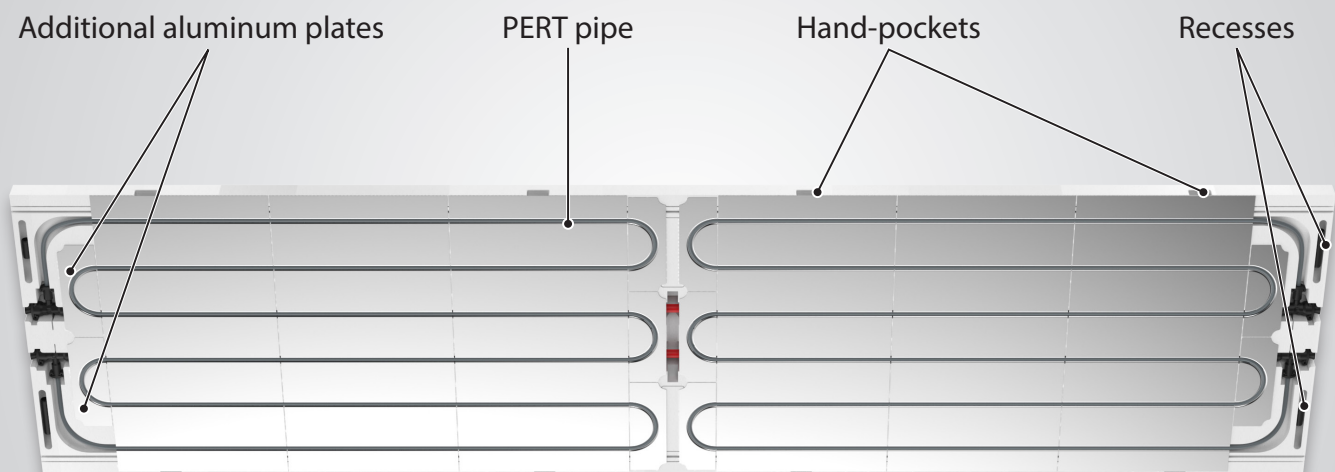




## Ray Magic® NK radiant ceiling panels, the most efficient radiant cooling and heating delivery system.

At Messana, we firmly believe that a radiant ceiling is more than just a ceiling — it's a canvas offering extensive possibilities in design and functionality. Our Ray Magic® NK ceiling panels are concealed behind the drywall, providing a uniform level of radiant heating and cooling that's entirely unseen. Consequently, this not only ensures a visually appealing space but also delivers an impressive uniform comfort level that will impress your guests.

Furthermore, Radiant heating and cooling increase your well-being, offer substantial energy savings, and reduce your carbon footprint — contributing to a healthier and more sustainable living environment.



Ray Magic® NK 2x8 (or 2x4)

Ray Magic® NK panels are high-performance, hydronic radiant panels designed for ceiling installation. They can be covered with regular drywall, or wood, or other ceiling materials, creating an unobstructed radiant surface.

Each panel consists of a 1½" thick EPS board and aluminum heat transfer plates with proprietary omega-shaped channels. Within these channels, two symmetrical radiant tubing serpentine are connected in parallel to the return and supply leaders that run along the length of each individual panel.

Lastly, the panels can be interconnected using patented push-in fitting technology, allowing for internal pipe expansion and contraction.



### How are Ray Magic® NK panels installed?

Ray Magic® NK radiant ceiling panels are installed 24" O.C. in between ceiling joists or furring channels. They can be installed using nails, screws, or staples. If furring channels are utilized, they may be either wood or metal.

During the design phase of your project, our engineers will use your room-by-room load calculations to ensure that the correct number of panels are incorporated to meet loads.

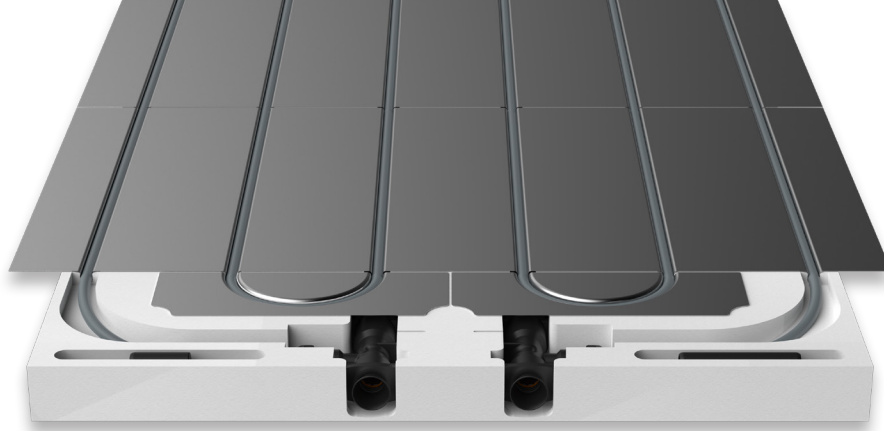
While heating loads are typically met at 40% ceiling coverage, cooling loads typically require >70% ceiling coverage.

New installation-ready 2x4 Ray Magic® NK panel added to the line



Ray Magic® NK 2x4

Although the full-size 2x8 panel can still be cut on the job site into two 2x4 halves, the new installation-ready 2x4 Ray Magic® NK panel comes with the 2-way fittings pre-installed and pre-tested at the factory. The 2x4 NK panel makes the system design more flexible and reduces the likelihood of installation errors.



## Quick Technical Specifications

**Heating capacity:** 24 Btu/h/sqft @100 °F (Max 52 Btu/h/sqft @130 °F) with 70 °F room temperature (with 5/8" gypsum board)

**Cooling capacity:** 21 Btu/h/sqft @55 °F (Max 31 Btu/h/sqft @46 °F) with 76 °F room temperature (with 5/8" gypsum board)

**Fluid operating temperature:** 46 °F to 130 °F

**Operating pressure:** 20 to 40 psi (pressure test at 100 psi)

**Water Content:** 0.23 gal [0.875 lt], equivalent to approximately 2 lb [0.9 Kg] of water

**Insulation:** 1 1/2" EPS board ASTM E84 (Class A rated, R-Value = 6.5)

## How does Radiant Cooling work?

To provide radiant cooling, cold water is pumped through Ray Magic® radiant ceiling panels, resulting in a cold ceiling surface temperature.

Thermal energy can only move from hot objects to cooler ones. So, in radiant cooling, thermal energy is being radiated from your body to the ceiling panels, resulting in a cooling sensation.



Consequently, this slightly increases the temperature of the panels, which are then cooled back down as we continue to pump chilled water through the ceiling.

### But how do we avoid condensation?

Luckily, since our panels have a low thermal mass, we can change their temperature quickly to avoid condensation. Messina Controls uses mSense room comfort sensors to monitor the dew point temperature, and then adjusts the radiant surface temperature to avoid condensation. Additionally, dehumidifiers can be incorporated to lower the dew-point within an environment, allowing us to use colder water within the radiant ceiling panels, increasing cooling output.





## Ray Magic® Radiant Cooling & Heating



### How does Radiant Heating feel?

People often compare radiant heat to the warmth you feel from the sun on a summer day - direct and comforting!

Radiant heating systems emit heat, reminiscent of the warmth from the sun or a nearby fire. In contrast to traditional methods that primarily focus on heating the air, this approach targets people and objects directly, offering a more energy-efficient solution.



### How does Radiant Cooling feel?

While traditional air conditioning systems chill air and blow it into your space, a radiant system conditions the objects and organisms inside of the environment rather than just the air.

Radiant cooling is most comparable to walking into a cave or parking garage where the walls are very cold. As soon as you enter the environment, you feel cooler, and this is the sensation of thermal energy leaving your body (heat extraction via a radiant surface)!



## Why a radiant ceiling?

- 1. Extra low thermal mass:** A low thermal mass results in a very fast responding radiant surface. This allows the system to deliver thermal comfort quicker than other high-mass radiant systems. Furthermore, a low-mass system allows the system to provide greater cooling output, because the radiant surface can stay close to the dew point and still be responsive enough react to changes in the dew point temperature.
- 2. Unobstructed radiant surface:** Unlike radiant floor systems which are covered by various types of floor coverings and furniture, a radiant ceiling provides an unobstructed radiant surface. This ensures the maximum amount of thermal energy is being exchanged with the environment to provide optimal comfort
- 3. Convection cycle in cooling:** As hot air rises, it contacts the radiant surface and is chilled. That air then falls and is replaced by warmer air, creating a speedy convection cycle that further improves cooling capacity. A convection cycle is not required in heating because the maximum radiant surface temperature is not as limited as the cooling surface temperature.

## Frequently Asked Questions:

### Doesn't heat rise?

No, hot air is what rises! Thermal radiation moves from hot to cold. So, we can heat from above, just like the Sun!

### Why should I choose radiant cooling and heating over a traditional forced air system?

There are a variety of reasons to go with a radiant system over a forced air system. Radiant systems efficiently provide even thermal comfort, allow for zoning, are more aesthetically pleasing, reduce noise, reduce dust movement, increase humidity in winter climates, and allow for a compact design with less ductwork.



## Ray Magic® Radiant Ceiling Pricing



### Material Cost:

Panels Only (heating only)	\$9/sqft
Panels + Controls (heating and cooling)	\$12/sqft

If your project requires heating only, you'll only need our radiant panels and relatively simple mechanical equipment. If your project calls for heating and cooling, it will require a robust control platform such as Messina Controls, more mechanical equipment, and a qualified installer.



### Installation Cost:

Panels Only (heating only)	\$25/sqft
Panels + Controls (heating and cooling)	\$35/sqft

Since modern hydronic systems are relatively new to installers in the US building industry, projects are still being quoted at a premium price. But as we see hydronics continue to grow in the US, we can expect to see installation costs fall.