

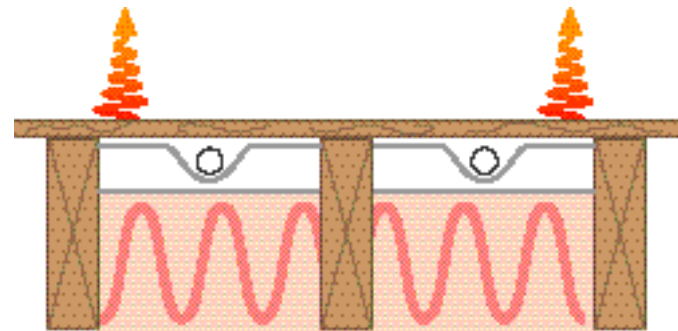
WITHIN JOISTS INSTALLATION

260

Joists

When tubing is placed beneath a joisted floor system, it is weaved between the joists and supported by aluminum heat distribution plates.

Plastic heat exchanger tubing is run within the floor joist cavity. Heat emission plates are formed around the tube and used to support the tubing and distribute heat into the floor in an efficient manner. Foil faced insulation is placed underneath the tubes and fins to reflect heat upward.



PLAN THE INSTALLATION – Make a layout and decide how many circuits you should have in each zone based upon minimum and maximum circuit lengths. (Radiantec can help you in person or over the telephone, 1-800-451-7593)

For hints, refer to Radiantec's [LAYOUT SUPPLEMENT](#).



Radiantec Company provides a worksheet with design recommendations that comes with each price quotation. Check with Radiantec if you make changes to our recommendations because any changes could affect the size of the pump required.

Here are some of the “tricks of the trade” that will help the work go easier.

1. Run the tubing when the joists are as unobstructed as possible, before the other trades do their work and before cross bridging is installed. Work from below whenever possible. Push and pull at the same time. If you pull too hard on the pipe without pushing, you will get a kink. Have someone feed the tubing to you. Work with the tubing at room temperature. Tie a rope around the coil to keep it together.

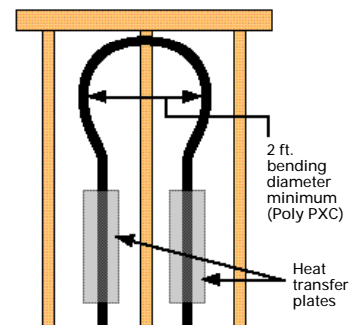


2. Do not try to work with a length of tubing that is unnecessarily long. Anything longer than 200 ft. will become more difficult as the tubing must pass through more holes. If the work becomes too difficult because there are too many holes and joists, cut the tubing and start again. Couple the tubing ends together later.

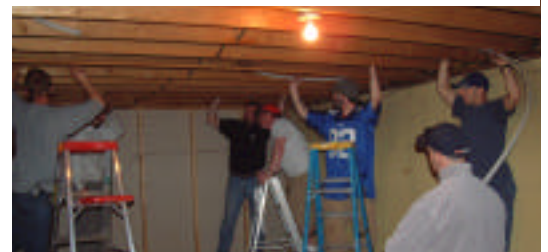


3. Tape the open end of the pipe to keep out sawdust and dirt.

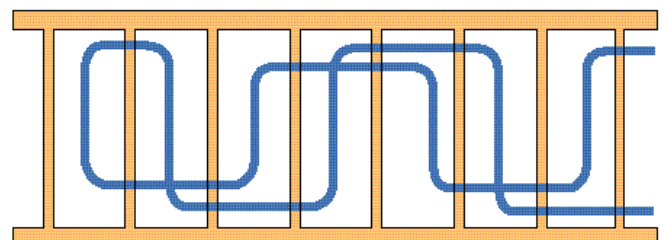
4. Each tubing has a minimum bending diameter and if you try to make a sharper bend, you are likely to get kinks. Smaller diameter tubes can make sharper turns but they put out less heat and have higher costs. In general, work with the largest tube you can.



5. The more workers, the easier the work will proceed. It is ideal to have one person at each point where the tubing turns. For do it yourself projects, it is a good excuse for a party.



6. Consider skipping every other joist space, and then, at the end of the building, turn around and come back through the joists that you missed. The advantages are that the turns will be wider and that there is no need to run a return pipe.



PLACEMENT OF THE ALUMINUM DISTRIBUTION PLATES

The aluminum plates carry heat away from the heat exchanger tubing and transfer heat to the floor above. It is common to place aluminum plates on straight runs only and not to put plates where the tubing bends between the joists.

SPACING OF THE ALUMINUM PLATES

Put up one aluminum plate and then skip approximately 8" – 10" , leaving the tubing uncovered. If more heat output is needed, run the aluminum plates continuously. Use continuous aluminum coverage in bathrooms, under wall-to-wall carpets, and in high heat loss areas.



Staggered spacing

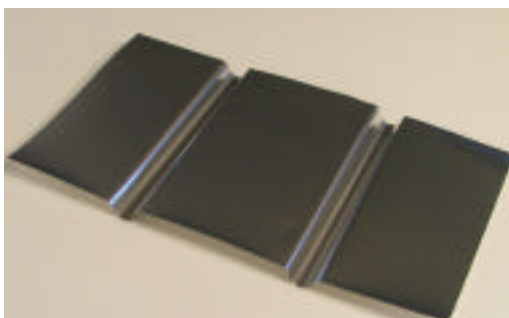


Continuous coverage

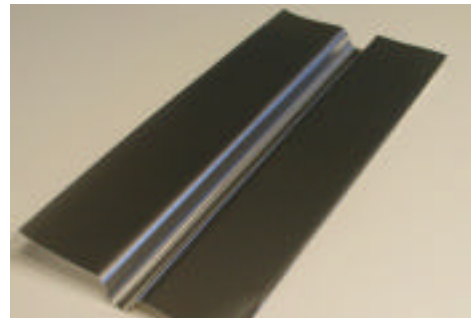


Two tubes per joist, 1/2" PEX

Aluminum heat emission plates come pre formed for your convenience. They are similar in thickness to premium quality flashing, but they are pure aluminum and undergo an additional heat-treating process to make them soft, like lead.



Preformed aluminum plate for two tubes.
(8 inches x 14.5 inches)



Preformed aluminum plate for one tube.
(7 inches x 16 inches)

Flat aluminum stock (not pre formed) is available for custom projects, and comes in 8" x 16" pieces.

Aluminum plate modified on site

If you are concerned about nails coming down from the flooring installation above,

- use shorter nails and glue
- do the flooring before installing the tubing
- consider one of the special laminated floors like Pergo, or
- modify the aluminum plate on site so that the tubing hangs down lower.



When the aluminum plate is slipped over the tubing, it should be stapled to the underside of the subfloor with 12 staples. An electric staple gun is highly recommended (about \$25). Heavy-duty staples are not needed. Staple length is 1/4"

Be sure to wear hearing and eye protection! Be aware that the plates have sharp edges.

MANIFOLDS

The purpose of the tubing is to allow water (or another fluid) to pass through it and lose heat as it goes along. This heat is received by the floor, and the floor heats the building. Circuit lengths should be neither too long nor too short. If the circuit length is too long, there will be a tendency for the water to lose too much heat before it reaches the end of the tube. The result is tubing at the end of the circuit exposed to water that has already lost much of its heat and the tubing is then "loafing". The circuit length for 1/2" tubing should be no longer than 300 ft. The circuit length for 7/8" tubing should be no longer than 400 ft. Accordingly, any area larger than 300 square ft. will have two or more circuits if using 1/2" PEX.



Short manifold

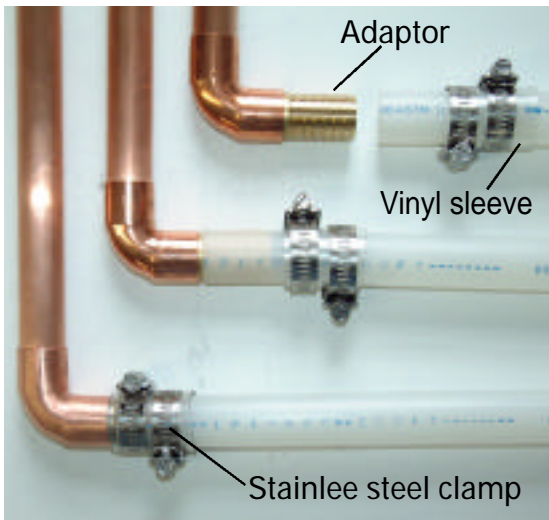
The manifold is the place where the heating fluid branches off from one pipe into two or more circuits. It is constructed on site using fittings supplied by Radiantec. The manifold may be very compact, or it could run the length of the building. Radiantec does not supply pre-assembled manifolds because they are all different and they lend themselves more to construction on site.



Long manifold

When the fluid branches off, there should be a shut off valve installed so that air can be removed by controlling the fluid flow through each circuit. The shut off valve could also be used to balance the system if needed.

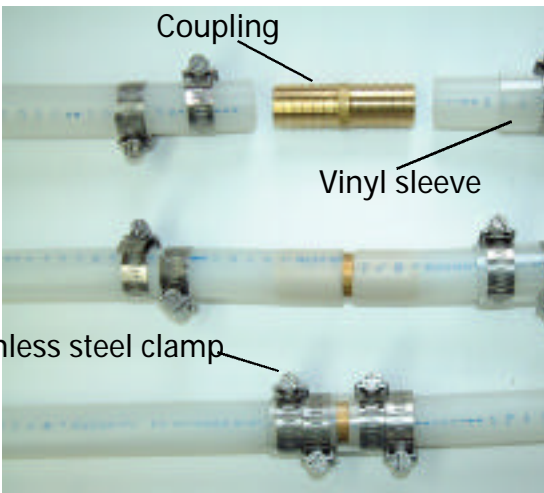
FITTINGS AND CONNECTIONS TO THE MANIFOLD



To make the connection to a manifold with 7/8" tubing, first slip the vinyl sleeve and stainless steel clamp over the end of the plastic tubing. Warm the tubing with a heat gun or boiling water to slightly soften it. Some workers will very carefully use a torch but we cannot recommend the practice.

Push the warmed plastic end onto the insert adaptor all the way to the shoulder of the fitting.

Bring the vinyl sleeve and the stainless steel clamp back down the plastic pipe to the serrated part of the adaptor and screw the clamps down tightly with the vinyl sleeve acting as a cushion.



Double clamp the fitting for an extra strong connection. Plan the connection so that the hubs are opposite each other.

If a coupling is used, be sure to double clamp each end and be sure to use the vinyl sleeve.

Do all soldering first. Do not solder close to the plastic fitting. After the heat has been turned on and the tubing is a little softer, it is good practice to go around and re-tighten the fittings.

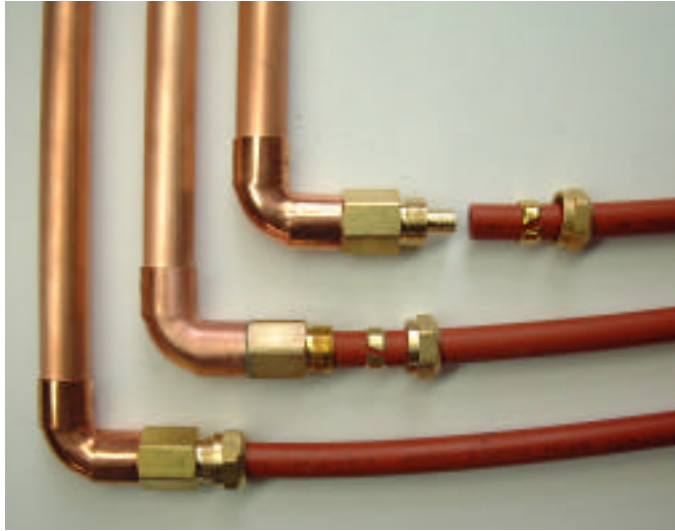
When drilling holes through floor joists, keep holes at least 2 inches down from the top of the joists and at least 2 inches away from any edge to avoid weakening the strength of the joist. If using engineered joists, be sure to follow manufacturers recommendations.

Recommended hole size for 7/8" tubing is 1 1/2 inch.

Recommended hole size for 1/2" tubing is 1 inch.

When using 1/2" PEX tubing, the fittings will be of the compression type.

Compression fittings



Slide the locking nut and split compression ring up the tubing.

Insert the tubing onto the compression fitting.

Tighten the nut onto the compression fitting snugly.

TOOL LIST

1. Right angle drill with appropriately sized bit.
2. Step ladders.
3. Hacksaw (to cut tubing).
4. Long tape measure
5. 5/16" nut driver.
6. Hearing and eye protection.
7. Heavy duty staple gun (1/4" regular type staples).
8. Heat gun.

Important notice - These design and installation suggestions are of a general nature and they are based upon our 25 years of experience. It is important to understand that every project is a little different. It is the role of the designer to incorporate all available information into the project. Radiantec makes no representation that these general suggestions are applicable to any particular project. Radiantec takes no responsibility for the design of any heating project. Radiantec makes no representation about the completeness of the information provided. It is important to comply with all building codes.



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