



Business Partner



OVERVIEW

The Airius Thermal Equalizer product line is designed to create a more pleasant working/living environment and to reduce total energy consumption, which results in significant annual cost savings.

DEFINING THE PROBLEM

First it is important to understand and appreciate the natural phenomena of "temperature gradients." Temperature gradients, or levels, occur when there is minimal air movement within an enclosed building space. The hot air generated by a building's heating system steadily rises to the ceiling. The same holds true for the warm air created during the day by the sun striking a building's roof and southerly facing outer walls. Conversely, cold air sinks to the floor. The net effect is that the ambient temperature at ceiling level is substantially higher than the temperature at floor level.

- How great is this "substantial" differential? If the heating system's thermostat is set to maintain a comfortable environment at floor level, the temperature at ceiling level typically will be between 0.5 and 1.0 degrees Fahrenheit higher per foot of vertical elevation.
- What is the net effect? In a typical open manufacturing or warehouse space (assuming 20' to 50' ceiling heights) the temperature at ceiling level can easily reach over 100 degrees Fahrenheit while the temperature at floor level is barely at comfort level.

Thermal equalization is the obvious answer to the situation. But, how is "thermal equalization" achieved?

PRESENTING THE SOLUTION

Airius Thermal Equalizers are specifically designed to efficiently and silently move large quantities of hot ceiling air in a downward direction to the floor. Each unit measures approximately 16" in height and is about 12" in diameter. The external shape is very similar to that of a modern jet engine. The big difference is that the "engine" is mounted so that the exhaust-end points downward.

Inside each unit highly efficient fan blades interact with a patented uniquely designed multiple vane stator assembly. The net result is a column of air that smoothly flows in a downward direction up to a distance of 60 feet.

A typical Airius System installation is comprised of a series of units working in concert to address the thermal equalization requirement of an enclosed open high-bay environment.

After start-up (and in a relatively short period of time) an almost uniform temperature balance (floor to ceiling) is achieved throughout the installed space. Once "thermal equalization" is achieved, several very dramatic things begin to happen.

- The difference between ceiling and floor temperature readings is substantially reduced. Studies indicate that over time, this difference will stabilize to between 1 and 2 degrees Fahrenheit; thus, the comfort level of the environment is dramatically increased. There are no "cold or hot spots" at floor level, nor is it "hot upstairs and cold downstairs."

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Over the short span of a few weeks, the previously wasted heat energy that was at ceiling level (and escaping through the roof) is increasingly transferred into the mass of the floor and onward into the ground beneath it. A gigantic multi-thousand ton "heat battery" is created. Just as it is possible to have "perma-frost" soil, it is also possible to create "perma-warm" soil.

- The result is that the total "thermal mass" of a building (including its furnishings, machinery and contents) stabilizes to the same temperature. In a very short period of time there is a dramatic decrease in heating system utilization. In recent experiments, the outside air temperature at night was in the mid-twenties; the heaters rarely turned on. Energy utilization dropped by over 50%.
- A three to four day snowstorm or weeklong cold snap is no match for thousands of tons of building mass and months of stored thermal energy. It is also important to remember that the sun produces significant heat energy during the winter months (just put your hand on a black car, even on a cloudy day). When it is bitter cold outside, radiant heat energy is still being generated during daylight hours.

WHAT ABOUT COOLING?

Thermal gradients can also cause discomfort and excessive energy utilization problems during the summer months. Typically floor level areas near cooling outlets are very cool indeed, while the rest of the occupied zone may be overly warm. In many cases, the total internal volume of a building must be overcooled in an attempt to maintain reasonably cool temperatures in non-directly cooled areas. The net result is increased energy consumption and cost. The benefit of thermal equalization is a consistent and uniform temperature gradient, which in turn results in the elimination of areas that are overcooled in order to maintain an acceptable temperature in other areas. This does not mean the elimination of cooling costs but, instead, the elimination of "overcooling" costs. So even during the hot summer months, Airius Thermal Equalizers reduce energy consumption and pass the cost savings on to you.

HOW DOES THE AIRIUS THERMAL EQUALIZER WORK?

As previously described, each Airius Thermal Equalizer is basically an extremely efficient air turbine that is suspended just below ceiling height. Each unit takes in resident hot ceiling air and silently transports it to the floor in the form of an almost imperceptible air column. Unlike a ceiling fan, the air is highly directed in a downward direction and not simply swirled around. Each unit is capable of "equalizing" somewhere between 1,000 and 1,500 square feet of open floor area; roughly a 40 foot diameter circle.

The direct financial benefits of an Airius System installation are profound:

- Recent tests have conclusively demonstrated that an 18,000 square foot manufacturing facility in Colorado has reduced its annual heating bill of \$24,000 by half. That's \$12,000 per year of reduced operating expense, or put another way, potential increased profit.
- An Airius System will pay for itself (equipment and installation costs) within one to four years. The major influencing factors are ceiling height, building configuration and geographical location.
- Airius Systems are inexpensive to install and operate. Each individual Model 25 unit for buildings with ceilings up to 25 feet in height consumes about the same energy as a 35-watt light bulb.

- The costs associated with system maintenance are minimal. The suspended electrical conduit installation system allows for a simple swap-out of units for annual or periodic cleaning. Cleaning and maintenance frequency will naturally be a factor of the environment.
- In many environments once thermal equalization and mass stabilization are achieved, there will be no need to run the Airius System 24 hours a day. The Airius System effectively becomes a building's low-cost supplemental heating system. All the Airius System has to do is maintain a constant thermal mass temperature.
- In addition to the cost savings achieved through reduced energy utilization, there is also the benefit of reduced wear and tear on the originally installed heating and cooling systems from reduced on/off cycles. This is a significant consideration.
- In certain situations, there is also the benefit of reduced spoilage or damage to temperature-sensitive products due to temperature variations and/or extreme heat concentrations at elevated storage levels.
- In other specialized building applications such as pools, gymnasiums and indoor tennis courts, there is significantly reduced indoor moisture condensation—a comfort, health and facility maintenance benefit.
- In temperature sensitive manufacturing or process environments such as high quality offset printing, thermal equalization and stabilization creates a constant and dependable temperature environment. Precision machining tolerances, manufacturing and/or production process tolerances are more easily maintained.
- A significant factor to remember is that the Airius Thermal Equalization System results in a vastly improved level of comfort for staff, visitors and customers.

The Airius Thermal Equalization System represents a technological breakthrough in high-bay building energy utilization. Rather than wasting a free and clean natural resource, i.e. the sun's daily radiant heat energy, the Airius System silently and effectively utilizes that thermal energy, and passes the net savings on in the form of a direct operational cost reduction. In addition, the system's ability to eliminate the thermal gradient phenomena inherent in any large open space environment reduces the costs associated with overcooling during summer months.

IN SUMMARY

Airius Thermal Equalizers are easy to install, quickly pay for themselves, and ultimately reduce heating/cooling related operating costs by up to 50%. Your facility could benefit by installing an Airius Thermal Equalizer today.

ABOUT THE AIRIUS THERMAL EQUALIZER – Free Hanging Ceiling Models

The Airius Thermal Equalizer is designed to equalize the layers of hot and cold air in buildings and facilities with high ceilings. This state-of-the-art energy saving product is designed to create a more pleasant working/living environment and to reduce total energy consumption, which results in significant annual cost savings. The Airius Thermal Equalizer is an extremely efficient air turbine that is suspended just below ceiling height. Each unit takes in resident hot ceiling air and silently transports it to the floor in the form of an almost imperceptible air column. Unlike a ceiling fan, the air is highly directed in a downward direction and not simply swirled around. Each unit is capable of “equalizing” somewhere between 1,000 and 1,500 square feet of open floor area; roughly a 40 foot diameter circle.

ABOUT THE AIRIUS THERMAL EQUALIZER – Suspended Ceiling Models

The Airius Thermal Equalizer is designed to equalize the layers of hot and cold air in buildings and facilities with high ceilings. This state-of-the-art energy saving product is designed to create a more pleasant working/living environment and to reduce total energy consumption, which results in significant annual cost savings. The Airius Thermal Equalizer is an extremely efficient air turbine that is installed in a suspended ceiling grid, 2 feet by 2 feet. Each unit takes in resident hot ceiling air from below the suspended ceiling and silently transports it to the floor in the form of an almost imperceptible air column. Unlike a ceiling fan, the air is highly directed in a downward direction and not simply swirled around. Each unit is capable of “equalizing” somewhere between 1,000 and 1,500 square feet of open floor area; roughly a 40 foot diameter circle.

REFURBISH PROGRAM – AIRIUS THERMAL EQUALIZER - All Airius Models

AIRIUS offers a refurbish program on all Airius Thermal Equalizers that are no longer under the one-year warranty. Any Airius Thermal Equalizer that is no longer under warranty can be returned to AIRIUS and will be refurbished, or replaced, for one half the current price of the Airius Thermal Equalizer Model. The Refurbish Program does not cover units that are damaged beyond the normal expected usage of the product.

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AIRIUS is a proud partner of “Rebuild America,” a network of partnerships that foster energy efficiency and renewable energy in commercial, government and public housing buildings. For more information about Rebuild America, visit www.rebuild.org.