make sure the end cap is properly and securely fit onto the end of the gutter, so use locking c clamps to hold the end cap into position for soldering or riveting.



Notice that the end cap sits slightly below the back of the gutter. This is a proper fit. Once installed into the hangers, the back of the gutter will be higher than the front. 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.

If not riveting move on to step 5.

Fourth step (optional): Now the end cap can be riveted into place. First drill and rivet the front bead as shown in pictures 11, 12, and 13. Now drill and put a rivet through the tab piece that was cut earlier.

Note:

Make sure the copper rivets you use have solid copper, bronze, or brass pins, and not a copper, bronze, or brass coated steel pins. If you do use copper rivets with the steel coated pins, then the pins will eventually rust out and can potentially cause leaks depending on where the rivets are used.

Fifth step: flux and solder the spherical end cap onto the gutter using standard soldering procedures.





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Last Rev - 05-11-07
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Flat End Caps

Tools Required:

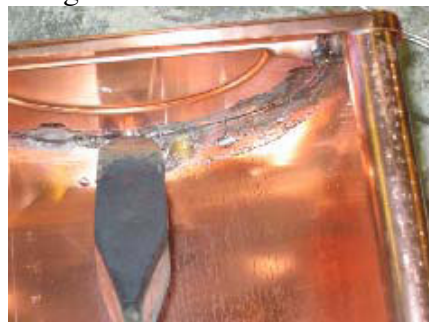
- Tin snips
- Soldering equipment

First Step: Fit the end cap onto the gutter. Euracraft flat end caps are not universal and come in a right and left style. It may be necessary to fit the front of the end cap over the bead first and squeeze the gutter together in order to get the back on.

Second Step: There may be some interference from the back lip on the gutter when fitting the end cap. If this is the case, a small section of the lip must be trimmed off, approximately $\frac{1}{4}$ ". This can easily be done with the tin snips.



Third Step: Once the end cap is properly fit onto the gutter, flux and solder the seam following proper soldering procedures. Be sure to fill the gap in the seam. Clean the excess flux off of the seam after soldering.





Gutter Outlet (solder type)

Tools required:

- Scribe or marker
- Tin snips
- Soldering equipment
- Hammer

First step: Mark where the outlet will be placed. Turn the gutter over, center the outlet with the gutter, and scribe a line on the inside of the outlet all the way around.

Second Step: Use tin snips to cut out the hole, and then check the fit. It will probably be necessary to trim the hole, possibly several times before the outlet fits into place. Be cautious and patient, a tight fit is preferred.

Third Step: After the outlet fits into place, use a hammer to lightly tap the soldering flange to get a tighter fit.

Fourth Step: Flux around the flange and solder using standard soldering procedures.



Plug In Outlet (no solder required)

Tools Required:

- Tin snips
- Template



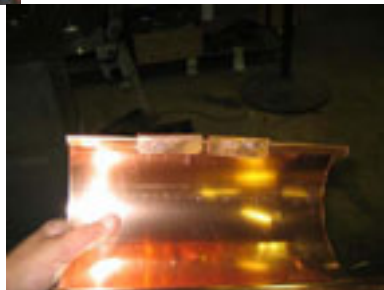
- Scribe
- Pliers or vice-grips

First Step: Cut the hole where the outlet will be installed. The size of the hole is determined by the size of the downspout you are using. The hole must be approximately ½ inch smaller than the downspout. A compass can be useful in creating a template. The hole should be centered on the bottom of the gutter.

Second Step: Cut out the hole using tin snips.

Third Step: Pliers are then used to bend down a ¼” to ½” lip around the hole.

Fourth Step: The outlet can now be installed. The lip on the front of the outlet locks into the front bead of the gutter. After the outlet is attached to the bead it gets rotated into its proper position. The two tabs on the back of the outlet then get bent down to hold the outlet in place.



Note:

The outlet has a clip that will help hold the downspout in place. This seam still needs to be sealed the same way every other seam in the downspout is sealed.



Downspout

Tools required:

- Soldering equipment or sealant
- Pipe expander
- Drill
- 1/4" drill bit



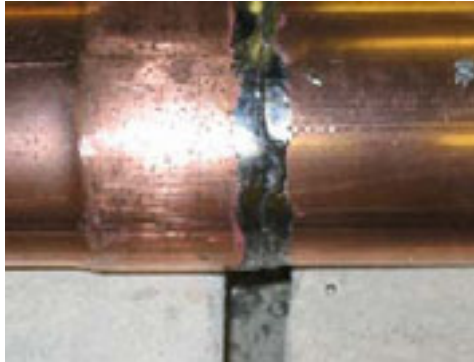
First Step: Examine the pieces of downspout to be installed and make sure that they are expanded to fit together. If previously cut pieces are being used, and neither end is expanded, then there are two methods of fitting the pieces together. A pipe expander can be used to expand one end, or a downspout connector can be used to fit the pieces together.



In order to use a pipe expander, use a drill capable of 600-1200 rpm. Work the expander into the pipe **very** slowly.



Second Step: It is necessary to either solder or seal all of the joints, including the downspout connectors. When soldering, flux the seam and hold as much of the iron over the overlap in order to draw as much solder as possible into the seam. Clean the seam after soldering to remove excess flux.



If a sealant is used, be aware that the joints may require maintenance at some point just as an unsoldered system would. Sealant should be kept inside of the overlap, and any excess sealant should be cleaned off since a contaminated area will not weather uniformly.

Elbows and rainwater pipe cleanouts fit into the downspout and are sealed the same way. The rainwater pipe cleanout is already expanded at the top, and it is important to make sure it is positioned in such a way that the trap door can open fully.

It is recommended that the downspout be secured at every joint, or 24 inches from both ends if the run is over 30 feet or in a severe wind environment.

When installing the brackets, a 1/4" starter hole should be drilled whether using a bracket with a screw or a spike.

BASIC SOLDERING TERMS AND TECHNIQUES

The successful application of soldering requires several elements that include properly tinned coppers, application and type of flux, properly blended solder, type of soldering tip, correctly heated coppers, properly prepared metal surface free of oxidation and the skill of the person applying the solder.

Common Terms

Solder – Any of various fusible alloys, usually made of tin and lead, used to join metallic parts.

Soldering – Joining or uniting of two or more pieces of metal by means of an alloy, usually tin and lead, having a lower melting point than the pieces being joined.

Soldering Coppers – An instrument for soldering, consisting of a bit or bolt of copper having a pointed or wedge shaped end, and furnished with a handle. Soldering Coppers can have various shapes for different kinds of work.

Tinning – Covering the point of a soldering copper or other surface with solder.

Flux – A substance applied to a surface to be joined by welding, soldering or brazing to facilitate the flowing of solder and prevent formation of oxides.



Sal Ammoniac – Another name for Ammonium Chloride (NH_4Cl), is a white crystalline compound used as a soldering flux.

Zinc Chloride – (ZnCl) A substance, also called cut or killed acid, which is unequalled as a flux when soldering galvanized steel, stainless steel and copper. It is colorless, odorless and corrosive; therefore it should be handled with care.

Muriatic Acid – The commercial grade of Hydrochloric Acid (HCl), also called raw acid, which is used for making Zinc Chloride, used as a flux and for cleaning dirty parts of metal before they are soldered. It is colorless, has a sharp pungent odor and is corrosive; therefore it should be handled with care.

Rosin – The by-product of oil of turpentine that is a common, non-corrosive type of flux for soldering copper. Rosin is usually found in powder or paste form.

Oxide – A compound that is formed on the surface of a metal due to a reaction with the oxygen in the air.



Safety

There are several safety issues to be aware of when soldering. The fumes should not be inhaled, so solder in well-ventilated areas, and use an exhaust fan and even a respirator in a poorly vented area. Solder contains lead, so wear gloves and thoroughly wash your hands after soldering. Finally, soldering is done at very high temperatures, so wear safety glasses, solder on a fire resistant surface, and be careful of where the iron is set down.

Preparation

Filing and Tinning Soldering Coppers

Unless the soldering copper is properly tinned, a good soldering job is impossible. Tinning keeps scale and corrosion from forming on the soldering copper point that acts as insulation, allows the solder to flow properly from the point to the metal, and keeps dirt and scale out of both the solder and the seam.

For best results, use a 50% Tin – 50% Lead solder.



1. Using a grinder, remove pits and old tinning. The grinder can also be used to shape the copper.
2. Reheat the copper enough to melt the solder. Apply a small portion of solder to the tip and rub the tip lightly back and forth on a block of Sal Ammoniac. If the solder does not adhere to the point, it is because the soldering copper is not hot enough. Do not inhale the white smoke that should rise from the Sal Ammoniac block. It is a toxic gas and should not be breathed.
3. The solder copper should be neither overheated nor under heated during the tinning operation. If the copper is too hot, the tin will burn off as fast as it is applied. If it is too cold, the solder will not adhere to the copper.

Clean All Surfaces of Oxides, Dirt, Grease, and Other Foreign Matter

Unless the metal that is being soldered is clean, neither the solder nor the flux will adhere to the surface if the metal.

Applying the Soldering Flux

Applying the flux is important. Carelessness in its application will ruin the entire solder procedure.

1. Liquid Fluxes are applied with a small brush. Dip the brush and spread it lightly on the area to be soldered. Do not apply flux anywhere except where the soldering is to be done.
2. Powdered flux, such as rosin may be sprinkled onto the surface to be soldered or it can be melted on to the metal with a hot copper. Do not apply flux anywhere except where the soldering is to be done.
3. Flux will absorb moisture, which weakens its capability. Be sure to use fresh flux that has not been diluted.

Soldering



Position of the Soldering Copper

The position of the soldering copper is important as it is applied to the parent metal because it heats the metal to the melting point of solder and it keeps the solder in a liquid state while soldering. Seam soldering involves running a layer of solder along the edges of a joint. Seam joints should be soldered on the inside whenever possible. The best method to use for this process is soldering coppers, because they provide better control of heat and cause less distortion.

1. It is important that as much of the point of the copper is resting on the metal as possible to allow maximum heat transfer from the tip to the metal. Most of the heat is in the body and the base of the point of the soldering copper – not in the tip.
2. Since melted solders flow to the hottest point of the metal, have the base of the soldering copper in contact with the area in which the solder is to flow. When soldering a seam, allow the soldering copper to heat the seam itself so solder will flow into the seam for a watertight seal.
3. When you use a corrosive flux, clean the joint by rinsing it with water and then brushing or wiping it with a clean, damp cloth.