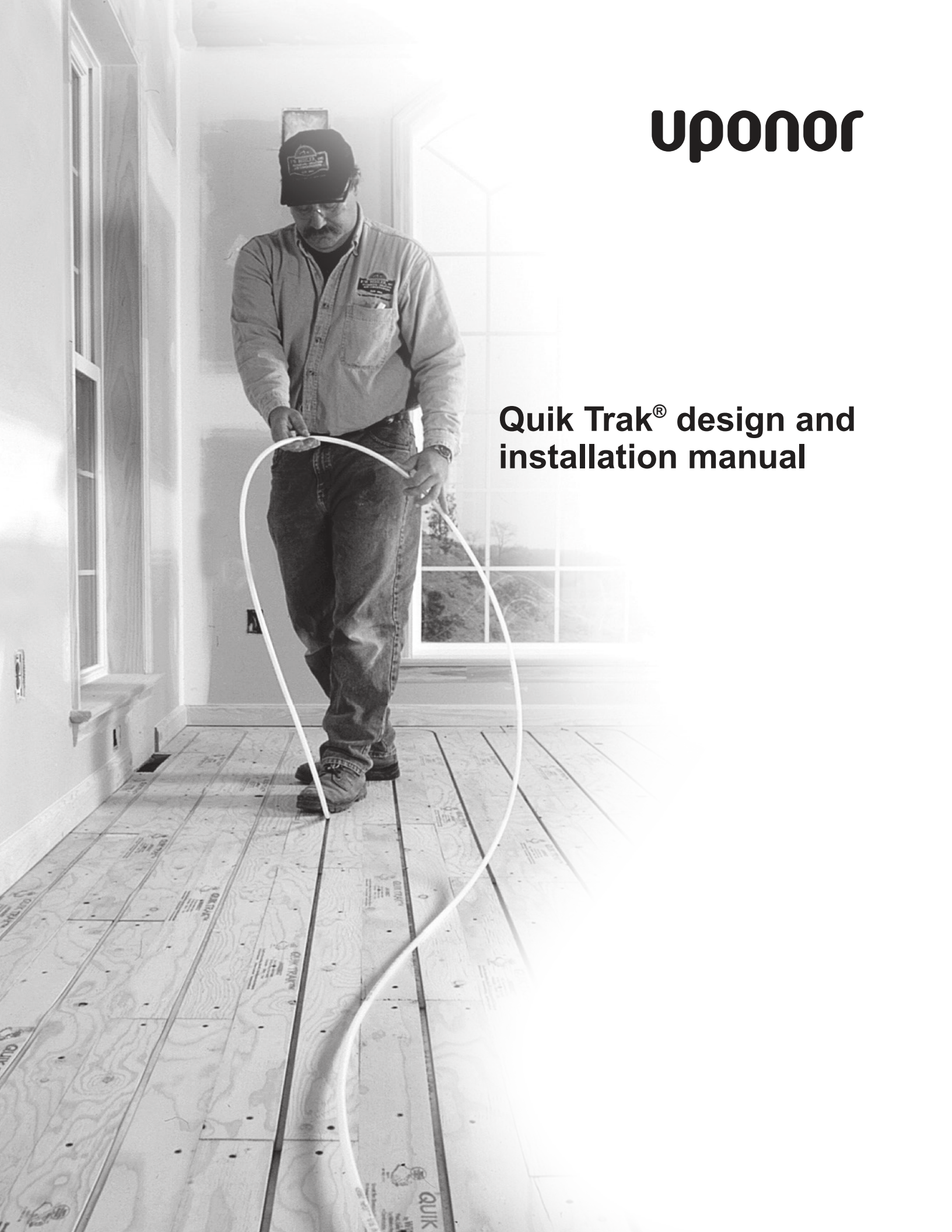

Quik Trak® design and installation manual

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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™ tubing into the panel. Quik Trak panels are designed with a center groove that provides a tight fit for the 5/16" Wirsbo hePEX tubing. 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 tubing cutter (E6081125, E6081128, E6081501)
- ❑ 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.
- ❑ Tubing uncoiler (E6061000, E6062000, E6063000) (recommended)
- ❑ Router with ½" cutting blade (recommended)
- ❑ Quik Trak Installation Tool Kit (E6050000) with Quik Trak Screws (E6051250) (recommended)

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

Figure 1: Quik Trak straight panel

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 outlined in some way.

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. Have some ½" plywood on hand for any custom tubing adjustments that may happen due to field changes.

Figure 2: Quik Trak Installation Kit (E6050000)

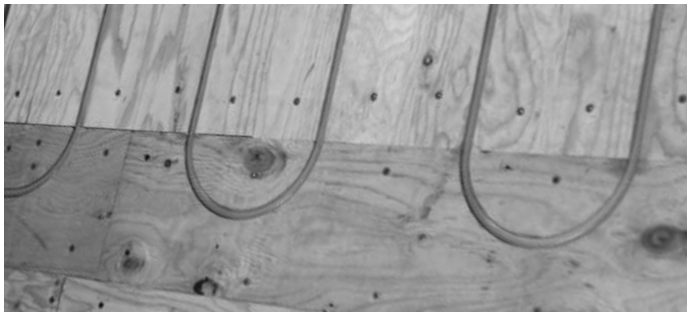


Figure 3: Quik Trak return panel

Quik Trak calculations

Uponor's Advanced Design Suite™ (ADS) 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 ADS prompts the user to input the tubing type, the design differential temperature and the specifics of floor construction. ADS analyzes the information and calculates a supply water temperature and the amount of tubing 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 ADS, 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's ADS 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

Tubing calculations

To calculate the amount of tubing needed, multiply the net floor area by 1.7. Divide the total amount of tubing 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 4: Installing Quik Trak straight panels

Installation methods

Quik Trak over a wood subfloor with hardwood floor covering

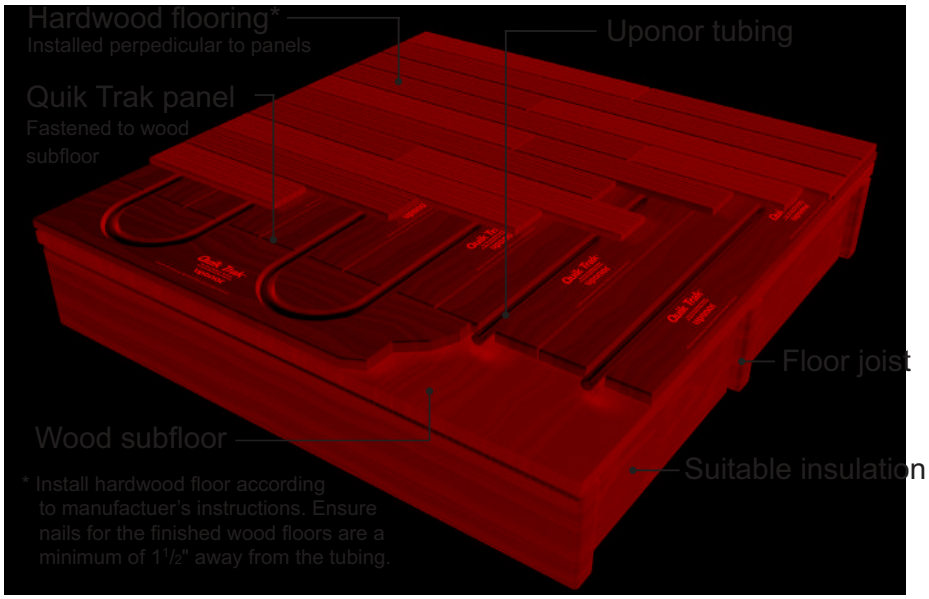


Figure 5: Quik Trak over a wood subfloor with hardwood floor covering

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" Quik Trak 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 tubing to the panel.

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

Note: Do not exceed 80ºF (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 tubing 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

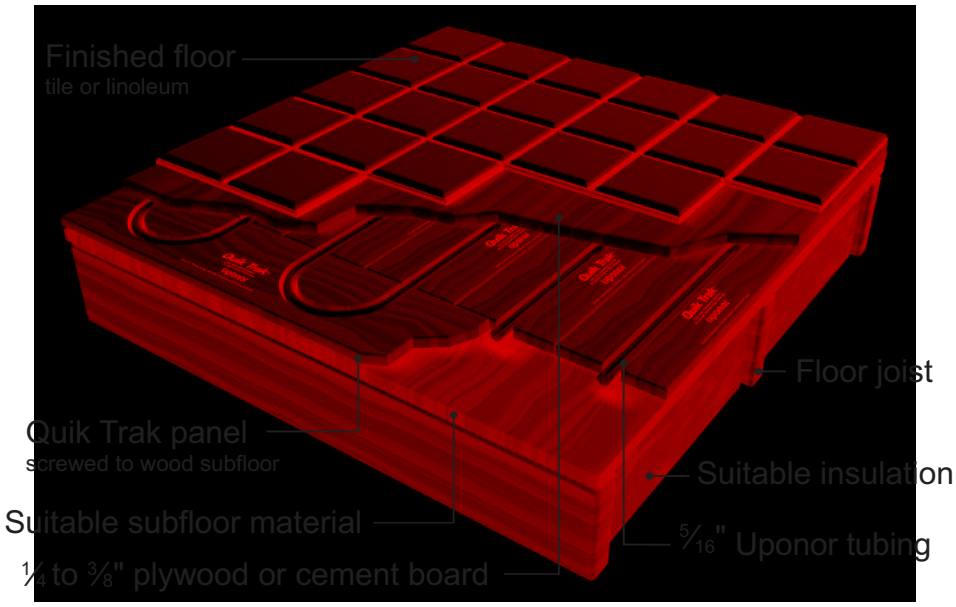


Figure 6: Quik Trak over a wood subfloor with tile/linoleum floor covering

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" Quik Trak 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 tubing to the panel.

Install the tubing by stepping the tubing into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the tubing 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 tubing 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 87.5ºF (30.8°C) for tile and linoleum floor surface temperatures.

In all Quik Trak applications, the maximum loop length for $^5/_{16}$" Wirsbo hePEX tubing 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

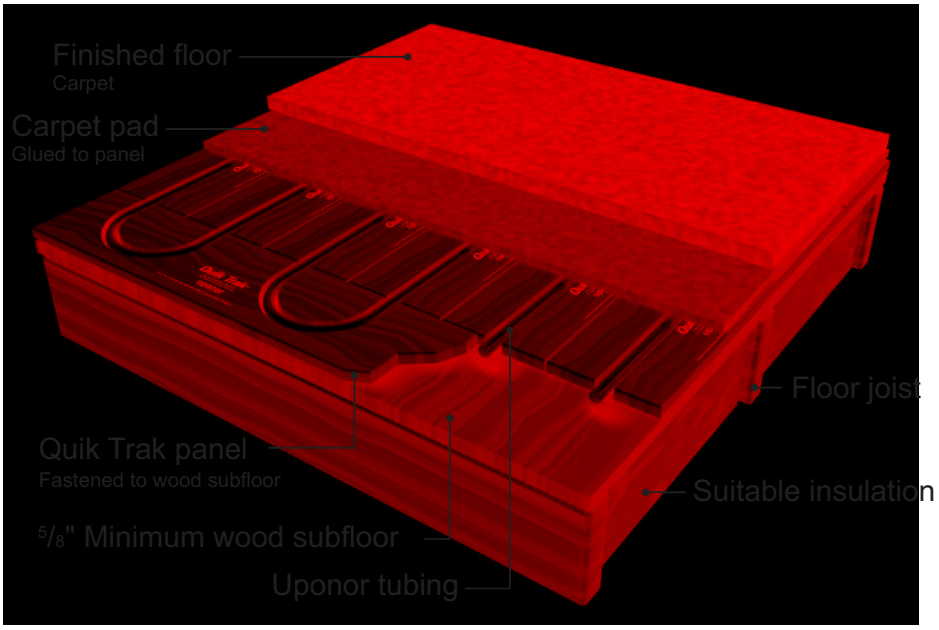


Figure 7: Quik Trak over a wood subfloor with carpet floor covering

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" Quik Trak 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 tubing to the panel.

Install the tubing by stepping the tubing into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the tubing 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 tubing 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 87.5ºF (30.8°C) for carpeted floor surface temperatures.

In all Quik Trak applications, the maximum loop length for ⅝" Wirsbo hePEX tubing 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

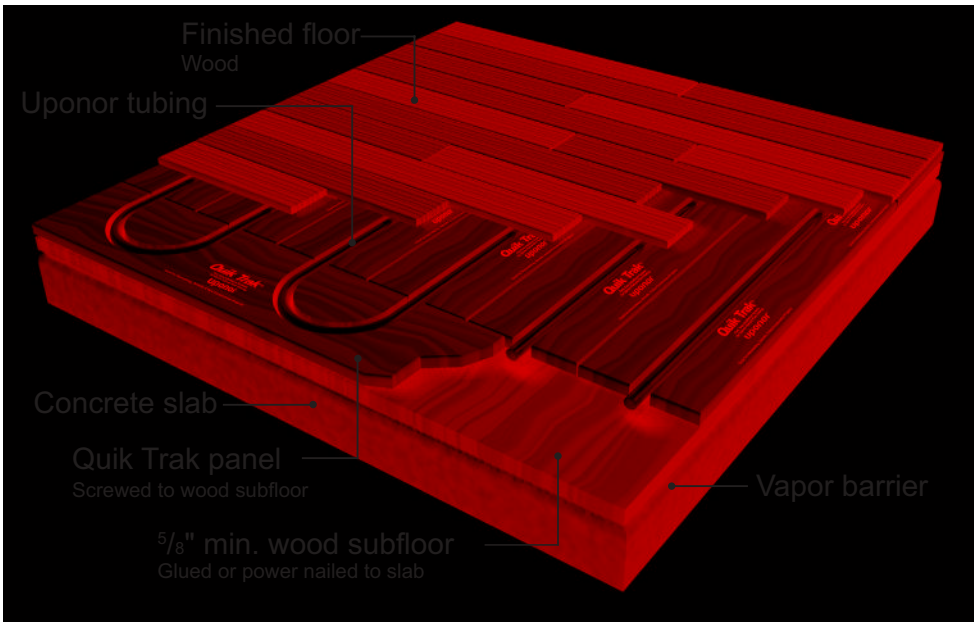


Figure 8: Quik Trak over an existing concrete slab

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 tubing to the panel.

Install the tubing by stepping the tubing into the panel grooves. If you're not wearing hard-sole shoes, you may need to use a rubber hammer to snap the tubing 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 ⅝" Wirsbo hePEX tubing 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

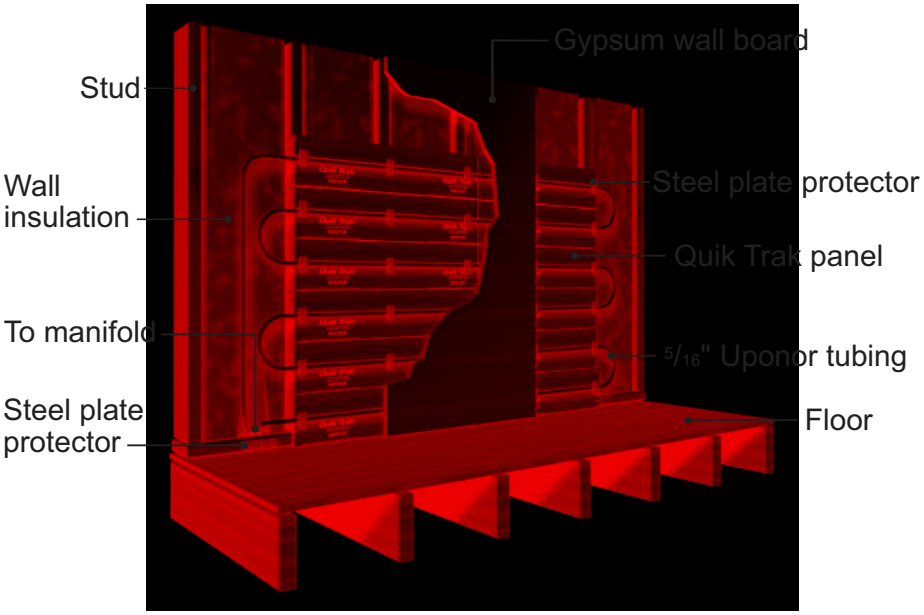


Figure 9: Quik Trak radiant wall installation

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 tubing, drill two ⅝" holes in the footer plate opposite the tubing 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 tubing crosses the studs to protect the tubing 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 tubing 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 ⅝" Wirsbo hePEX tubing 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

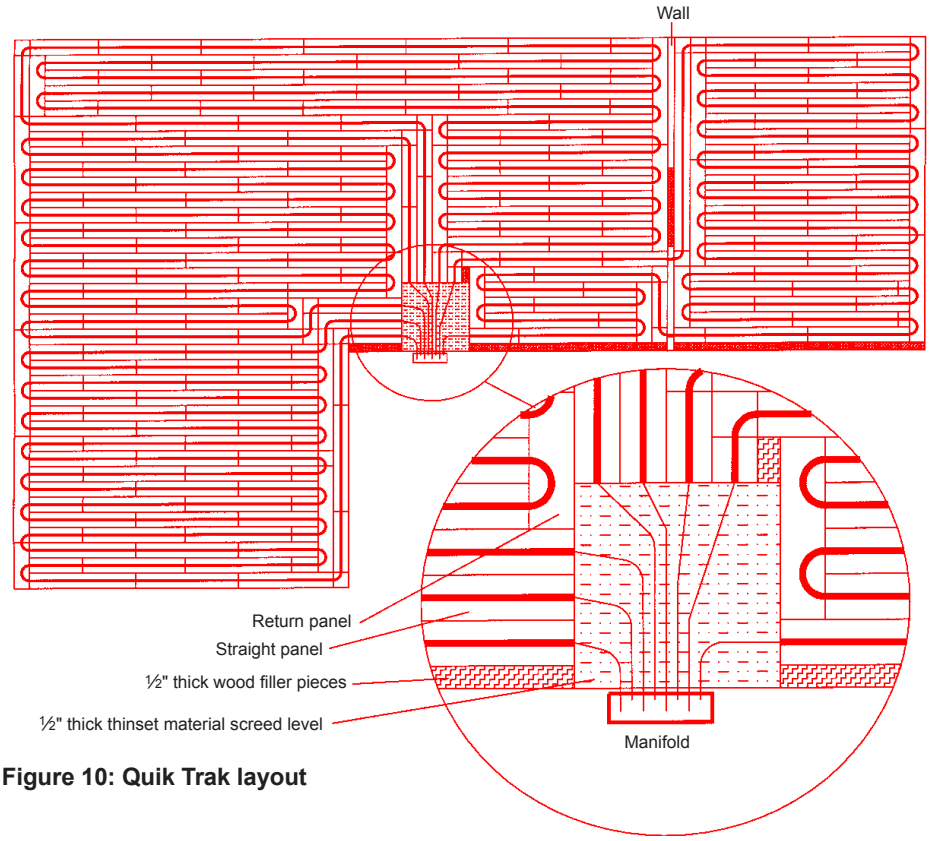


Figure 10: Quik Trak layout

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 ADS 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 tubing 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 tubing, use staples or U-shaped tube fasteners to hold the tubing down in the area in front of the manifold.
10. After connecting the tubing 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 tubing 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 11 and 12 show manifold location in the wall because the floor is inaccessible from below (e.g., over a concrete slab).

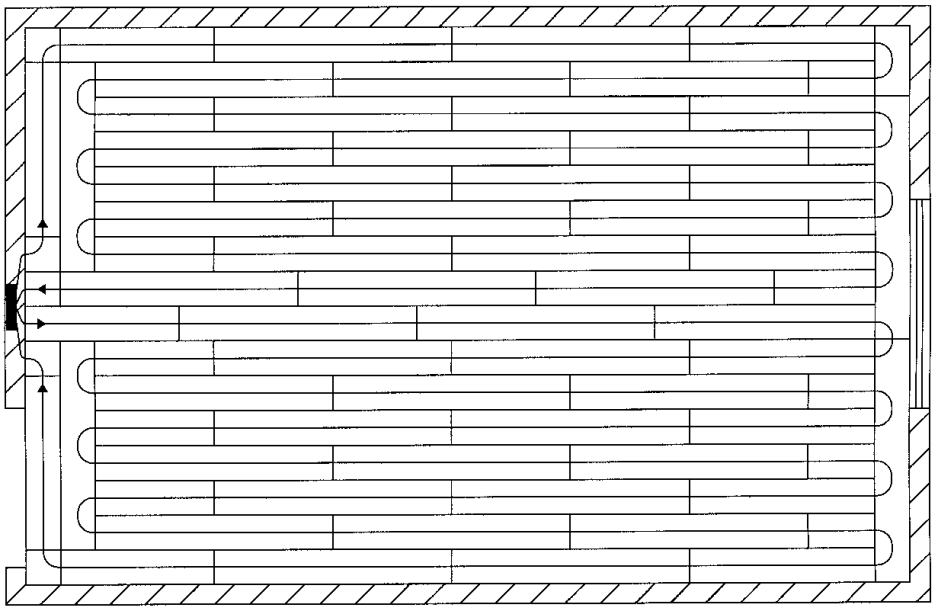


Figure 11: Manifold location in the wall

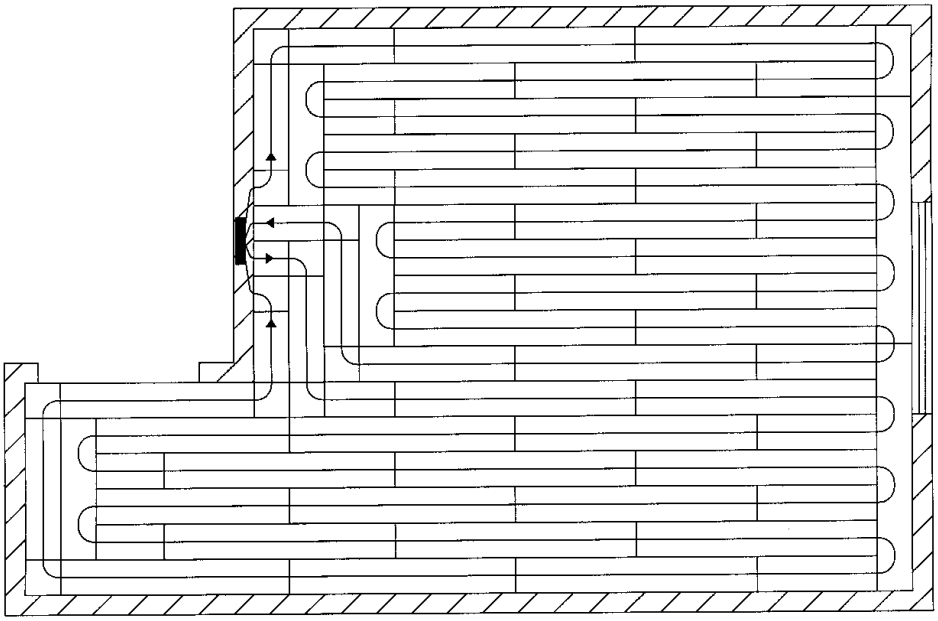


Figure 12: Manifold location in the wall

Piping layout with access from below the floor

Figures 13 and 14 show manifold locations in the joist cavity. The entire floor area is accessible.

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

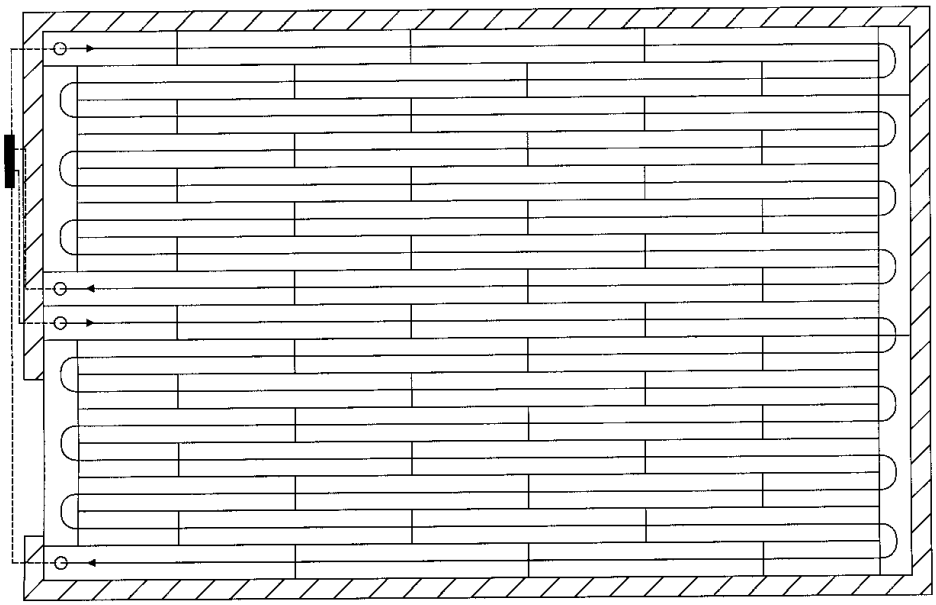


Figure 13: Manifold location in the joist cavity

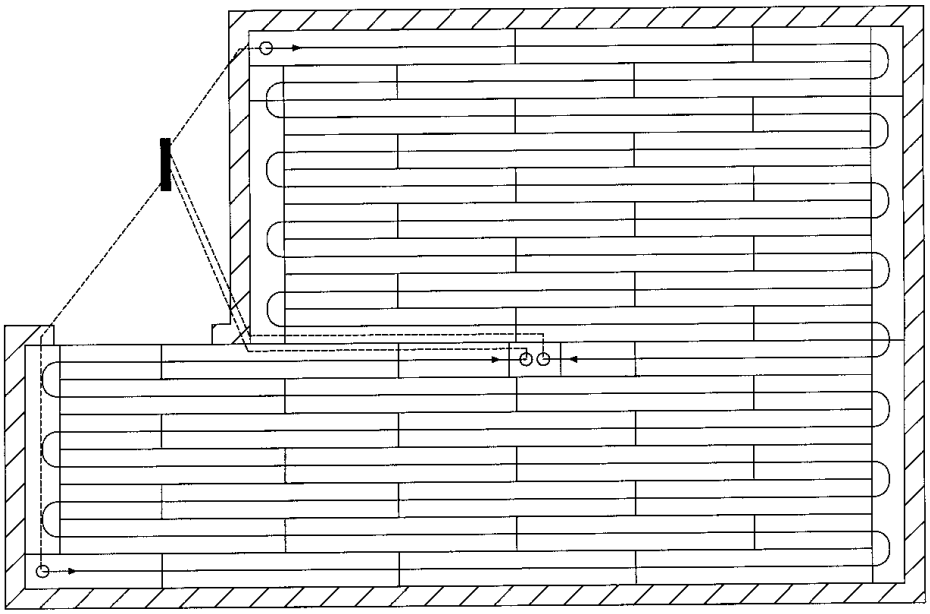


Figure 14: Manifold location in the joist cavity

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 tubing runs.

Figures 15, 16 and 17 show the recommended layout for the panels. The arrows represent the recommended direction of the Quik Trak panels.

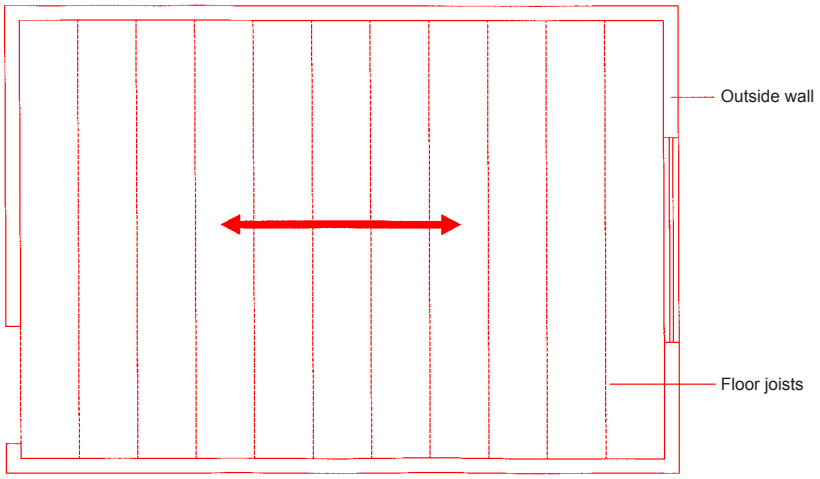


Figure 15: For tile, parquet and linoleum finished floors, install Quik Trak panels perpendicular to the floor joists. This will add strength to the floor and help prevent deflection of the floor.

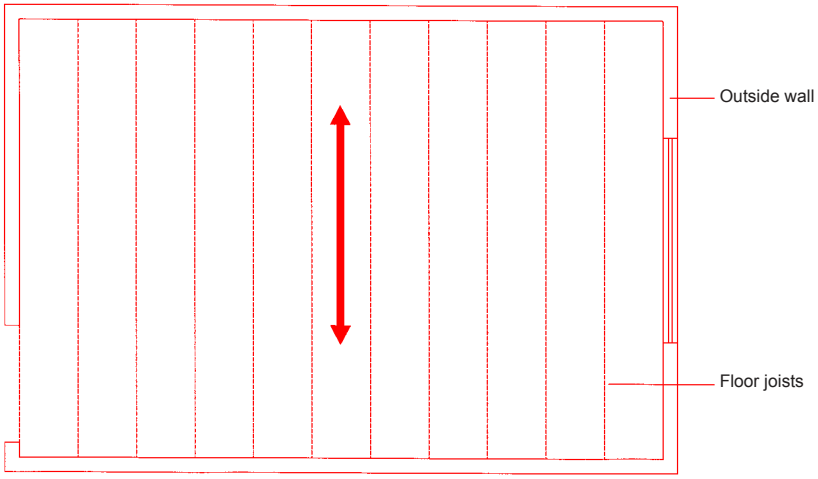


Figure 16: For carpeted floors, install Quik Trak panels parallel to the exterior wall to allow the warmest water to reach the coldest area first.

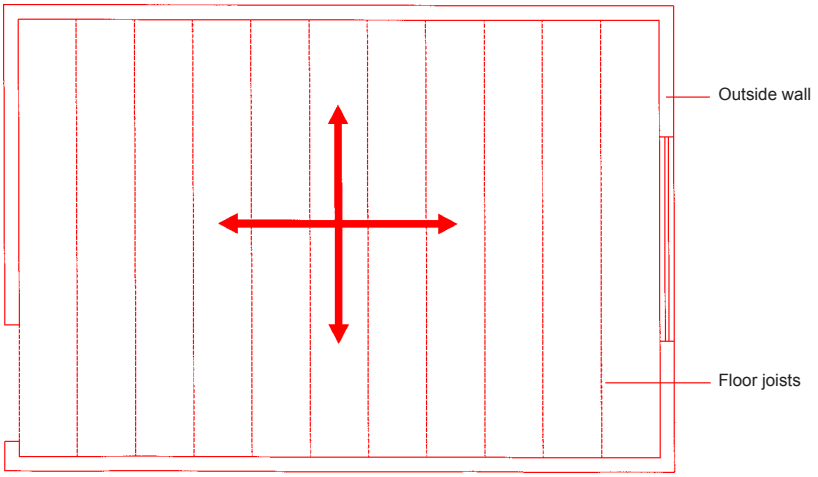


Figure 17: For a wood-finished floor covering, install Quik Trak panels perpendicular to the direction of the finished-wood floor boards.

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 18**).
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.

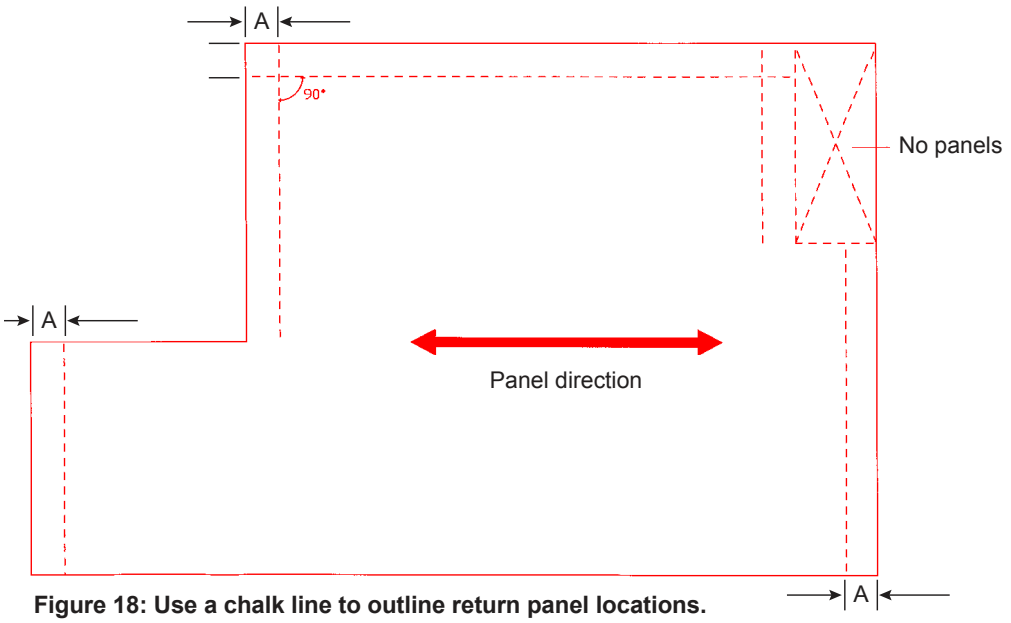


Figure 18: Use a chalk line to outline return panel locations.

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 19**).

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.

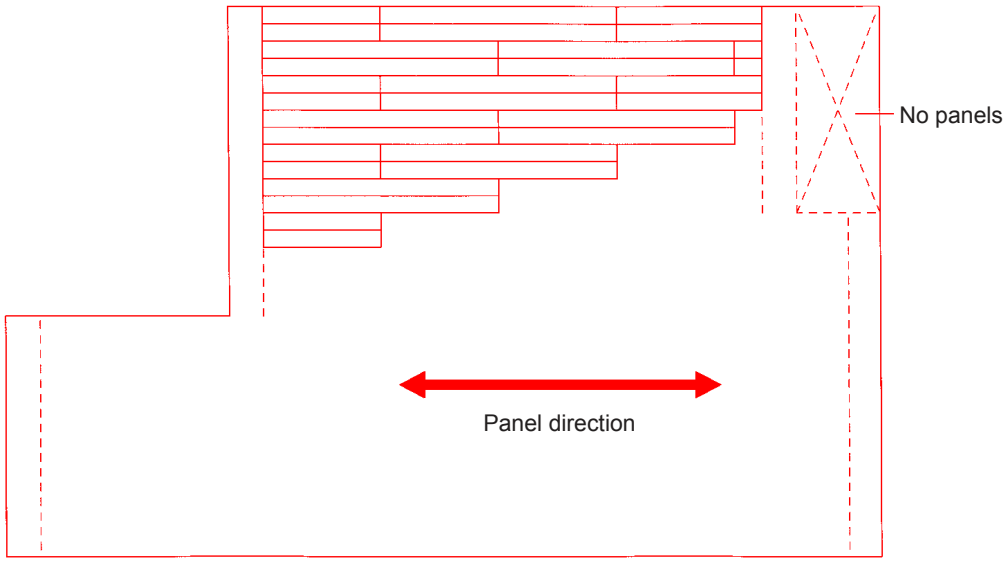


Figure 19: Stagger panels so seams do not line up.

Panel installation (cont.)

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 21**). 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 22**). Using the Quik Trak Installation Tool Kit (E6050000) will speed this process and alleviate strain from bending.

Figure 20: Quik Trak Installation Tool Kit

Figure 21: Anchor one side of a panel.

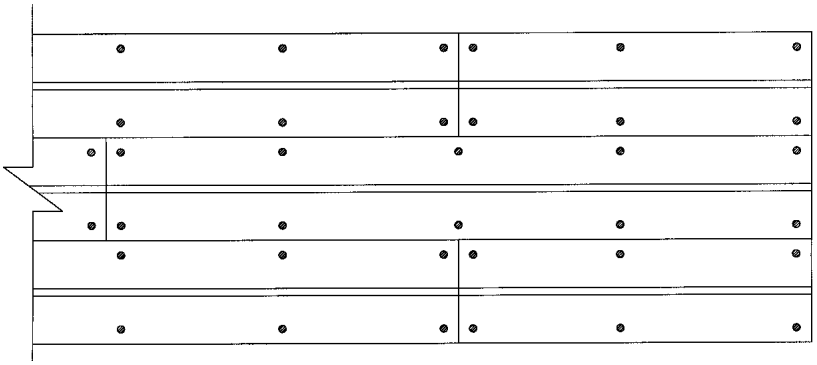


Figure 22: Fasten panels with 10 screws.

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 tubing placement (see **Figures 23 and 24**).
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 tubing turns.

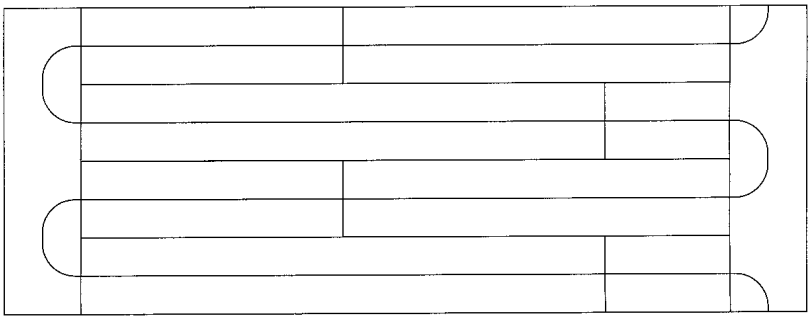


Figure 23: Correct panel placement for serpentine pattern

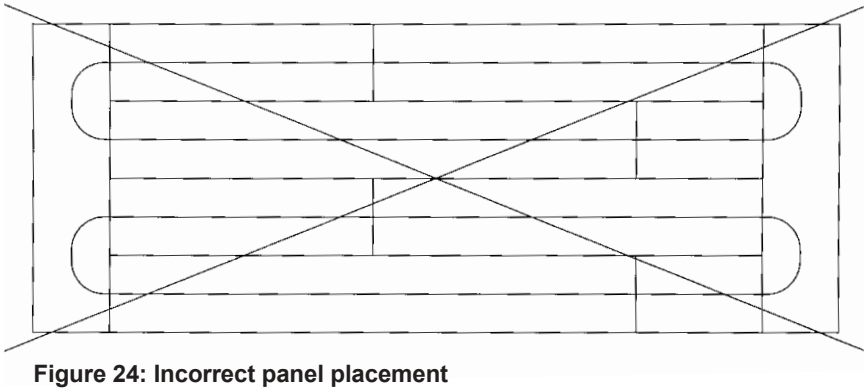


Figure 24: Incorrect panel placement

Final floor preparation

Use ½" plywood or similar product to fill any small areas not covered by panels (see **Figure 25**). 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 13 and 14** on **page 10**).

Note: Leader length is crucial when calculating the number of loops for a given room. When calculating the amount of tubing 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 13 and 14** on **page 10**.

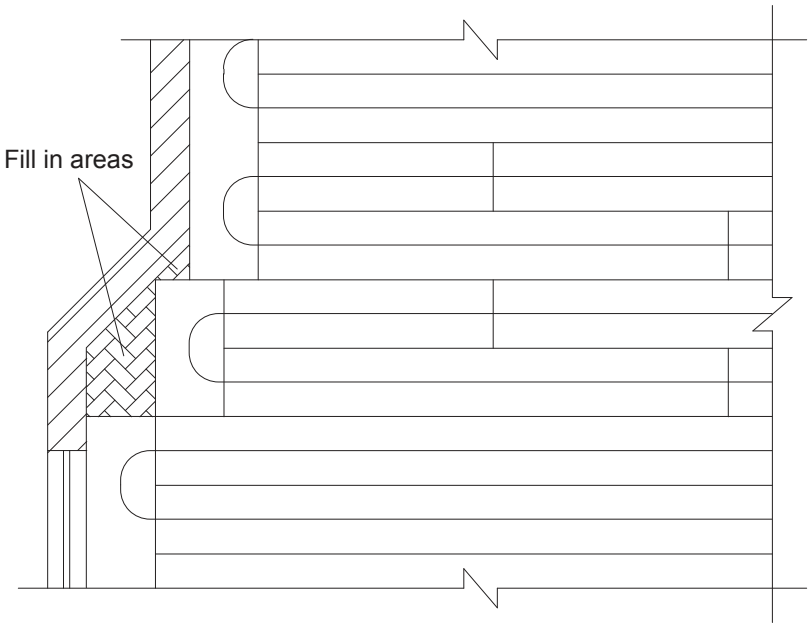


Figure 25: When installing the panels in a room with an alcove or bay area, remember to allow enough room for the return panels. Fill any areas not covered with panels with ½" plywood.

Tubing installation

When the manifold location is below the subfloor, each supply and return run requires a ⅜" Metal Bend Support (A5110375) to ensure tubing 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 26**). 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 27**).

Next, vacuum the groove to remove all debris.

Begin the tubing 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.

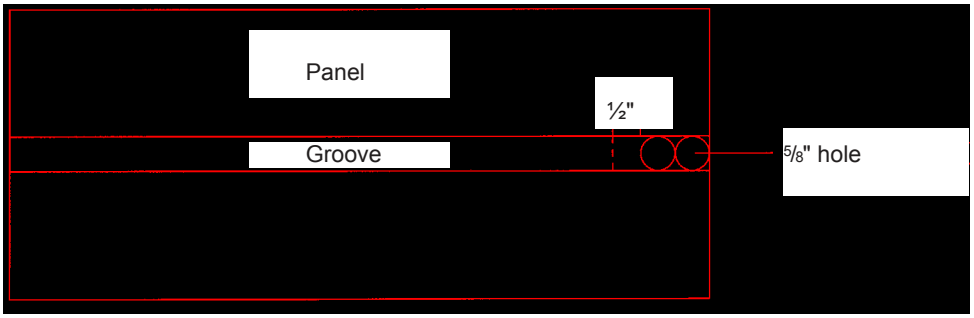


Figure 26: Drill two holes to create a rectangular slot in the subfloor.

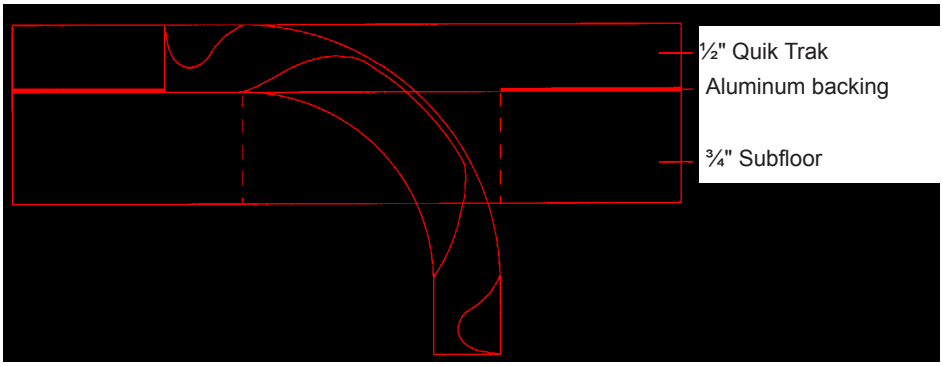


Figure 27: Trim aluminum backing to allow bend support to be flush with the top of the panels.

Tubing installation (cont.)

Once the tubing is attached to the supply manifold, secure the 3/8" Metal Bend Support to the tube 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 tubing that will remain below the floor. Then position the bend support at the desired point on the tubing and snap the tubing into place. Finally, push the bend support into the hole that you drilled in the Quik Trak groove.

The tubing is now attached to the supply manifold and is through the subfloor. Next, insert a 1/8" bead of 100% silicone sealant to the entire length of the Quik Trak straight panel grooves only (see **Figure 28**). Do not apply the silicone sealant to the return panel grooves. Next, walk the tubing into the groove. Hard-soled boots or shoes are recommended (see **Figure 29**).

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

Repeat the process of applying the sealant and placing the tubing into the groove until you are a few feet from the pre-drilled hole for the run back to the return manifold. Slide the tubing through the hole and install a 3/8" Metal Bend Support as outlined in **Figure 27**. Finish by connecting the tubing to the return manifold. Repeat this procedure for any additional loops on the manifold.

Figure 28: Apply a thin, 1/8" 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 29: Use hard-soled boots or shoes to walk the tubing into the panel groove.

Pressure testing

Once you are finished with all the loops to a specific 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.

Appendix A — Advanced Design Suite™ (ADS) worksheet

Project information

Project name _____ Date received _____

Project location _____ Date design due _____

Contact person _____ Contact number _____

Design information

Outdoor design temp.	

Default settings/components***	
Wall R-value	
Ceiling R-value	
Window R-value	
Skylight R-value	
Door R-value	
Air change/hour	

Suspended floors	
Under-floor insulation R-value	

Slab-on-grade floors	
Water table present	
Under-slab R-value	
Water table temperature	
Edge R-value	
Slab depth	
Perimeter R-value	

Notes

_____

_____

_____

_____

_____

_____

_____

_____

Plan information

Floor level _____

Room name								
Room temp.								
Zone number								
Gross floor area								
Unheated floor area								
Net ceiling area								
Average wall height								
Floor construction*								
Floor type**								
Floor covering***								
Distance to manifold								
Assigned to manifold number								
Wall 1 (L x H)	X	X	X	X	X	X	X	X
Wall 2 (L x H)	X	X	X	X	X	X	X	X
Wall 3 (L x H)	X	X	X	X	X	X	X	X
Door 1 (L x W)	X	X	X	X	X	X	X	X
Door 2 (L x W)	X	X	X	X	X	X	X	X
Window 1 (L x W)	X	X	X	X	X	X	X	X
Window 2 (L x W)	X	X	X	X	X	X	X	X
Skylight (L x W)	X	X	X	X	X	X	X	X

***Floor construction**
Slab on grade = SO
Slab below grade = SB
Suspended over heated = SH
Suspended over unheated = SU

****Floor type**
Concrete slab = C
Poured underlayment = U
Single plates = S
Double plates = D
Joist (tubing alone) = J
Joist Trak™ = JT
Quik Trak = QT

*****See Appendix D for R-values**.

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	Tubing size										
I	Floor covering R-value										
J	Differential temp.										
K	Tubing 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 ADS printout (upward load).

F Enter the "Floor Unit Load" value from ADS 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 tubing size available for Quik Trak is 5/16" Wirsbo hePEX.

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

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

K Tubing 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 tubing installed within the room (i.e., active loop).

N Enter the length of the tubing 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	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"
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						
Vinyl	0.20					
Linoleum (uninsulated)	0.20					
Linoleum (insulated)		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	1/8"	1/4"	3/8"	1/2"	5/8"	3/4"
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				

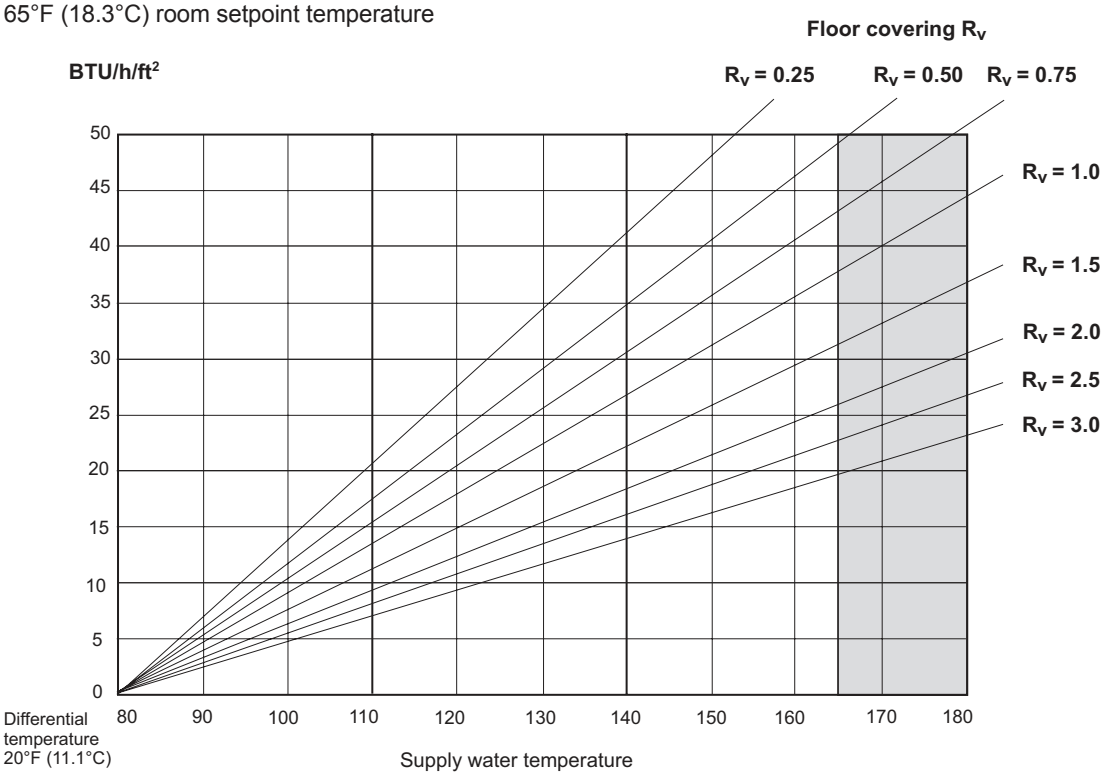
Windows	
Single glass	0.91
Single glass with storm	2.00
Double glazed – 3/16" air space	1.61
Double glazed – ¼" air space	1.69
Double glazed – ½" air space	2.04
Double glazed – ¾" air space	2.38
Double glazed – with suspended film	2.77
Double glazed – with 2 suspended films	3.85
Low-E	3.13
Low-E – with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

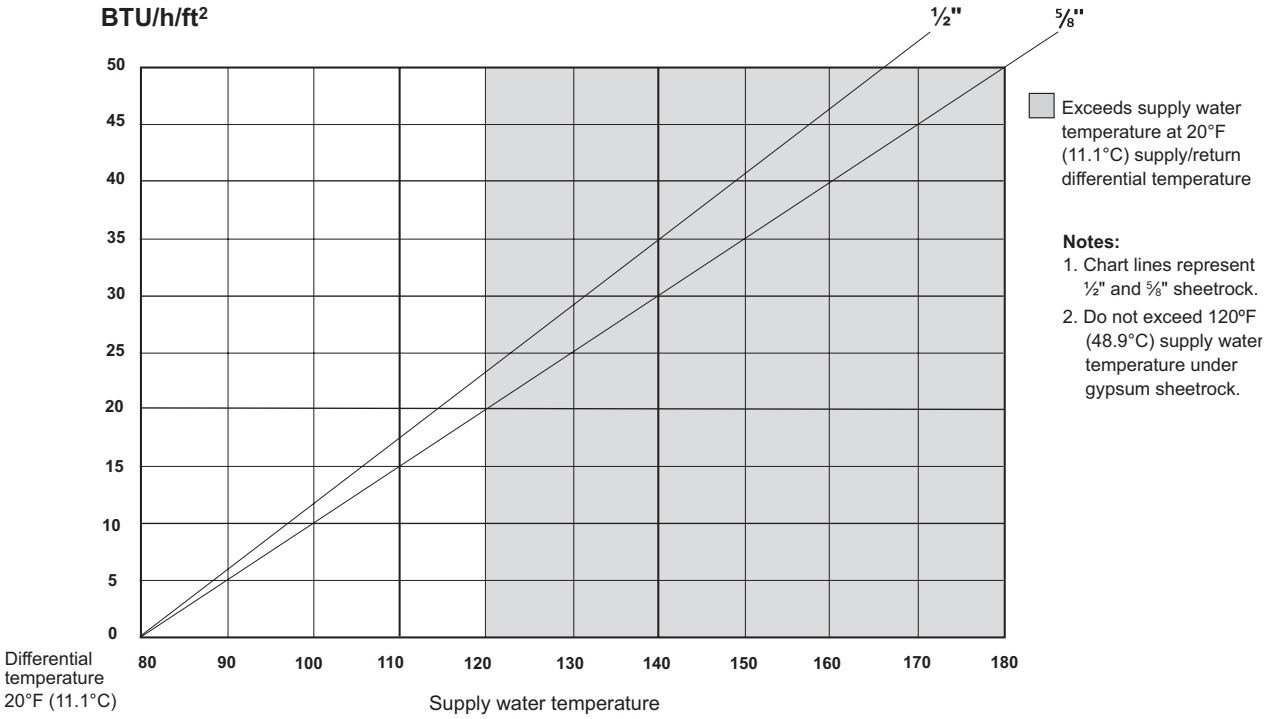
65°F (18.3°C) room setpoint temperature



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



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 tubing 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 tubing 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 tubing.

  15 x 2 = 30 ft.
  Vertical distance of tubing 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 tubing (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 120ºF (48.9°C)

20ºF (11.1°C) supply/return differntial flow in GPM per foot of tubing

BTU/h/ft²	7" tubing on-center distance
50	0.00296
49	0.00290
48	0.00284
47	0.00278
46	0.00272
45	0.00266
44	0.00260
43	0.00254
42	0.00248
41	0.00242
40	0.00236
39	0.00231
38	0.00225
37	0.00219
36	0.00213
35	0.00207
34	0.00201
33	0.00195
32	0.00189
31	0.00183
30	0.00177
29	0.00171
28	0.00166

BTU/h/ft²	7" tubing on-center distance
27	0.00160
26	0.00154
25	0.00148
24	0.00142
23	0.00136
22	0.00130
21	0.00124
20	0.00118
19	0.00112
18	0.00106
17	0.00101
16	0.00095
15	0.00089
14	0.00083
13	0.00077
12	0.00071
11	0.00065
10	0.00059
9	0.00053
8	0.00047
7	0.00041
6	0.00035
5	0.00030

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

5/16" Uponor PEX-a — 100% water — feet of head per foot of tubing

Velocity (ft./sec.)	GPM	80ºF 27ºC	90ºF 32ºC	100ºF 38ºC	110ºF 43ºC	120ºF 49ºC	130ºF 54ºC	140ºF 60ºC	150ºF 66ºC	160ºF 71ºC	170ºF 77ºC	180ºF 82ºC	190ºF 88ºC	200ºF 93ºC
0.5	0.10	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
0.6	0.13	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
0.7	0.15	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
0.8	0.17	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
0.9	0.19	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
1.0	0.21	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
1.1	0.23	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
1.2	0.25	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
1.3	0.27	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
1.4	0.29	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
1.5	0.31	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
1.6	0.33	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
1.7	0.35	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
1.8	0.38	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
1.9	0.40	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
2.0	0.42	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
2.1	0.44	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
2.2	0.46	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
2.3	0.48	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
2.4	0.50	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
2.5	0.52	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
2.6	0.54	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
2.7	0.56	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
2.8	0.58	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
2.9	0.61	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
3.0	0.63	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
3.1	0.65	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
3.2	0.67	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
3.3	0.69	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
3.4	0.71	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).

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