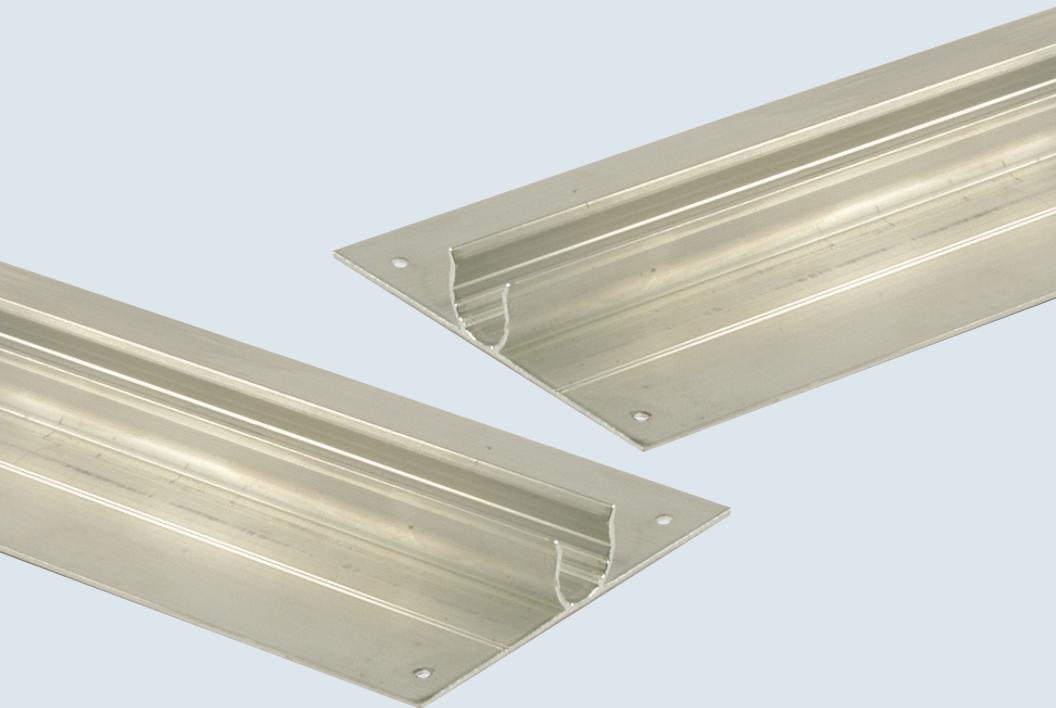


uponor

Joist Trak™

Heat-Transfer Panel

Installation Guide



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Section 1

Joist Trak™

Heat-Transfer Panel Overview



Introduction

Joist Trak™ heat-transfer panels provide fast and effective installation of radiant heat in virtually every application (floors, walls, and ceilings). The rigid channel construction makes it easier to fasten Wirsbo hePEX™ pipe into place tightly and securely. Joist Trak is also an excellent alternative to poured floor underlayments.

- Outstanding for both new construction and retrofit
- Excellent thermal conductivity makes it the ideal material for today's radiant heating systems
- Increased heat output and more uniform floor temperatures, at lower water temperatures, compared to staple-up installations
- Easily installed from below the subfloor with no alteration to existing or planned wood-frame floor construction

Figure 1: Joist Trak Heat-Transfer Panel

- Adaptable for above floor, wall, and ceiling applications
- No need for additional straps or fasteners to secure Wirsbo hePEX pipe
- Open-channel design leaves pipe runs fully visible and accessible during installation
- Convenient 4-foot lengths simplify ordering, handling, and installation (if necessary, Joist Trak can be easily cut to length on the job)
- Joist Trak system's low mass allows for quicker response time to changes in room temperature compared to high-mass systems

Section 2

Joist Trak Heat-Transfer Panel Specifications

Product Name	Part Number
Joist Trak, $\frac{3}{8}$ " Heat Transfer Panel	A5080375
Joist Trak, $\frac{1}{2}$ " Heat Transfer Panel	A5080500

Technical Information	$\frac{3}{8}$ "	$\frac{1}{2}$ "
Overall Height	0.546"	0.675"
Internal Channel Diameter	0.515"	0.640"
Wall Thickness	0.050"	0.050"
Width	3.5"	3.5"
Length	48"	48"

Typical Joist Trak Construction Method

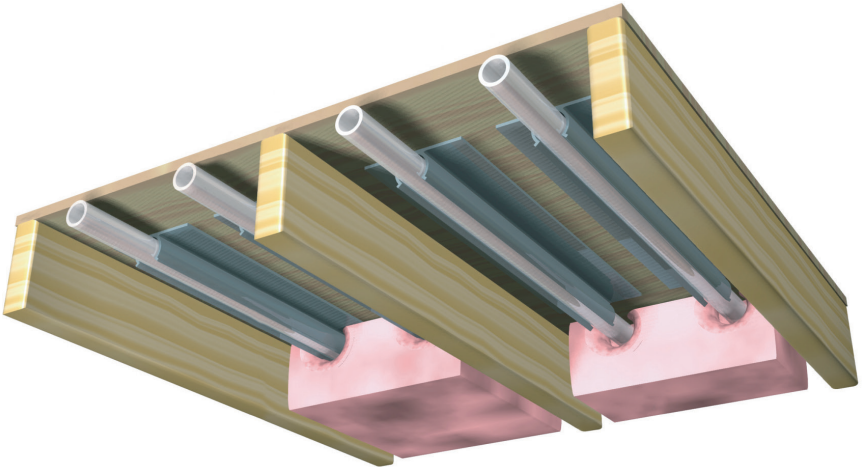


Figure 2: Typical Joist Trak Construction Method

Filler Boards

When installing Joist Trak panels to the face of a wall or ceiling, it is necessary to provide $\frac{5}{8}$ " thick filler boards between the channels of the panels ($\frac{5}{8}$ " sheetrock is commonly used). For 8" on-center wall spacing, use 7" wide filler boards. For 12" on-center ceiling spacing, use 11" wide filler boards.

The filler boards or sheetrock provide an even surface for finish material application. Install $\frac{3}{8}$ " or $\frac{1}{2}$ " sheetrock directly over the filler boards.

Manifold Connections and System Startup

Refer to **Chapter 5** in the Uponor Residential Radiant and Hydronics Installation Handbook for specific manifold connections and system startup instructions.

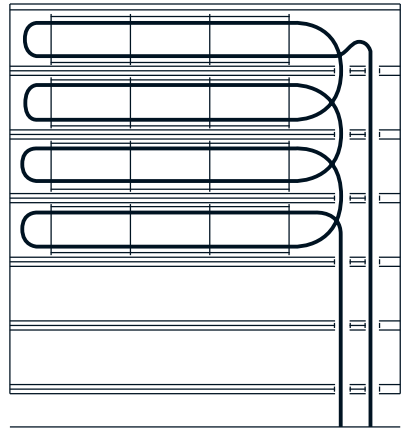


Figure 3: Pipe Runs for Joist Trak Installation

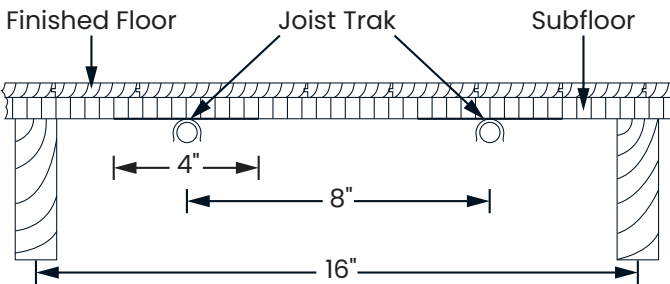


Figure 4: Below Subfloor Installation

Section 3

Joist Trak Heat-Transfer Panel Design

Design Notes

The Joist Trak heating system design incorporates many of the same required calculations and parameters discussed in the Uponor Complete Design Assistance Manual (CDAM). However, Joist Trak design utilizes a separate Water Temperature Chart (see **page 8**) and uses a simple material calculation formula for the panels.

Step 1

Determine the Heating BTU/h Requirements

Perform a complete room-by-room, heat-loss analysis of the areas to be heated using Uponor LoopCAD®. For information about radiant floor and ceiling system design, refer to the CDAM or contact Uponor Construction Services at 888.594.7726.

Step 2

Determine the Required Heat Output

Once the heating requirement (heat loss) is known, use the following formula to determine the BTU/ft² output required.

$$\text{Required Heat Output (BTU/ft}^2\text{)} = \frac{\text{Heat Loss}}{\text{Net Area (sq. ft.)}}$$

Step 3

Select the Pipe Size and Joist Trak Spacing

The Joist Trak system is generally based on an 8" on-center design to accommodate the typical 16" on-center floor joist construction found in most modern wood-frame structures. It is possible to find 24" on-center spacing in older homes. As this spacing is still a multiple of eight, 8" on-center Joist Trak spacing remains applicable.

Discuss construction practices and joist spacing that differ from the above, as well as structures with low-heating requirements with an experienced designer to determine acceptable Joist Trak spacing and system alternatives.

Step 4

Determine the System Supply-Water Temperature

Use the Joist Trak Water Temperature Chart (**Figure 5**) to determine the system supply-water temperature.

1. Find the required Joist Trak output on the left side of the chart and extend a line to intersect with the floor covering R-value line.
2. From this intersection, extend another line straight down. Find the supply water temperature at the bottom of the chart.

3. If the supply water temperature is above 160°F (71.1°C), or if the surface temperature is above 87.5°F (30.8°C):
 - a. Check the heat-loss calculations for accuracy.
 - b. Choose a floor covering with a lower R-value if possible.
 - c. Reduce the heat loss of the area (e.g., increased insulation, new windows).
 - d. Include supplemental heating for the area (e.g., Joist Trak wall or ceiling heating, baseboard, air handler, etc.).

**Water Temperature Chart
Based on 8" On-Center Spacing**

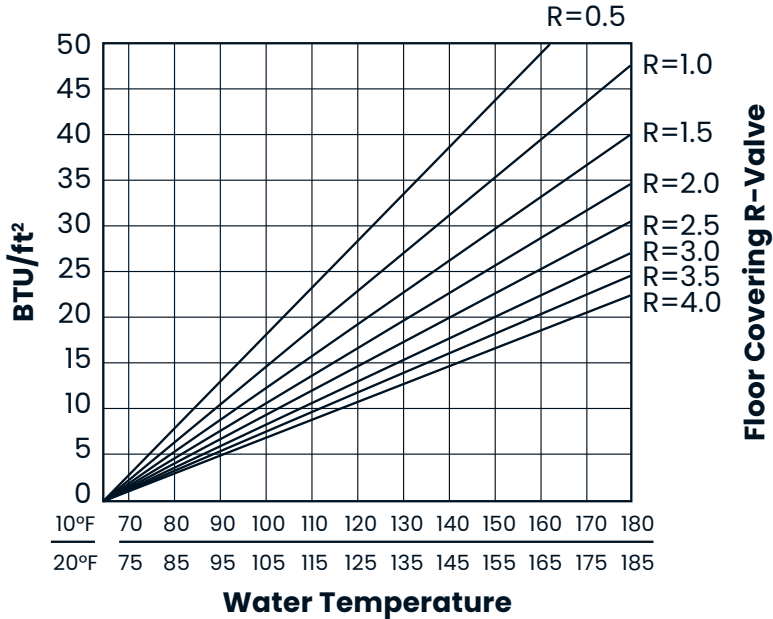


Figure 5: Water Temperature Chart Based on 8" On-Center Spacing

Step 5

Calculate the Piping and Joist Trak Panels Needed

Piping

Multiply the net area by 1.5 to determine the piping required for 8" on-center spacing. Be sure to include the supply and return runs to the manifold location.

Joist Trak

Multiply the total length of pipe by 0.85. This takes into account the turns at the end of each run that are not used by Joist Trak. (Do not include the supply and return runs to the boiler and manifold for this calculation.) Divide this number by four (for 4-foot Joist Trak lengths) to get the estimated number of Joist Trak panels required for the area.

Number of Loops

The maximum circuit length for a Joist Trak loop is 200 feet for $\frac{3}{8}$ " pipe and 300 feet for $\frac{1}{2}$ " pipe. The maximum area that can be covered per loop using 8" on-center Joist Trak spacing, including a 10" supply and return leader, is 186 sq. ft. using $\frac{3}{8}$ " pipe and 247 sq. ft. using $\frac{1}{2}$ " pipe. Taking into account the supply and return runs to the manifold location, determine the number of loops. If the boiler location is a great distance from the area to be heated, establish a remote manifold location.

Step 6

Calculate the Flow Rate and Pressure Drop

Refer to the CDAM to calculate the flow rate and pressure drop.

Section 4

Joist Trak Heat-Transfer Panel Installation

Joist Trak Installation

Install the Joist Trak panels with either screws or nails into the prepunched mounting holes. If available, a power nailer or screw gun helps facilitate the installation process. Install the panels with a minimum ¼" gap between them to allow for expansion and contraction. This gap can also be as wide as 5" to help maximize the Joist Trak coverage area and minimize the amount of panels that have to be cut to fit into the end of joist bays. The ends of all joist bays require a minimum of 12" and a maximum of 18" to loop the piping from panel-to-panel and bay-to-bay.

Note: Joist Trak panels are easily cut on a standard miter saw (with a carbide blade) or with a hand hacksaw. Remove any burrs left on the Joist Trak panels before installing them.

Installing the Piping

Once the Joist Trak panels are installed, snap the pipe into the channel of the panels. Use a rubber mallet to tap the pipe securely into place. When working overhead, use a suitable length of construction lumber (2" x 4") to push the pipe into place.

When drilling holes in joists for the pipe to pass from bay to bay, allow sufficient clearance for sleeving of the piping. Never exceed the pipe's minimum bending radius, and make sure the pipe does not rub against the joist hole. See **Chapter 5** in the Uponor CDAM for more information about construction methods.

Insulation

Install fiberglass batt insulation below all Joist Trak installations. Failure to provide suitable insulation decreases system efficiency and may not allow for sufficient heat output. Install insulation tightly against the Joist Trak panels to minimize air gaps between the subfloor and the insulation.

**Moving
> Water**

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