RADIANT ENERGY
—A TIME-TESTED SOLUTION

The concept of heating by radiant energy has been around for thousands of years, dating back to the time of the Romans. Now, with modern manufacturing technology, hydronic radiant ceiling panels are providing designers and engineers with new solutions for their projects.

In the 1950s, Airtite Contractors developed, supplied and installed some of the first lightweight aluminum radiant heating and cooling ceiling systems in the United States. These systems were installed in a variety of venues, including offices, schools, hospitals, convention centers, airports and universities.

We’ve come a long way since our first systems, having developed even more innovative and efficient methods to provide radiant energy. Today, Steel Ceilings has elevated its use into sophisticated panels that work well in many types of designs, providing unparalleled, clean comfort qualifying for green-building projects.

Our six flexible types of panels offer architects and engineers a solution that fits the look, space and energy requirements for many kinds of applications.

COMFORT, AESTHETICS, FLEXIBILITY

Imagine an environment with no drafts—just quiet, clean and consistent heating and cooling, usually at a cost well below traditional systems.

For decades, people have recognized that a radiant heated environment is one of the most comfortable and green-friendly options available. The reason? It’s all about heating surfaces versus transferring energy by natural or forced convective air currents. By elevating room surface temperatures close to the room air temperature, occupants enjoy greatly improved comfort levels.

Because it’s more efficient to transfer energy through water than air, hydronic radiant energy provides additional fuel savings over all air systems, whether heating or cooling. And the mechanical simplicity of the system results in minimal maintenance costs.

SMART HEATING AND COOLING TECHNOLOGY

In heating applications, the Steel Ceilings Airtite Radiant Panels use ceiling panels with elevated surface temperatures to transmit heat to colder surfaces. In turn, surfaces—including the people in the room—absorb and re-radiate the heat, keeping a consistent level of warmth inside.

In radiant cooling, radiant ceiling panels use reduced surface temperatures to absorb heat from windows, room surfaces and occupants, again, making for an extremely comfortable living environment.

Cold water circulating through radiant panels carries off the sensible heat absorbed by the panels. The entering water temperature is kept above the dew point of the space to avoid condensation.

A BETTER DESIGN OPTION

Steel Ceilings Airtite Radiant Panels also give designers a welcome alternative when planning spaces. Traditional perimeter baseboard systems and radiators require extra floor space and present limitations in furniture placement, in order to avoid blocking convective airflow. But radiant ceiling panels eliminate any of these concerns, instead bringing the solution to the space above.

The six types of panels Airtite offers, available with variations, will complement your design and fit into nearly any kind of ceiling, including acoustic ceilings, gyp board and soffits—and even open or no-ceiling configurations. They can be painted almost any color and repainted in the field. Installation, too, is straightforward: The panels can be field modified, allowing them to be cut, notched or mitered.

INSTALLATION

AR-X, AR-D, AR-L & AR-C

Panels are designed with cross-bracing near each end of the panels with additional cross-bracing (number of braces is based on the length of the panel) spread out between the ends of the panel.

AR-M & AR-B

Installation options include within a suspended ceiling, mounted in visible sections, & concealed installation above a perforated panel or drywall for a monolithic appearance.
Because surfaces are uniformly heated or cooled, occupant comfort is achieved at lower winter design temperatures and higher summer design temperatures.

Energy consumption is reduced by using hydronic heating/cooling and design temperatures as described above.

Panels provide excellent architectural appearance with a large array of existing and new design creations.

Can be incorporated in various ceiling types: lay-in, drywall, soffits, concealed grid, cloud systems, wall-to-wall metal ceilings and with no ceilings, providing unrestricted floor space.

Ceiling panels avoid being scratched, bumped or dented.

Efficient, lightweight radiant panels will heat up and cool down quickly.

Reduced air quantities in cooling mode used for ventilation and dehumidification, with 100% outside air allow for high-quality filtration.

Wet coils used in traditional cooling—which provides breeding areas for bacteria and viruses—are eliminated. "Once-through" air systems eliminate cross-contamination of infectious airborne diseases.

Slab-to-slab height can be reduced, resulting in smaller ducts, reduced plenum heights and lower air flows. Mechanical equipment rooms are smaller and the radiant system is located in the ceiling, giving full utilization of floor space.

Mechanical construction costs are reduced by utilizing smaller air handlers, smaller duct sizes, and elimination of VAV systems. In addition, reduced slab-to-slab heights are realized.

Hydronic systems generally require 20% of the energy used by all air systems. Since there are no moving parts in the radiant system, maintenance costs are minimal.

Radiant systems previously evaluated against other typical HVAC systems have shown to have a life-cycle cost advantage.

Perforated panels with insulation can provide noise reduction levels that are higher than standard acoustical ceilings.

A combined radiant panel cooling system designed with a dedicated outdoor air mechanical system offers the potential to earn LEED certification points.
This extruded aluminum hydronic panel not only transfers hot and cold radiant energy efficiently, but also is aesthetically pleasing. Its efficiency is due to a transfer saddle that covers more than half the circumference of the copper tubes on the back of the panel, delivering optimum hot and cold energy conveyance.

Panel widths are available from 4" to 36"—and even wider, if required—with maximum lengths up to 16'. Extensive testing indicates the Airtite AR-X panel performance is on a par or better than any other radiant panel, including those with larger tube diameters. The fluted face of the AR-X panel also enhances the finished interior detail.

As with all Steel Ceilings Airtite Radiant Panels, there's no need for perimeter baseboard, covers or other floor-mounted heating systems, so you'll enjoy greater design freedom.

Hydronic perimeter radiant systems provide a more comfortable environment by heating surfaces, not air. In fact, ASHRAE has found that thermostat set points can be 3 to 4 degrees lower than traditional heating systems. Owners will enjoy increased comfort, lower energy costs and lower maintenance costs over the life of the system.
The AR-D Diffuser Panel is the perfect complement to a clean-line ceiling arrangement. Best of all, this combination radiant diffuser panel generally has lower material and installation costs than separate heating and linear air diffuser systems.

Like the AR-X system, the AR-D offers the same kind of piping and flexibility advantages. This design incorporates an integral hydronic radiant panel with a linear air diffuser. There’s no separate assembly of an air diffuser radiant panel, making for a more seamless, streamlined and aesthetic look.

The AR-D also offers a two-fold benefit: longer, continuous extruded panels that often can extend wall to wall without joints and increased total output due to air flowing across the panel, boosting total heating capacity by as much as 35 percent.

Designers also will appreciate that the pattern controller can be located anywhere along the slot, with supply plenums directly above the diffuser section. Air pattern controllers can range from 1’ to 5’ long with vectoring for left, right or vertical air flow. Together, these features provide for maximum design flexibility and lab-tested, proven airflow efficiency.
These panels are designed and manufactured to fit standard ceiling grids, with a look that matches acoustical ceilings. Airtite's AR-M modular panels fit seamlessly into traditionally designed ceilings, at the same time providing the efficiency of hydronic heating and cooling.

The .040" formed aluminum panel is available in 2' x 2’ and 2’ x 4’ standard sizes, with a 1” batt of insulation. The lightweight design has six-pass sinuous coils metallurgically bonded/soldered to the back of the aluminum panel, providing optimal heat transfer. These panels can be silk screened to match adjacent acoustical ceiling tiles. Custom sizes can be made on request.

Airtite's modular panels are a welcome choice for those looking for options in acoustical ceilings, recess mounts in drywall or surface mounts. Most ceiling grids will support the panels which, when filled with water, weigh less than 2 lbs. per square foot and require no additional suspension.
The AR-B panels are architectural perforated metal ceiling panels that can be designed for various suspension systems such as Torsion Spring, Lay-In, etc. The panels can be provided in various sizes, metals, thicknesses, and perforation patterns. Typically the panels are fabricated with aluminum which provides the best heat transfer and hence the best radiant performance.

The panels are made “active” by bonding aluminum extrusions (heat transfer rails) incorporating integral sinuous copper coils to the back of the panels. Fleece can be installed between the extrusions for both appearance and noise reduction. With this or other insulation (such as fiberglass or recycled cotton), these architectural perforated panels can achieve high NRC values that exceed typical standard mineral tile ceilings. Flexible braided SST hoses with oxygen barrier and push fit fittings (ideal for installation and facilities personnel) are used to interconnect the panels and connect to the piping supply and return.
By separating the linear radiant elements with a gap, the AR-L and AR-C couple the radiant cooling effects of standard radiant panels with a high convective component.

Chilled AR-L and AR-C ceilings create natural convection by cooling the surrounding air as it passes over the surface facing the plenum.

As the denser air falls into the occupied zone, warmer air is pulled over the element, combining the increased convective cooling capacity of the AR-L and AR-C with the radiant capacity of the cool surface. The approximate breakdown of heat transfer of the chilled radiant system is 30% by thermal radiation and 70% by natural convection.

When used for heating the AR-L and AR-C transfer heat mainly through thermal radiation with room surfaces, where they increase the average unheated surface temperature of the room.

AR-L and AR-C can be installed in a variety of applications including full or cloud ceiling areas. Special design options such as hinged modules, sprinklers, lighting openings, air intake, etc., are available.