uponor

Quik Trak® Design and Installation Manual

For residential radiant heating in new construction, remodels, and retrofits

Quik Trak Design and Installation Manual
is published by

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Table of Contents

Uponor Quik Trak Overview

Uponor makes it easier to keep up with the demand for radiant heating with Quik Trak. This cost-effective, patented, wood-panel system is engineered for wood-frame construction and offers an alternative to joist heating and poured-floor underlayment installations. Only ½" thick, Quik Trak adds minimal height to floors.

Uponor's Quik Trak system provides fast, easy, and trouble-free installation of radiant heating in retrofit, remodeling, and new construction projects. The system incorporates 5/16" Wirsbo hePEX™ piping into the panel. Quik Trak panels are designed with a center groove that provides a tight fit for the 5/16" Wirsbo hePEX piping. In many installations, the low profile of the panels require only a ½" alteration of the finished floors, doors, and entryways.

Quik Trak is easily installed in many types of applications.

- Over a suspended wood subfloor
- Over an existing concrete slab
- In walls or ceilings

Installation Tools

- 12" power miter box, slide-cut saw, table saw or circular saw with ripping guide (use new or sharp carbide blade)
- Cordless or corded drill with several quality #2 Phillips bits and/or #2 square-drive bits and a ⅝" wood bit
- Jig saw or reciprocating saw and wood cutting blades
- Tape measure
- Square
- Hammer
- Rubber mallet
- ¾" wood chisel
- Chalk line
- Straight tin snips
- Shop vacuum
- Extension cord
- Safety glasses
- PEX piping cutter (E6081125, E6081128)
- Air compressor/air chuck for air testing and powering pneumatic tools
- 100% silicone sealant or Quik Trak sealant (E6050010) (recommended)
- Caulk gun for 10.1 oz. tubes
  Note: A pneumatic or cordless caulk gun work well for this application.
- Piping uncoiler (E6061000, E6062000) (recommended)
- Router with ½" cutting blade (recommended)

Figure 1: Quik Trak straight panel

Important! Take the time to carefully plan the layout of your Quik Trak design prior to installation. It will save you considerable labor costs on your first project.

Prepping the Panel Area

Ensure the subfloor is clean and free of movement and high spots.

Note: Since Quik Trak panels are considered an underlayment, the subfloor must be rated to carry the load of the structure without including the ½" Quik Trak panels. Make sure all areas that will not have panels (e.g., cabinets, built-ins) are marked or outlined.

Fill all areas that won't get panels with ½" plywood or other materials. These areas should be left open until the Quik Trak System goes down. This can easily be handled by the carpentry contractor or the radiant installer. Keep ½" plywood on hand for any custom piping adjustments that may happen due to field changes.

Figure 2: Quik Trak return panel

Quik Trak Calculations

Uponor LoopCAD software performs heat-loss calculations, guides the system designer through the radiant panel design, provides system requirements, and generates a material list. This powerful design tool also offers the contractor a host of business tools for a variety of job-management functions.

The calculation portion of LoopCAD prompts the user to input the piping type, the design differential temperature, and the specifics of floor construction. LoopCAD analyzes the information and calculates a supply water temperature and the amount of piping and number of panels for the room. The user assigns each room or area to a manifold. The program then calculates loop lengths, flow, and feet of head.

If you do not have LoopCAD, perform a room-by-room heat loss. From the heat loss information, divide the BTU/h load per room by the available net floor area (i.e., area that will have installed panels) to determine the BTU/h load per square foot of net floor space.

$$\frac{\text{BTU/h/room}}{\text{Net floor area (paneled)}} = \text{BTU/h/ft}^2$$

See the design worksheet in **Appendix B** for assistance.

When designing the system, Uponor recommends surface temperatures not exceed 80°F (26.7°C) for a solid wood floor and 87.5°F (30.8°C) for any other floor surface.

Note: If the BTU/h/ft² load exceeds the BTU/h output of the Quik Trak panels or recommended surface temperature, supplemental heat is required. Uponor LoopCAD will give you this information. You can deliver supplemental heat to a specific area by using radiant wall or ceiling, baseboard, radiators, or hot-water convectors.

Panel Calculations

To determine the number of straight and return panels, use the following formulas:

Net floor area x 0.386 = Number of straight panels (round up to the next whole number)

Net floor area x 0.043 = Number of return panels (round up to the next whole number)

Example

Given a 375-square-foot room, 375 x 0.386 = 145 straight panels needed; 375 x 0.043 = 16 return panels needed

Piping Calculations

To calculate the amount of piping needed, multiply the net floor area by 1.7. Divide the total amount of piping into equal lengths that are less than 250 ft. including the leader length for the loop. Leader length is the distance from the manifold to the room and back to the manifold plus the vertical distance from the floor to the manifold.

Note: The leader length is doubled to account for supply and return runs.

Example

Given a 375-square-foot room with a leader length of 15 ft. between the room and the manifold location, calculate the number of loops required and the average loop length.

375 square ft. x 1.7 = 638 linear ft.

638 ÷ 3 = 213 ft. average active loop length

15 ft. (leader length) x 2 = 30 ft.

213 + 30 = 243 ft. total loop length

The room will require 3 loops of 243 ft.

Refer to the design worksheet in **Appendix B** for guidance

Note: Do not exceed 250 ft. for the total loop length.

Figure 3: Installing Quik Trak straight panels

Installation Methods

Quik Trak Over a Wood Subfloor with Hardwood Floor Covering

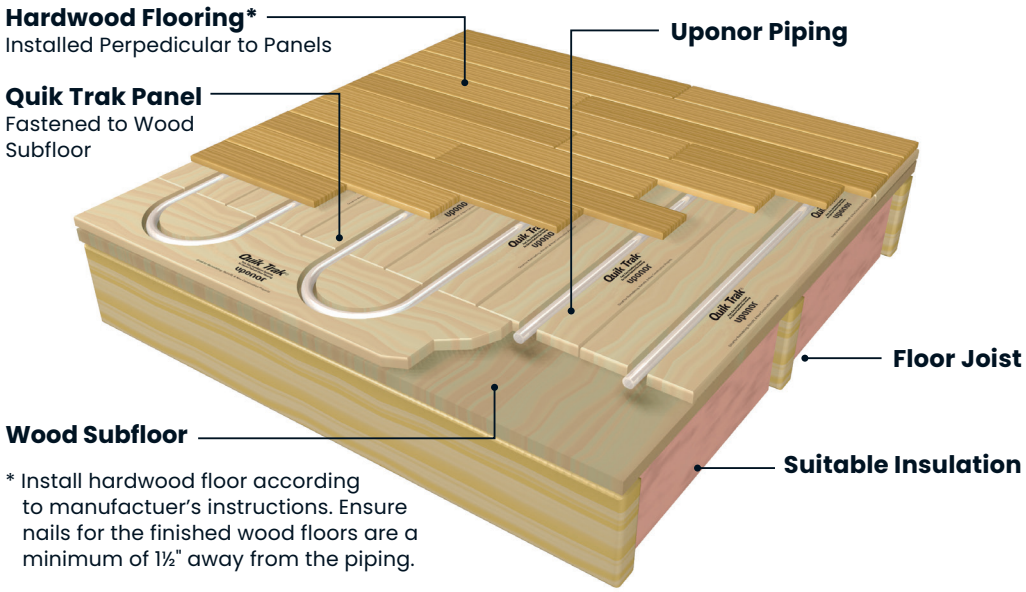

Figure 4: Quik Trak over a wood subfloor with hardwood floor covering

How — Lay Quik Trak panels over a plywood subfloor perpendicular to the finished wood floor. Make sure to stagger the seams of the Quik Trak.

Secure panels to the subfloor with 1¼" wood screws or 1" staples. To start, secure the middle of the panel with a screw or staple. Work from the middle to the ends, alternating from side to side.

After laying the panels, vacuum the debris from the panel grooves. Next, apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only. Do not apply the silicone sealant to the return panel grooves. The sealant in the straight panels acts as an adhesive agent and promotes good heat transfer from the piping to the panel.

Install the piping by stepping the piping into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the piping into the groove.

Where — This application is used in residential construction as an alternative to joist heating and poured-floor underlayment installations. Quik Trak is also beneficial when the finished floor material is hardwood. Installers can actually see the piping when installing the hardwood floor. This method offers several advantages, including minimal increase in floor height, no moisture from concrete, and increased BTU/h/ft^2 output potential over joist heating.

What to look for — Take special care when installing hardwood flooring over radiant floors. Please consult **Chapter 16 from the Complete Design Assistance Manual** (CDAM) for detailed wood floor information.

Always install hardwood floors in accordance with the flooring manufacturer's instructions. Ensure nails for the finished wood floor are a minimum of 1½ inches away from the piping.

Note: Do not exceed 80°F (26.7°C) for hardwood floor surface temperatures.

Proper insulation is critical to the performance of Quik Trak. A minimum of R-19 is recommended in between the floor joists beneath the floor.

In all Quik Trak applications, the maximum loop length for $^5/_{16}$" Wirsbo hePEX piping is 250 ft., including leader lengths. Flow rates for all Quik Trak installations are calculated to a 20°F (11.1°C) temperature differential.

Quik Trak Over a Wood Subfloor with Tile/Linoleum Floor Covering

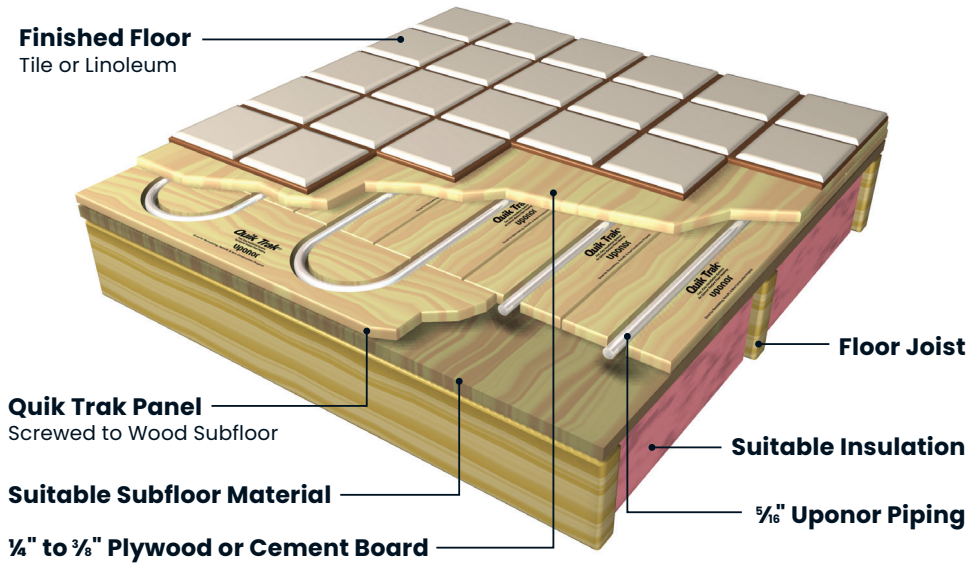

Figure 5: Quik Trak over a wood subfloor with tile/linoleum floor covering

How — Lay Quik Trak panels over a plywood subfloor perpendicular to the floor joists. Make sure to stagger the seams of the Quik Trak.

Secure panels to the subfloor with 1¼" wood screws or 1" staples. To start, secure the middle of the panel with a screw or staple. Work from the middle to the ends, alternating from side to side.

After laying the panels, vacuum the debris from the panel grooves. Next, apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only. Do not apply the silicone sealant to the return panel grooves. The sealant in the straight panels acts as an adhesive agent and promotes good heat transfer from the piping to the panel.

Install the piping by stepping the piping into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the piping into the groove.

Where — This application is used in residential construction as an alternative to joist heating and poured-floor underlayment installations. Quik Trak is also beneficial when the finished floor material is hardwood. Installers can actually see the piping when installing the hardwood floor. This method offers several advantages, including minimal increase in floor height, no moisture from concrete and increased BTU/h/ft^2 output potential over joist heating.

What to look for — Proper insulation is critical to the performance of Quik Trak. A minimum of R-19 is recommended in between the floor joists beneath the floor.

Note: Do not exceed 87.5°F (30.8°C) for tile and linoleum floor surface temperatures.

In all Quik Trak applications, the maximum loop length for 5/16" Wirsbo hePEX piping is 250 ft., including leader lengths. Flow rates for all Quik Trak installations are calculated to a 20°F (11.1°C) temperature differential.

Quik Trak Over a Wood Subfloor with Carpet Floor Covering

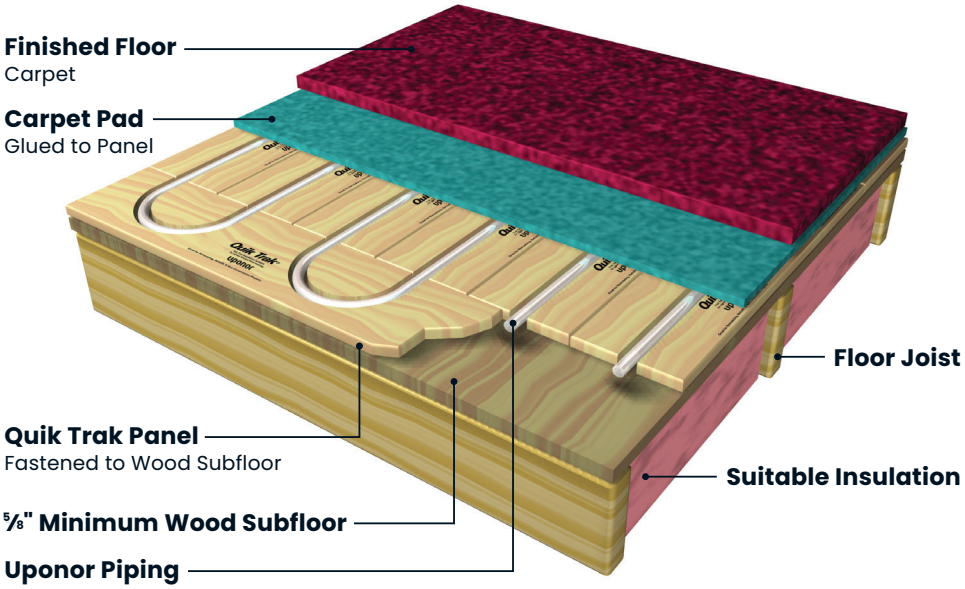

Figure 6: Quik Trak over a wood subfloor with carpet floor covering

How — Lay Quik Trak panels over a plywood subfloor perpendicular to the floor joists. Make sure to stagger the seams of the Quik Trak.

Note: For carpet installations, it is necessary to install 6" of plywood material around the perimeter of the room to allow space to install the tack strip and padding.

Secure panels to the subfloor with 1¼" wood screws or 1" staples. To start, secure the middle of the panel with a screw or staple. Work from the middle to the ends, alternating from side to side.

After laying the panels, vacuum the debris from the panel grooves. Next, apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only. Do not apply the silicone sealant to the return panel grooves. The sealant in the straight panels acts as an adhesive agent and promotes good heat transfer from the piping to the panel.

Install the piping by stepping the piping into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the piping into the groove.

Where — This application is used in residential construction as an alternative to joist heating and poured-floor underlayment installations. Quik Trak is also beneficial when the finished floor material is hardwood. Installers can actually see the piping when installing the hardwood floor. This method offers several advantages, including minimal increase in floor height, no moisture from concrete and increased BTU/h/ft^2 output potential over joist heating.

What to look for — Proper insulation is critical to the performance of Quik Trak. A minimum of R-19 is recommended in between the floor joists beneath the floor.

Note: Do not exceed 87.5°F (30.8°C) for carpeted floor surface temperatures.

In all Quik Trak applications, the maximum loop length for ⅝" Wirsbo hePEX piping is 250 ft., including leader lengths. Flow rates for all Quik Trak installations are calculated to a 20°F (11.1°C) temperature differential.

Quik Trak Over an Existing Concrete Slab

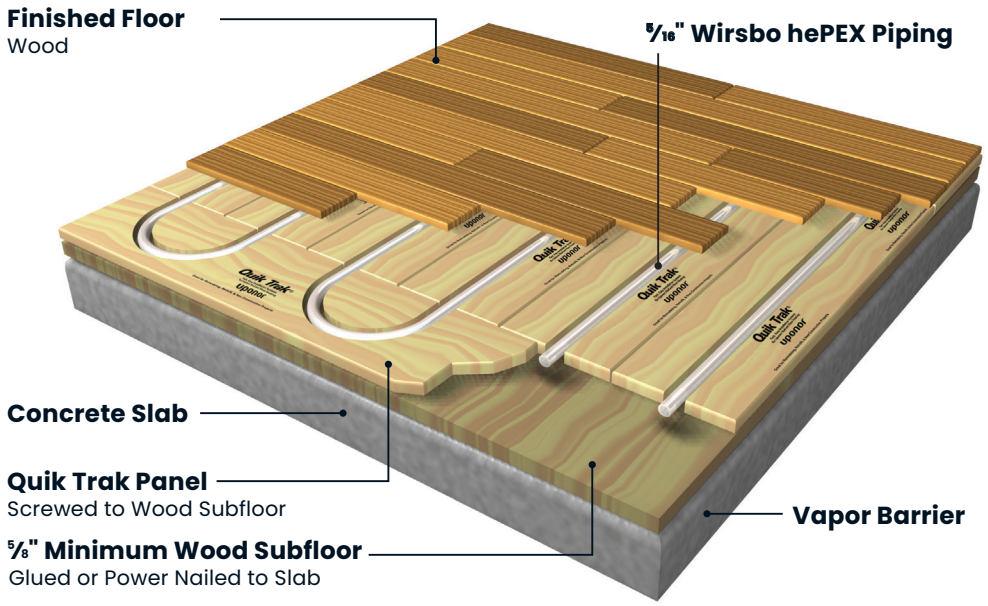

Figure 7: Quik Trak over an existing concrete slab

How — First, install a layer of ⅝" or ¾" plywood subfloor over the concrete slab. Glue or power-nail the plywood directly to the concrete if a vapor barrier is not required. If a vapor barrier is required, then power-nail the plywood to the concrete slab.

Lay Quik Trak panels over the plywood subfloor. Make sure to stagger the seams of the Quik Trak.

Secure the panels to the subfloor with 1" screws or 1" staples. To start, secure the middle of the panel with a screw or staple. Work from the middle to the ends, alternating from side to side.

After laying the panels, vacuum the debris from the panel grooves. Next, apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only. Do not apply the silicone sealant to the return panel grooves. The sealant in the straight panels acts as an adhesive agent and promotes good heat transfer from the piping to the panel.

Install the piping by stepping the piping into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the piping into the groove.

Where — This application is used in residential construction over existing concrete slabs. The plywood base together with the Quik Trak panel only adds 1⅛" to 1¼" in floor height. It is the ideal solution when retrofitting or remodeling a basement.

What to look for — A high water table will adversely affect the performance of this application. If there is moisture present that cannot be eliminated from the area, do not use this application.

Note: In a basement or walkout application, it is very important to install perimeter and edge insulation for proper design performance.

In all Quik Trak applications, the maximum loop length for 5/16" Wirsbo hePEX piping is 250 ft., including leader lengths. Flow rates for all Quik Trak installations are calculated to a 20°F (11.1°C) temperature differential.

Quik Trak Radiant Wall Installation

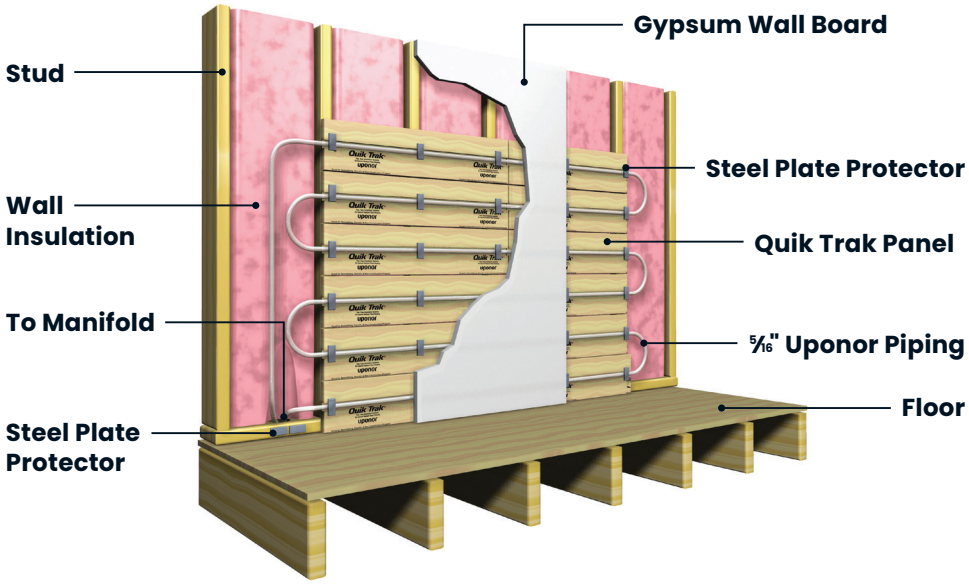

Figure 8: Quik Trak radiant wall installation

How — Starting at the floor level on the outside wall, install Quik Trak panels parallel to the floor at a maximum of six rows high (42") to avoid interference with window and picture placement. Fasten panels to the studs on both sides of the groove with 1" drywall screws. After installing the panels, attach ½" furring strips to the remainder of the stud wall, to provide an even base for the sheetrock.

To install the piping, drill two ⅝" holes in the footer plate opposite the piping return. Feed the supply through the ⅝" hole and attach to the supply manifold. Vacuum the grooves. Apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only. Do not apply the silicone sealant to the return panel grooves. Feed return to the second ⅝" hole and attach to the return manifold. Lastly, attach protector plates (strike plates) where the piping crosses the studs to protect the piping from puncture.

Where — Radiant wall installations are a low-cost alternative to radiant floor heating and are often installed when radiant floor is not viable. This method is routinely used in retrofit applications. In addition, radiant wall installations are most often used in supplemental heat situations when the radiant floor cannot satisfy the heat loss of a room under design conditions.

What to look for — Do not install piping in an area where pictures may be hung.

Ensure the supply loop feeds from the top of the panel and works its way to the bottom. This will help eliminate the possibility of air lock in the loop.

Install a minimum of R-19 insulation in the exterior wall behind the Quik Trak panels.

In all Quik Trak applications, the maximum loop length for 5/16" Wirsbo hePEX piping is 250 ft., including leader lengths. Flow rates for all Quik Trak installations are calculated to a 20°F (11.1°C) temperature differential.

Quik Trak Design and Installation

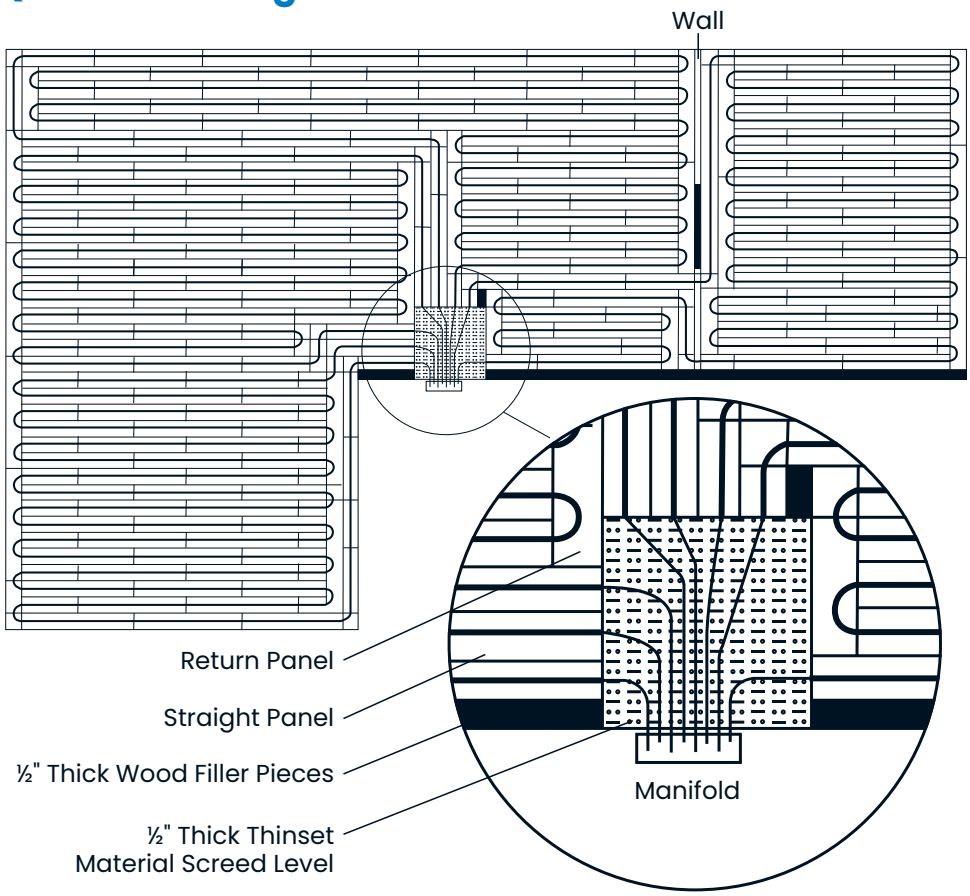

Figure 9: Quik Trak layout

Planning the Quik Trak Installation

In a concrete application, you can improve installation time by carefully planning the placement of manifolds and leaders. As shown above, the leaders must run above the floor.

To save time, draw the Quik Trak layout on a piece of paper before you begin the installation.

1. Split the areas that will have panels into even areas based on the number of loops. The number of loops can be determined by using the design worksheet in **Appendix B** or your Uponor LoopCAD program.
2. Select the manifold location.
3. For 7" panels, draw a 28" square in front of the manifold location. The manifold location is the area that will contain the tightly spaced piping running from the manifold to the panels. This area may be larger or smaller depending upon the number of loops.
4. To begin the panel installation, measure the distance from the outside wall back to the manifold wall. Divide by 0.583 to determine the number of panel rows needed. Any remaining areas less than the width of a panel can be filled with ½" plywood.
5. Place the panels that will be used for the leaders. Do not fasten them down at this time.
6. Place the straight and return panels to determine the overall placement.
7. When the panels are in place, fasten the panels using only two screws. This will allow for quick adjustments if needed. Once the layout has been completed, fasten panels with 10 screws.
8. Fill in any small areas that do not have panels with ½" plywood.
9. When installing the piping, use staples or U-shaped pipe fasteners to hold the piping down in the area in front of the manifold.
10. After connecting the piping to the manifold and pressure testing the system, fill in the square area in front of the manifold using ½" plywood (trimmed to fit) or a cement product that is screed to a level surface.

    Note: A combination is also possible. Fill the larger spaces with ½" plywood pieces and smaller areas with a thinset product. The type of finished flooring will dictate what method is appropriate.

Piping Layout When Running Piping Above the Floor

Carefully plan the Quik Trak layout before installation begins. A well-planned layout will result in equal loop lengths and minimal waste. Placement of the manifold is key to determining the layout. Manifolds can be placed either above or below the floor. Either location needs to be accessible by a service panel if the wall or ceiling below are finished.

Figures 10 and **11** show manifold location in the wall because the floor is inaccessible from below (e.g., over a concrete slab).

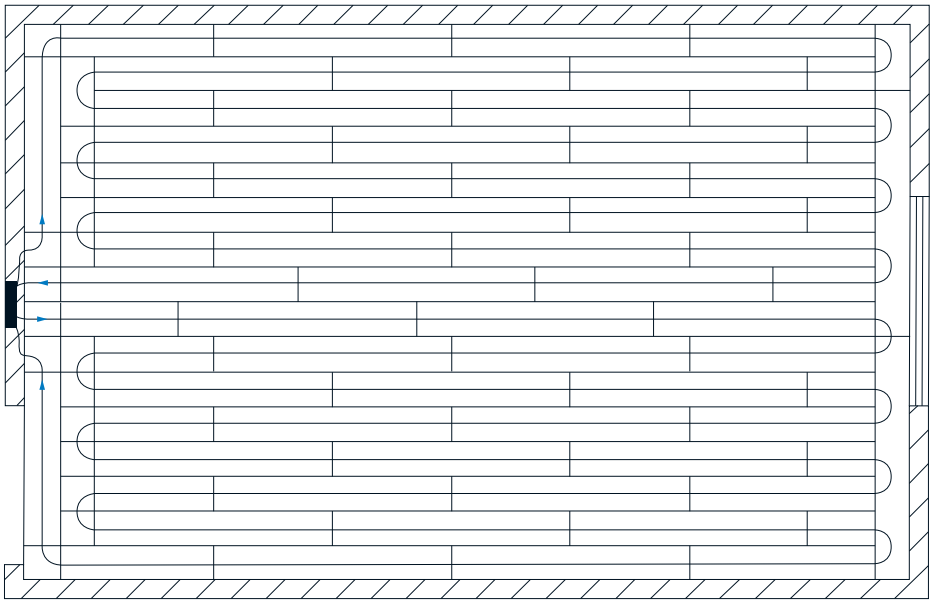

Figure 10: Manifold location in the wall

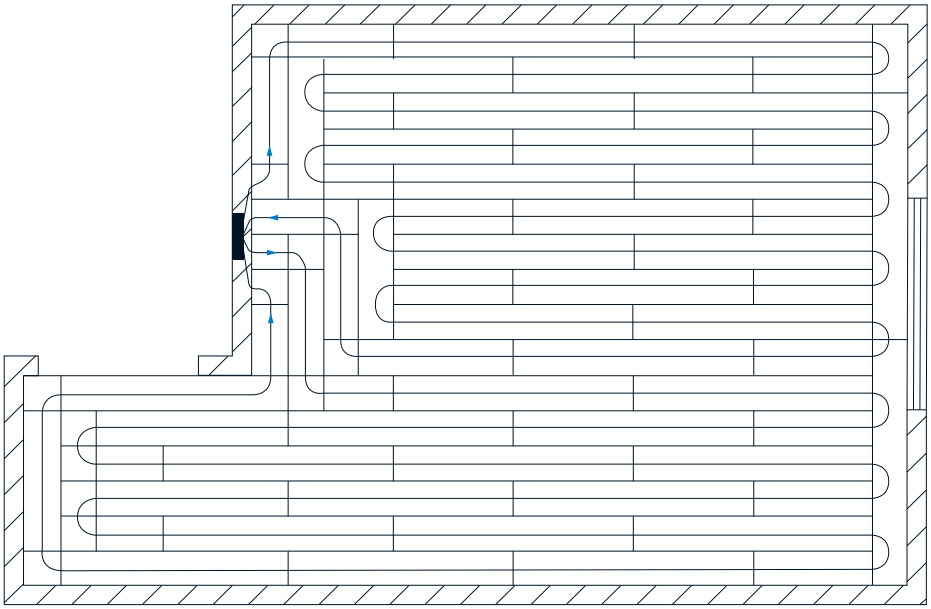

Figure 11: Manifold location in the wall

Piping Layout with Access From Below the Floor

Figures 12 and **13** show manifold locations in the joist cavity. The entire floor area is accessible.

The arrows illustrate the direction of water flow through the piping. The dotted lines represent the supply and return lines that are beneath the floor.

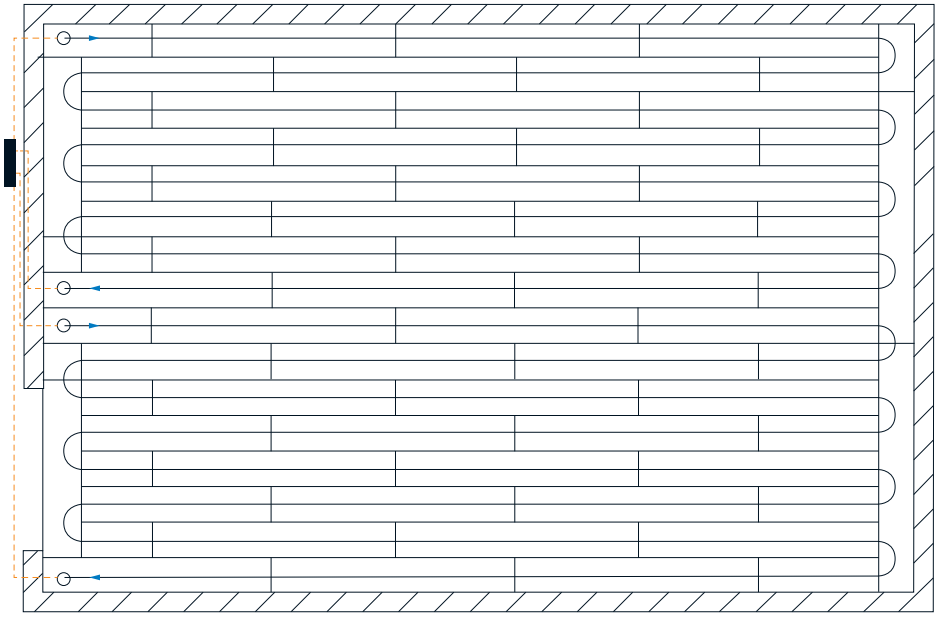

Figure 12: Manifold location in the joist cavity

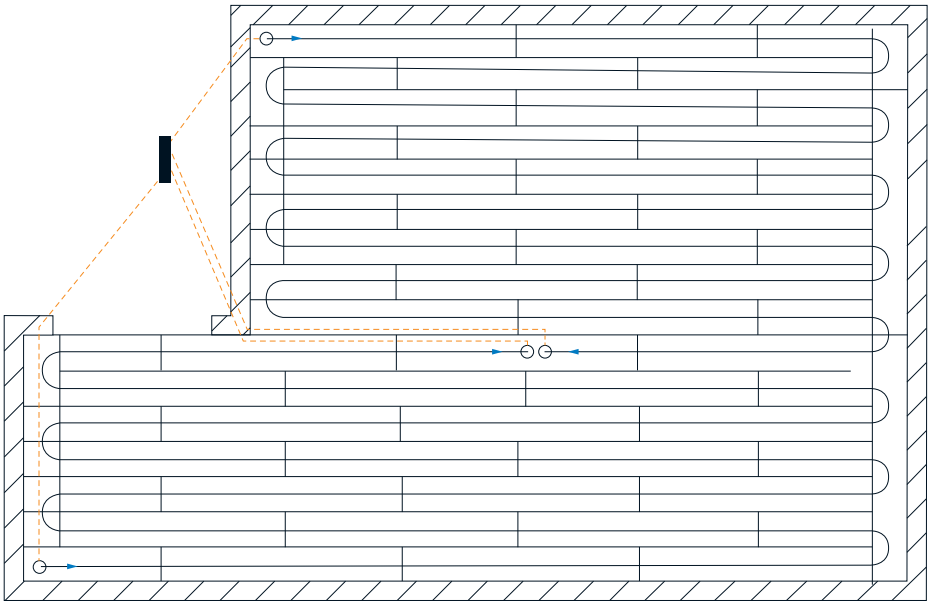

Figure 13: Manifold location in the joist cavity

Panel Direction

When possible, start with the warmest water on the exterior walls and progress toward the interior of the room. The direction of the panels in the layout dictate the piping runs.

Figures 14, **15** and **16** show the recommended layout for the panels. The arrows represent the recommended direction of the Quik Trak panels.

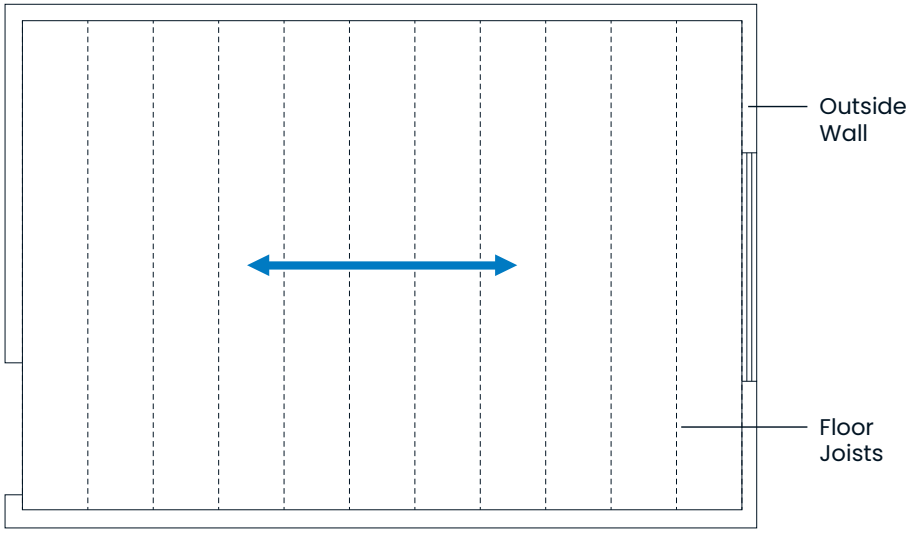

Figure 14: For tile, parquet, and linoleum finished floors, install Quik Trak panels perpendicular to the floor joists. This will add strength to the floor and help prevent deflection of the floor.

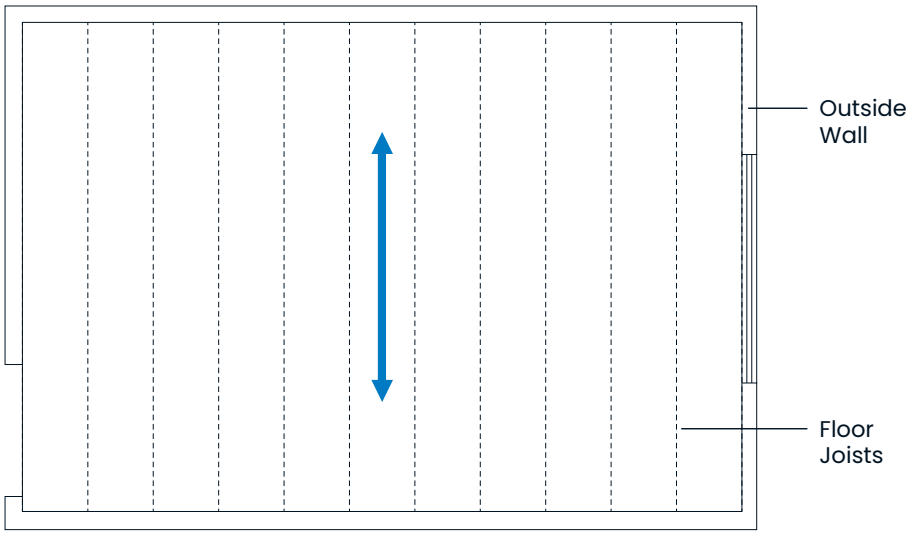

Figure 15: For carpeted floors, install Quik Trak panels parallel to the exterior wall to allow the warmest water to reach the coldest area first.

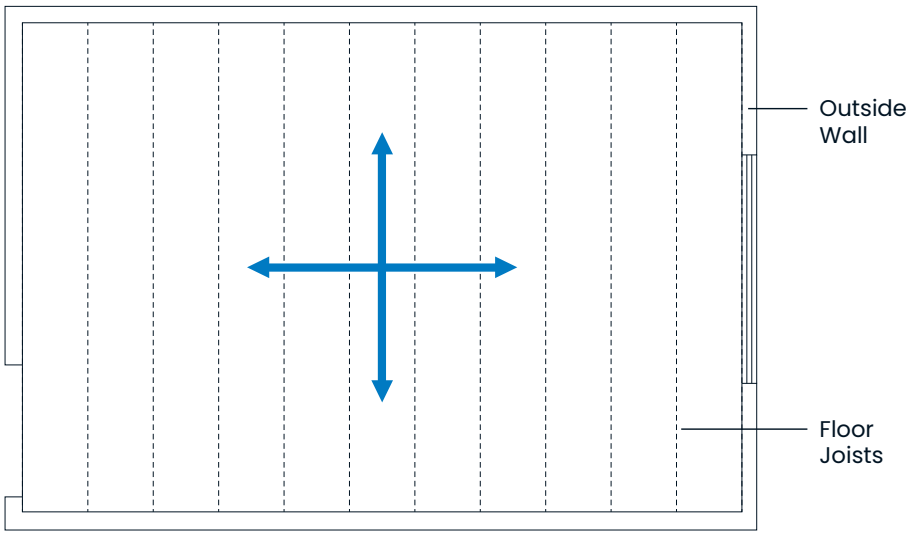

Figure 16: For a wood-finished floor covering, install Quik Trak panels perpendicular to the direction of the finished-wood floor boards.

Preliminary Layout

After determining the direction of the Quik Trak panels, design the layout.

1. Mark any areas where panels will not be installed (e.g., kitchen cabinets).
2. From the wall, measure the width of the return panel plus ¼" for a total of 7¼" (see **Distance A**).
3. Snap a chalk line to outline each of the return panel walls (see **Figure 17**).
4. Determine the starting point for the supply panel and snap a chalk line perpendicular to the other chalk lines using a square as a guide.

Note: For accurate results, use a square instead of the wall as a guide.

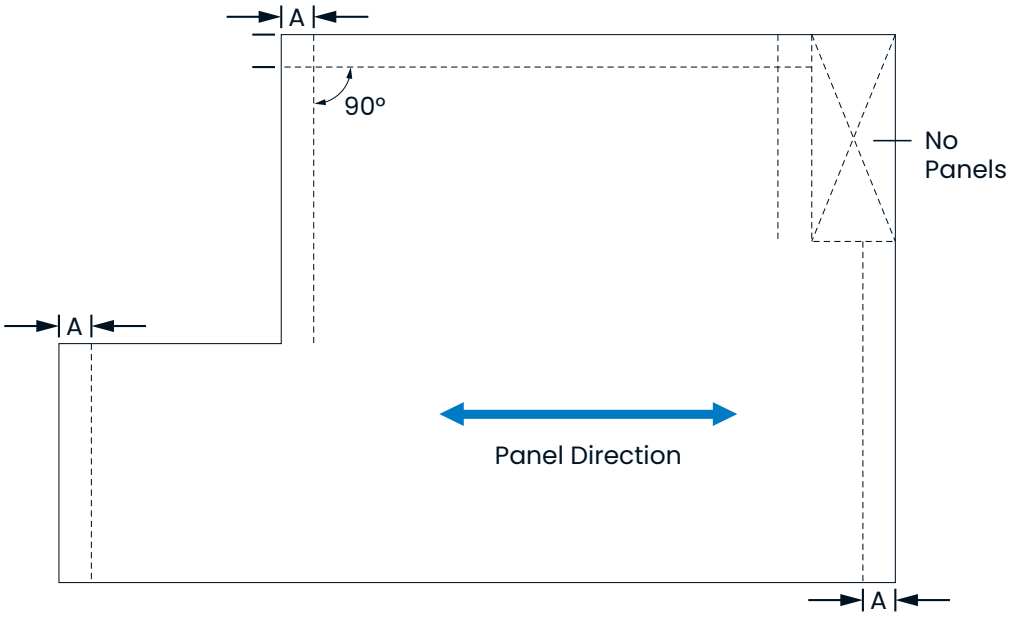

Figure 17: Use a chalk line to outline return panel locations.

Panel Installation

1. Use a circular, power miter or table saw with a carbide blade to cut the Quik Trak panels.
2. Begin by laying the first row of panels parallel to the chalk line.
3. To improve structural integrity, stagger the panels in each row so the seams are not lined up next to each other. If you have to cut the last panel in the first row, you can use the other cut piece to start the second row. As an alternative, you may cut a panel in half and begin the second row. Continue this staggered pattern throughout the installation (see **Figure 17**).

Note: If the finished floor is hardwood, it may be necessary to install a vapor barrier below the panels. Check with the wood floor installer or manufacturer to determine the proper location and type of vapor barrier needed with their product.

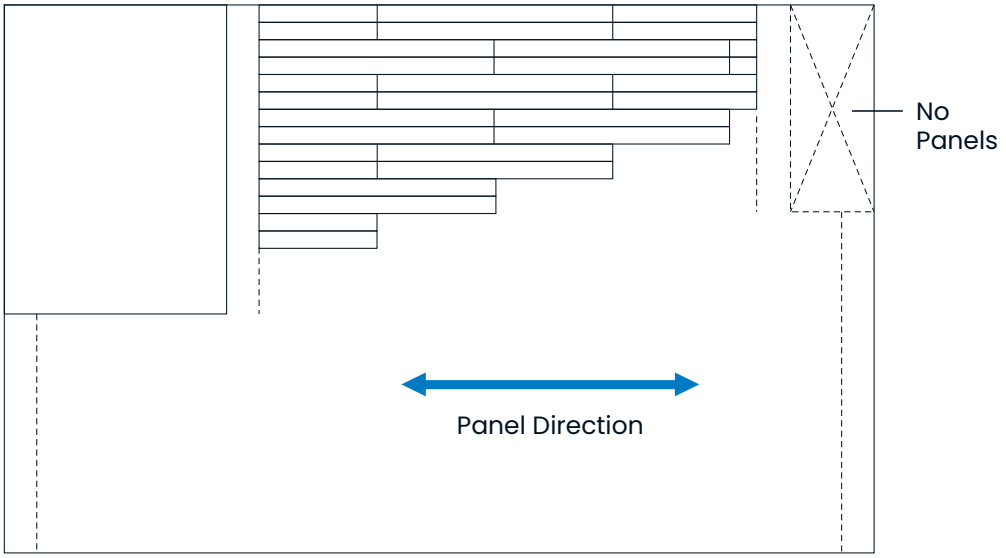

Figure 18: Stagger panels so seams do not line up.

Begin the installation by laying down the Quik Trak panels and anchoring one side of a panel with a screw at both ends (see **Figure 19**). This allows for quick realignment, if necessary. Once the panels are properly placed, install screws on both sides of a panel. Use ten screws to ensure the panels are secure (see **Figure 20**).

Installing Return Panels

When the Quik Trak installation is finished, it is time to install the return panels.

1. Place the aluminum strips in the area where the return panels will be installed.
2. Trim the aluminum strips with a pair of tin snips as needed.
3. Place the return panels so they align with the grooves in the straight panels. Make sure to maintain a serpentine pattern for proper piping placement (see **Figures 21** and **22**).
4. Secure the return panels into place using 10 screws. If necessary, you can cut return panels to provide 90° bends.
5. When return panels are in place, secure the half-moon wood pieces with a single screw to guide piping turns.

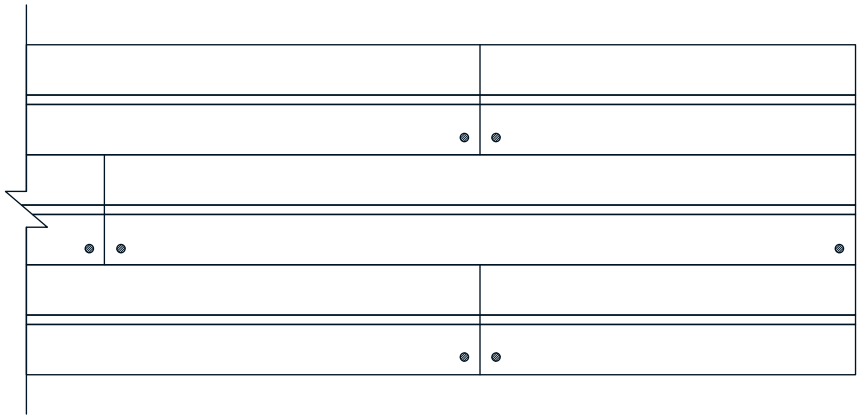

Figure 19: Anchor one side of a panel

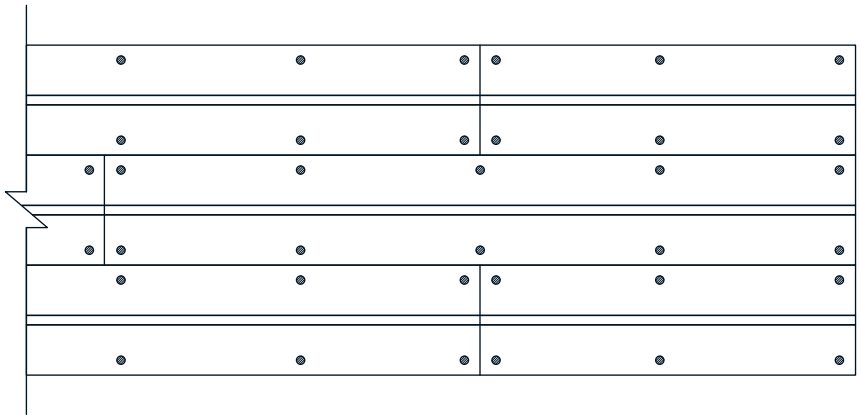

Figure 20: Fasten panels with 10 screws

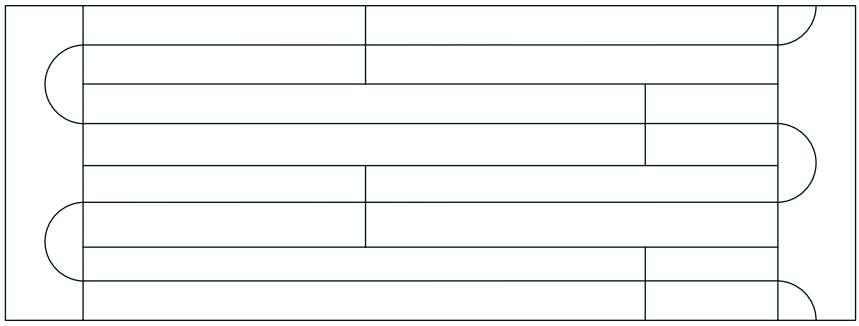

Figure 21: Correct panel placement for serpentine pattern

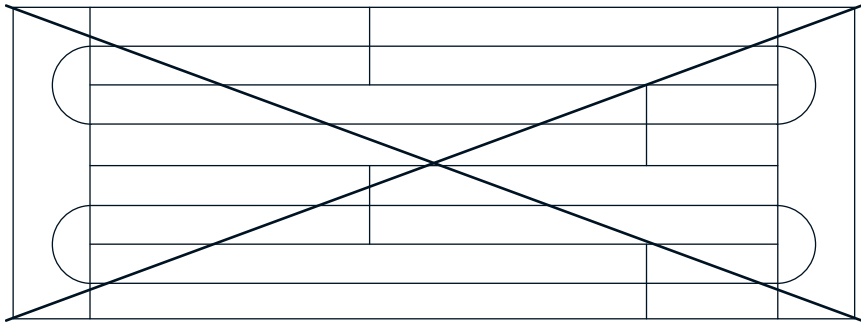

Figure 22: Incorrect panel placement

Final Floor Preparation

Use ½" plywood or similar product to fill any small areas not covered by panels (see **Figure 23**). This will make for a completely level surface. When installing panels on a suspended wood floor with access from below, determine the locations of the supply and return holes to the manifolds (see **Figures 12** and **13** on **page 10**).

Note: Leader length is crucial when calculating the number of loops for a given room. When calculating the amount of piping that is required, remember to add the distance for the leader length to and from the manifolds. Refer to the example given on **page 2** of this manual. Also refer to **Figures 12** and **13** on **page 10**.

Piping Installation

When the manifold location is below the subfloor, each supply and return run requires a ⅜" metal bend support (A5110375) to ensure piping alignment through the subfloor. To compensate for the bend in the support, you must create a rectangular slot in the subfloor.

First, use the ⅝" drill bit and drill two holes side by side (see **Figure 24**). Then, use a sharp wood chisel to square off the hole. Trim ½' of the aluminum backing out of the groove. This will allow the ⅜" metal bend support (A5110375) to be flush with the top of the panels (see **Figure 25**).

Next, vacuum the groove to remove all debris.

Begin the piping installation by attaching the supply side to the manifold. If the leader comes from under the floor, feed the loop through the floor and attach to the supply manifold.

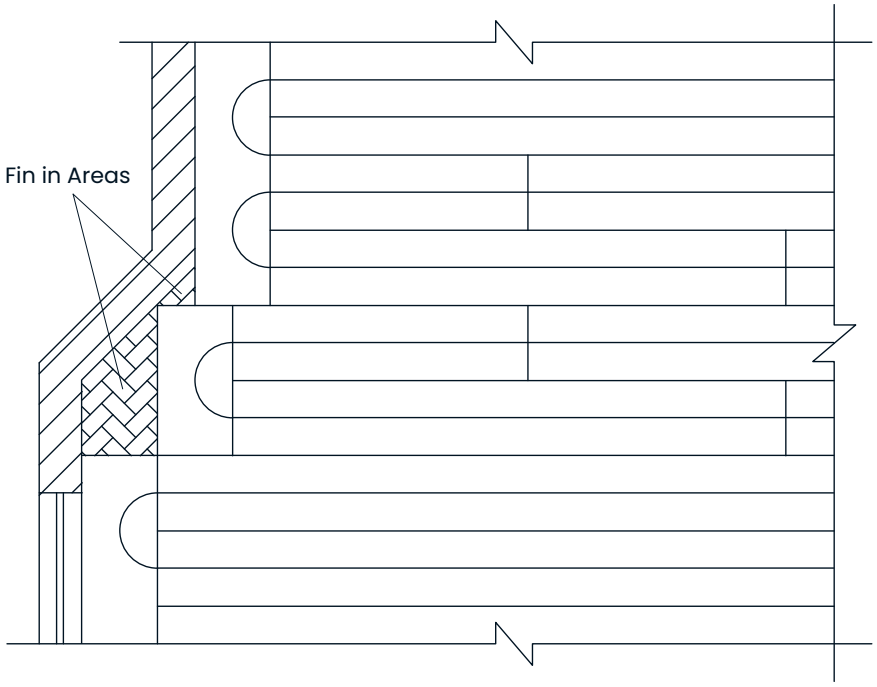

Figure 23: When installing the panels in a room with an alcove or bay area, remember to allow enough room for the return panels. Fill any areas not covered with panels with ½" plywood.

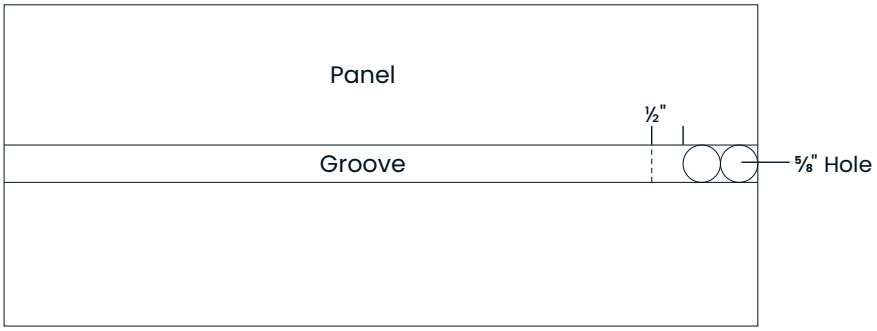

Figure 24: Drill two holes to create a rectangular slot in the subfloor.

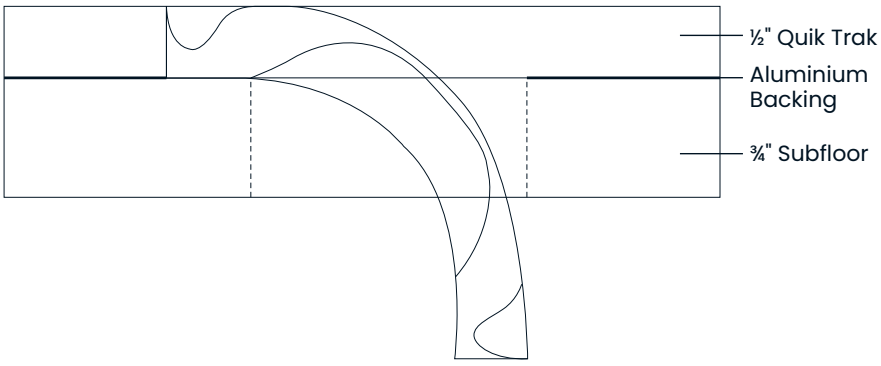

Figure 25: Trim aluminum backing to allow bend support to be flush with the top of the panels.

Once the piping is attached to the supply manifold, secure the ⅜" metal bend support to the pipe where it comes out of the floor from the supply manifold. It is best to first secure the bend support on the side of the piping that will remain below the floor. Then position the bend support at the desired point on the piping and snap the piping into place. Finally, push the bend support into the hole that you drilled in the Quik Trak groove.

The piping is now attached to the supply manifold and is through the subfloor. Next, insert a ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only (see **Figure 26**). Do not apply the silicone sealant to the return panel grooves. Next, walk the piping into the groove. Hard-soled boots or shoes are recommended (see **Figure 27**).

If the piping does not snap completely into the groove, first check to see if there is some obstruction under the pipe. If not, use a rubber mallet or the rubber-coated base of a hammer to tap the piping into place.

Repeat the process of applying the sealant and placing the piping into the groove until you are a few feet from the pre-drilled hole for the run back to the return manifold. Slide the piping through the hole and install a ⅜" metal bend support as outlined in **Figure 25**. Finish by connecting the piping to the return manifold. Repeat this procedure for any additional loops on the manifold.

Pressure Testing

Once you are finished with all the loops to a single manifold, pressure test the system to a minimum of 60 psi for a minimum of 24 hours or to local code requirements. After the system has been pressure tested and inspected, the finished floor can be installed.

Note: The Quik Trak system should either be under an air test or operating during the installation of the finished floor covering.

Figure 26: Apply a thin, ⅛" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves. Do not apply the silicone sealant to the return panel grooves.

Figure 27: Use hard-soled boots or shoes to walk the piping into the panel groove.

Appendix A - Uponor LoopCAD®

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3. On the Product Details page, select the **Edition** (MJ8, Professional or Standard).
4. In the Discount Code field, enter **LC2UP-LKF-54837**
5. Click **Continue**, and follow the remaining steps to complete the purchase.

Appendix B — Quik Trak Design Worksheet

Project name _____ Manifold number _____

		Loop 1	Loop 2	Loop 3	Loop 4	Loop 5	Loop 6	Loop 7	Loop 8	Loop 9	Loop 10
A	Room name										
B	Room setpoint temp.										
C	Zone number										
D	Net floor area (ft^2)										
E	Upward load ($BTU/h/ft^2$)										
F	Total load ($BTU/h/ft^2$)										
G	Floor surface temp.										
H	Piping size										
I	Floor covering R-value										
J	Differential temp.										
K	Piping o.c. distance (in.)										
L	Supply water temp.										
M	Active loop length										
N	Leader loop length										
O	Total loop length										
P	Loop flow in gpm										
Q	Loop head pressure (ft.)										
R	Loop balancing turns										
S	Quik Trak straights										
T	Quik Trak returns										
Manifold Totals											
U	Supply water temp.										
V	Manifold flow in gpm										
W	Highest pressure head (ft.)										

A Enter the name of the room. The room may have more than one loop.

B Room setpoint temperature is normally 65°F (18.3°C) for radiant floors.

C Zone is equal to thermostat.

D Enter the amount of square footage used in the room.

E Enter the "Floor Unit Load to Room" value from LoopCAD printout (upward load).

F Enter the "Floor Unit Load" value from LoopCAD printout (total load).

G (**Row E**/2) + **Row B** = floor surface temperature. Do not exceed 87.5°F /30.8°C for all floors (exception: wood floor limit is 80°F/26.7°C).

H The only piping size available for Quik Trak is ⅝" Wirsbo hePEX.

I Refer to **Appendix D** for floor covering information.

J Indicate differential temperature (20°F/11.1°C for Quik Trak).

K Piping o.c. distance is 7" for Quik Trak.

L Use information from **Rows E**, **I**, **K** with **Appendix E** to obtain the supply water temperature.

M Enter the length of piping installed within the room (i.e., active loop).

N Enter the length of the piping from the room being heated to the respective manifold.

O Use formula: (**Row M** + **Row N**) = total loop length.

P Use the values in **Rows F** and **M** with **Appendix F** to obtain the flow per loop.

Q Use the values in **Rows O** and **P** with **Appendix G** to obtain the head pressure per loop. Choose the appropriate solution (water or water/glycol solution).

R These cells are calculated after the design is completed. Use the formula: (current loop value in **Row O** x 4)/longest loop length on the manifold.

S Enter the number of panels. (For 7" o.c., multiply **Row D** by 0.386.)

T Enter the number of returns. (For 7" o.c., multiply **Row D** by 0.043.)

U Enter highest temperature from **Row L**.

V Add and enter all values from **Row P**.

W Enter highest value from **Row Q**.

Appendix C — Radiant Surface Temperature Charts

Radiant Floor

Surface Temperatures

Floor surface temperature = (BTU/h/ft² ÷ 2) + room setpoint

Room Setpoint										
	75°F	80.0	82.5	85.0	87.5	90.0	92.5	95.0	97.5	100.0	102.5
	72°F	77.0	79.5	82.0	84.5	87.0	89.5	92.0	94.5	97.0	99.5
	70°F	75.0	77.5	80.0	82.5	85.0	87.5	90.0	92.5	95.0	97.5
	68°F	73.0	75.5	78.0	80.5	83.0	85.5	88.0	90.5	93.0	95.5
	65°F	70.0	72.5	75.0	77.5	80.0	82.5	85.0	87.5	90.0	92.5
	60°F	65.0	67.5	70.0	72.5	75.0	77.5	80.0	82.5	85.0	87.5
		10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0

BTU/h/ft²

Exceeds the maximum recommended surface temperature for hardwood floors

Exceeds the maximum recommended surface temperature for all floors

Radiant Ceiling

Surface Temperatures

Ceiling surface temperature = (BTU/h/ft² ÷ 1.1) + room setpoint

Room Setpoint									
	75°F	84.1	88.6	93.2	97.7	100.0	102.3	106.8	114.4
	72°F	81.1	85.6	90.2	94.7	97.0	99.3	103.8	108.4
	70°F	79.1	83.6	88.2	92.7	95.0	97.3	101.8	106.4
	68°F	77.1	81.6	86.2	90.7	93.0	95.3	99.8	104.4
	65°F	74.1	78.6	83.2	87.7	90.0	92.3	96.8	101.4
	60°F	69.1	73.6	78.2	82.7	85.0	87.3	91.8	96.4
		10.0	15.0	20.0	25.0	27.5	30.0	35.0	40.0

BTU/h/ft²

Exceeds the maximum recommended surface temperature for 8-foot ceilings
Maximum is 110°F (43.3°C) for ceilings higher than 8 feet, but lower than 12 feet.

Appendix D — R-Value Charts

Construction Materials	⅛"	¼"	⅜"	½"	⅝"	¾"
Plywood (Douglas fir)		0.31	0.47	0.62	0.77	0.93
Oriented strand board (OSB)		0.31	0.47	0.62	0.78	0.94
Asbestos-cement board	0.03	0.06	0.09			
Particle board (underlayment)	0.17	0.33	0.49	0.66	0.82	

Sheet Goods

Plywood (Douglas fir)	0.20					
Oriented strand board (OSB)	0.20					
Asbestos-cement board		0.40				

Tiles and Stone

Ceramic tile		0.23	0.34	0.45	0.57	0.68
Cork tile	0.28	0.56	0.84			
Limestone			0.38	0.50	0.63	0.76
Quarried stone			0.30	0.40	0.50	0.60
Marble		0.20	0.30	0.40	0.50	0.60
Brick			0.38	0.50	0.63	0.76

Carpeting

Commercial glue down		0.60	0.90			
Acrylic level loop		1.04	1.56	2.08	2.60	3.12
Acrylic plush		0.83	1.25	1.66	2.08	2.49
Polyester plush		0.96	1.44	1.92	2.40	2.88
Nylon saxony		0.88	1.32	1.76	2.20	2.64
Nylon shag		0.54	0.81	1.08	1.35	1.62
Wool plush		1.10	1.65	2.20	2.75	3.30

Carpet Pads

Rubber (solid)		0.31	0.47	0.62	0.78	0.93
Rubber (waffled)		0.62	0.93	1.24	1.55	1.86
Hair and jute		0.98	1.47	1.96	2.45	2.94
Prime urethane (2-lb. density)		1.08	1.62	2.16	2.70	3.24
Bonded urethane (4-lb. density)		1.04	1.56	2.08	2.60	3.12
Bonded urethane (8-lb. density)		1.10	1.65	2.20	2.75	3.30

Wood Flooring	⅛"	¼"	⅜"	½"	⅝"	¾"
Ash			0.35	0.47	0.59	0.71
Cherry			0.35	0.46	0.58	0.69
Elm			0.33	0.45	0.56	0.67
Redwood			0.51	0.68	0.84	1.01
Maple			0.35	0.46	0.58	0.69
Oak			0.33	0.45	0.56	0.67
Walnut			0.34	0.45	0.57	0.68
Douglas fir			0.40	0.53	0.66	0.80
Southern pine			0.38	0.50	0.62	0.75
Spruce			0.51	0.68	0.84	1.01
Floating wood floor pad	0.20	0.40				

Windows

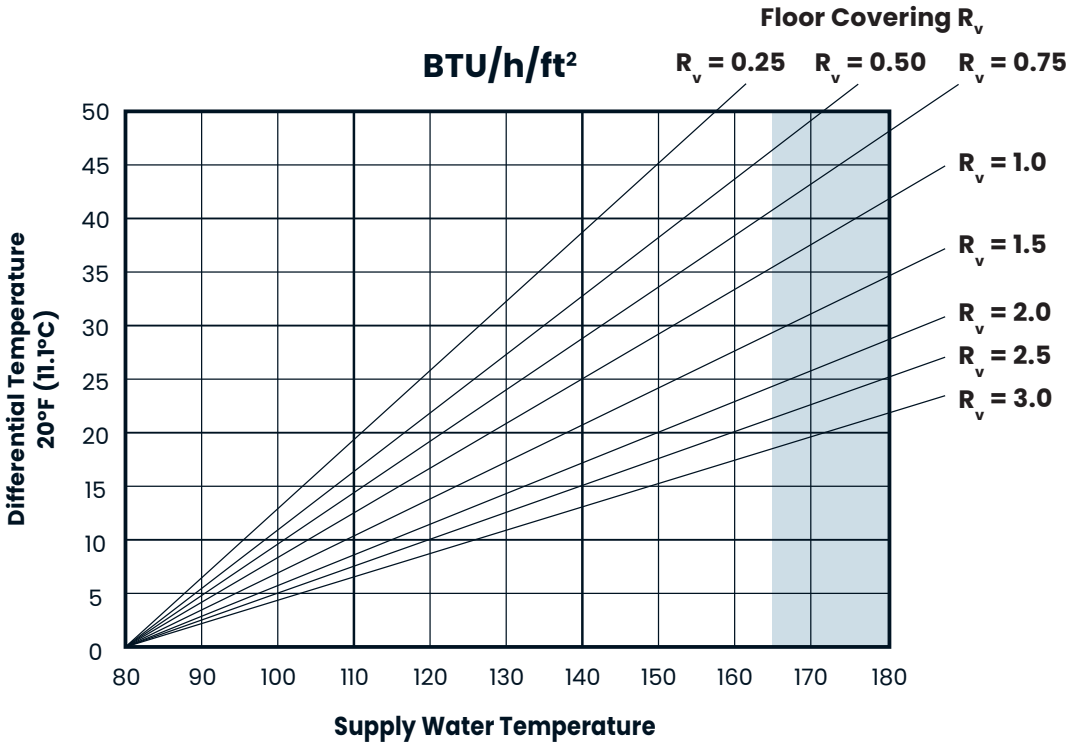
Single glass	0.91
Single glass with storm	2.00
Double glazed – 3⁄16" air space	1.61
Double glazed – ¼" air space	1.69
Double glazed – ½" air space	2.04
Double glazed – ¾" air space	2.38
Double glazed – with suspended film	2.77
Double glazed – with 2 suspended films	3.85
Low-E	3.13
Low-E – with suspended film	4.05
Low-E – with 2 suspended films	5.05

Note: The R-values depicted in these charts are representative and may vary by manufacturer. For specific R-values, check with the appropriate floor covering manufacturer.

Appendix E — Supply Water Temperature Charts

Quik Trak Radiant Floor

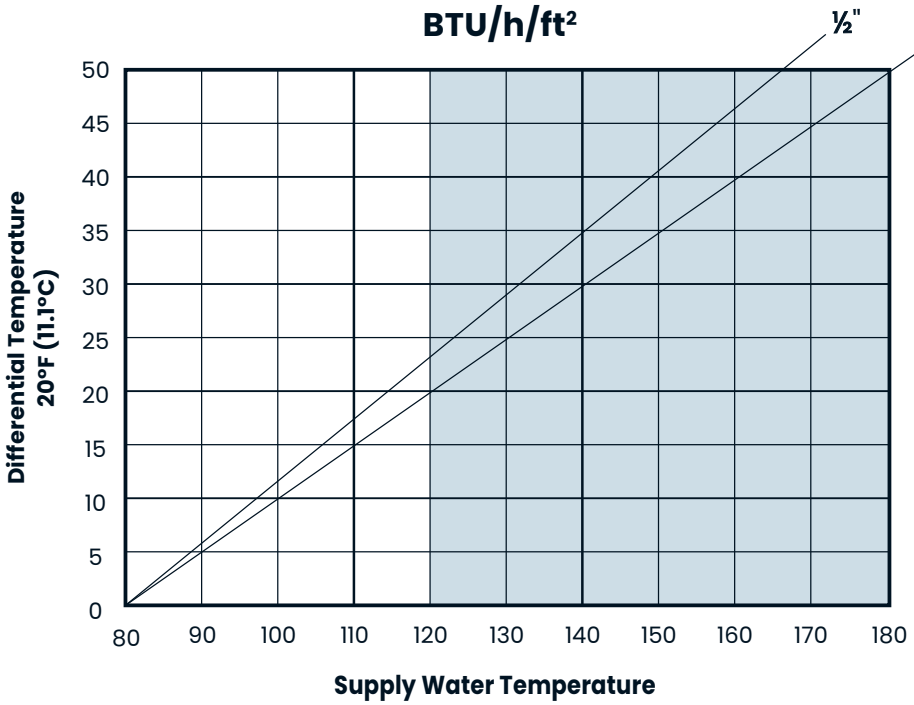
65°F (18.3°C) room setpoint temperature



Note: Uponor's recommended maximum design temperature is 165°F (73.9°C).

Quik Trak Radiant Wall

70°F (21.1°C) room setpoint temperature



Exceeds supply water temperature at 20°F (11.1°C) supply/return differential temperature

Notes:

1. Chart lines represent ½" and ⅝" sheetrock.
2. Do not exceed 120°F (48.9°C) supply water temperature under gypsum sheetrock.

Appendix F — Flow Chart

Refer to the following instructions to determine the flow per loop for a room.

- The room is 12 ft. by 12 ft. with the piping installed at 7" o.c. The load for the room is 40 BTU/h/ft². The room is 15 ft. from the manifold location.
- First determine the amount of piping in the room.

  12 x 12 = 144 sq. ft.
  144 x 1.333 = 192 ft.
  There is 192 ft. of active loop in the room.

- Next, determine the amount of leader length from the room to the manifold location. The distance from the room to the manifold location is 15 ft. The distance is doubled to account for the supply and return piping.

  15 x 2 = 30 ft.
  Vertical distance of piping at the manifold = 3 ft.

  30 + 6 = 36 ft.
  There is 36 feet of leader length for this loop.

- Total loop length is the active and leader length added together.
  192 + 36 = 228 total loop length
- Determine the flow for the loop by accessing data from the flow chart at right.
- Enter the chart at the BTU/h/ft² for the room (40) to get the value in gallons per minute (gpm) per foot of piping (0.00236).
- Multiply the active loop length by the value found in the line above.
  192 x 0.00236 = 0.45 gpm
- Flow for the loop is 0.45 gpm.

100% Water at 120°F (48.9°C)

20°F (11.1°C) supply/return differential flow in GPM per foot of piping

BTU/h/ft²	7" Piping On-Center Distance	BTU/h/ft²	7" Piping On-Center Distance
5	0.00030	28	0.00166
6	0.00035	29	0.00171
7	0.00041	30	0.00177
8	0.00047	31	0.00183
9	0.00053	32	0.00189
10	0.00059	33	0.00195
11	0.00065	34	0.00201
12	0.00071	35	0.00207
13	0.00077	36	0.00213
14	0.00083	37	0.00219
15	0.00089	38	0.00225
16	0.00095	39	0.00231
17	0.00101	40	0.00236
18	0.00106	41	0.00242
19	0.00112	42	0.00248
20	0.00118	43	0.00254
21	0.00124	44	0.00260
22	0.00130	45	0.00266
23	0.00136	46	0.00272
24	0.00142	47	0.00278
25	0.00148	48	0.00284
26	0.00154	49	0.00290
27	0.00160	50	0.00296

Note: Flow is based on the active loop length in the room. Head pressure drop is computed from the flow for the loop and the total loop length. Do not use the total loop length to determine the flow for the loop. See **Appendix G** for the hydronic friction loss table.

Appendix G — Hydronic Friction Loss Table

⅝" Uponor PEX-a — 100% water — feet of head per foot of piping

GPM	Velocity (ft./sec.)	80°F 27°C	90°F 32°C	100°F 38°C	110°F 43°C	120°F 49°C	130°F 54°C	140°F 60°C	150°F 66°C	160°F 71°C	170°F 77°C	180°F 82°C	190°F 88°C	200°F 93°C
0.10	0.5	0.00908	0.00873	0.00841	0.00814	0.00789	0.00767	0.00747	0.00729	0.00712	0.00697	0.00683	0.00670	0.00659
0.13	0.6	0.01230	0.01183	0.01141	0.01105	0.01072	0.01043	0.01016	0.00992	0.00970	0.00950	0.00931	0.00914	0.00899
0.15	0.7	0.01591	0.01531	0.01479	0.01433	0.01391	0.01354	0.01320	0.01289	0.01261	0.01235	0.01212	0.01190	0.01170
0.17	0.8	0.01990	0.01917	0.01852	0.01795	0.01744	0.01698	0.01657	0.01619	0.01584	0.01552	0.01523	0.01496	0.01471
0.19	0.9	0.02426	0.02338	0.02261	0.02192	0.02131	0.02075	0.02025	0.01979	0.01938	0.01899	0.01864	0.01832	0.01802
0.21	1.0	0.02898	0.02795	0.02703	0.02622	0.02550	0.02484	0.02425	0.02371	0.02322	0.02276	0.02235	0.02197	0.02161
0.23	1.1	0.03405	0.03285	0.03179	0.03085	0.03000	0.02924	0.02856	0.02793	0.02735	0.02682	0.02634	0.02589	0.02548
0.25	1.2	0.03946	0.03808	0.03687	0.03579	0.03482	0.03395	0.03316	0.03243	0.03178	0.03116	0.03061	0.03010	0.02962
0.27	1.3	0.04520	0.04364	0.04226	0.04104	0.03994	0.03895	0.03805	0.03723	0.03648	0.03579	0.03516	0.03458	0.03404
0.29	1.4	0.05127	0.04952	0.04797	0.04660	0.04536	0.04424	0.04324	0.04231	0.04147	0.04068	0.03998	0.03932	0.03871
0.31	1.5	0.05767	0.05572	0.05399	0.05246	0.05107	0.04983	0.04870	0.04767	0.04673	0.04585	0.04506	0.04433	0.04365
0.33	1.6	0.06438	0.06222	0.06031	0.05861	0.05707	0.05569	0.05445	0.05330	0.05226	0.05128	0.05041	0.04959	0.04884
0.35	1.7	0.07141	0.06903	0.06692	0.06505	0.06336	0.06184	0.06047	0.05920	0.05805	0.05698	0.05601	0.05512	0.05428
0.38	1.8	0.07874	0.07614	0.07383	0.07178	0.06993	0.06826	0.06676	0.06537	0.06411	0.06293	0.06187	0.06089	0.05997
0.40	1.9	0.08638	0.08355	0.08103	0.07880	0.07678	0.07496	0.07332	0.07180	0.07043	0.06914	0.06799	0.06692	0.06592
0.42	2.0	0.09433	0.09125	0.08852	0.08609	0.08390	0.08193	0.08014	0.07850	0.07701	0.07561	0.07435	0.07319	0.07210
0.44	2.1	0.10257	0.09924	0.09629	0.09367	0.09130	0.08916	0.08723	0.08545	0.08384	0.08233	0.08097	0.07970	0.07853
0.46	2.2	0.11110	0.10752	0.10434	0.10152	0.09896	0.09666	0.09458	0.09266	0.09092	0.08929	0.08782	0.08646	0.08519
0.48	2.3	0.11993	0.11609	0.11267	0.10964	0.10689	0.10442	0.10219	0.10013	0.09826	0.09650	0.09493	0.09346	0.09210
0.50	2.4	0.12905	0.12494	0.12128	0.11803	0.11509	0.11244	0.11005	0.10784	0.10584	0.10396	0.10227	0.10070	0.09924
0.52	2.5	0.13845	0.13406	0.13015	0.12669	0.12355	0.12072	0.11816	0.11580	0.11367	0.11165	0.10985	0.10817	0.10661
0.54	2.6	0.14814	0.14346	0.13930	0.13561	0.13226	0.12925	0.12653	0.12401	0.12174	0.11959	0.11767	0.11588	0.11422
0.56	2.7	0.15811	0.15314	0.14872	0.14480	0.14124	0.13804	0.13514	0.13247	0.13005	0.12777	0.12572	0.12382	0.12205
0.58	2.8	0.16836	0.16309	0.15841	0.15424	0.15047	0.14708	0.14400	0.14117	0.13860	0.13618	0.13401	0.13199	0.13011
0.61	2.9	0.17888	0.17331	0.16835	0.16395	0.15996	0.15636	0.15311	0.15011	0.14739	0.14483	0.14253	0.14039	0.13840
0.63	3.0	0.18968	0.18380	0.17856	0.17391	0.16970	0.16590	0.16246	0.15929	0.15641	0.15371	0.15128	0.14902	0.14692
0.65	3.1	0.20076	0.19456	0.18904	0.18413	0.17968	0.17568	0.17205	0.16871	0.16568	0.16282	0.16026	0.15788	0.15566
0.67	3.2	0.21210	0.20558	0.19977	0.19460	0.18992	0.18571	0.18189	0.17837	0.17517	0.17217	0.16947	0.16696	0.16462
0.69	3.3	0.22372	0.21686	0.21075	0.20533	0.20041	0.19597	0.19196	0.18826	0.18490	0.18174	0.17890	0.17626	0.17380
0.71	3.4	0.23560	0.22841	0.22200	0.21630	0.21114	0.20648	0.20227	0.19838	0.19486	0.19154	0.18856	0.18579	0.18320

Recommended head loss design range

Sizing in this region will lead to excessive head loss conditions.

If you need additional assistance or information on Quik Trak systems, please contact Uponor Technical Services at 800.321.4739.

For more information about radiant floor heating systems, including installation methods, wiring diagrams, control strategies, and product information, consult the Uponor Complete Design Assistance Manual (CDAM).

Notes

Moving
>Water

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