

PRODUCTS

PRODUCT:





ADVANCING THE SCIENCE OF AIR DISTRIBUTION

Redefine your comfort zone. [™] | www.titus-hvac.com

Rethink what air management systems can be. Revise your notion of functionality. Redefine your comfort zone.™

Comfort, Redefined.

Since 1946, Titus has focused on technologically advanced products that create the highest degree of comfort.

We've consistently led the industry by breaking the barriers of expectation and convention when it comes to technology. We've redefined how technology drives, influences and supports air management. And by being first to market with the most innovative approaches to air distribution, we're proud to say that the marketplace has taken notice, and is counting on us to lead the way into the next decade. A challenge we're more than happy to accommodate.

Titus has raised the bar on design, proving that functional can also be beautiful. And we've redefined what it means to be energy efficient, with a collection of smart technology products that optimize the use of natural resources.

Titus has also redefined what it means to work with an air management products partner. We pride ourselves on listening and responding so that we can not only meet expectations, but also exceed them. Service has been, and will always be, our main focus at Titus. And, it's why so many of our customers keep coming back.

Welcome to your new comfort zone. It starts here.

Overview



Installed along building perimeters to best handle extreme temperatures where they start – from the outside in - the TAO (Temperature Ambient Optimizer) provides superior thermal comfort in areas where high ventilation loads are needed, such as educational facilities and theaters. It combines the benefits of both chilled beam and displacement units, rolled into one system perfect for extreme climates.

Ideal for use in classrooms and theaters where air quality and sound are critical, the TAO supplies 100% outside air while meeting ANSI Standard S12.60 for acoustics in educational facilities.



Wood grain Finish Options

As sustainable design elements continue to dominate the commercial building industry, building owners, architects and engineers are looking for new and environmentally responsible solutions for everyday building needs without sacrificing performance or aesthetics. Titus' wood grain finishes offer an appealing substitute for wood and natural stone without harming the environment. Wood grain finishes allow for conservation of our natural resources while also offering a durable cosmetic alternative to conventional finishes with low-to-no VOCs.

BENEFITS

This dye sublimation process provides a finish that realistically resembles wood and stone, and is durable enough to be used in high traffic architectural applications. Is spaces where wood floors, ceilings or paneling are used, and architects would rather not see the required HVAC equipment, there are only a few options available such as using borderless installation methods, or paint and veneers which chip easily. The Titus wood grain finishes are so real and natural looking, you have to touch them to recognize the difference; and durable enough to be used in any architectural application.

Unlike natural wood, Titus' wood grain finishes are easy to clean and do not require the constant upkeep as wood products. They are available in either a smooth gloss or textured finish and will not deteriorate due to moisture, temperature extremes or corrosion. And of course you will never have to worry about termites. They will give you the look of high end wood grains, marbles, and granites with the durability of powder coating. Additionally, wood grain finishes offer high resistance toward all atmospheric agents and are resistant to heat, acids, humidity, salt, detergents and UV. All of the powders used are made in a TGIC free super durable formulation and meet the performance requirements listed in AAMA 2603 and AAMA 2604-2.



As the architectural industry searches for alternative materials to meet the growing demand for LEED and GREEN builds, Titus is proud to say that we are the first commercial HVAC company to bring this cutting edge technology to the U.S. market.

Redefine your HVAC aesthetics with high-performance metal products that look like wood and stone. There is really no limit to what you can create when you redefine your comfort zone.

TAO FLOOR MOUNTED DISPLACEMENT CHILLED BEAM

- » Perfect system for extreme climates
- » Suited for climate zones with heat loads greater than 250 Btuh per foot
- » Ideal for use in educational or healthcare facilities and/or similar environments
- » Simultaneous heating and cooling from one unit
- » Low noise levels, conforms to ANSI Standard S12.60
- » Designed to fit below windowsills
- » Multiple 5 or 6ft. units can be connected in series
- » Pencil proof grille



TAO

Installed on building perimeters to best handle extreme temperatures where they start – from the outside in – the TAO (Temperature Ambient Optimizer) provides superior thermal comfort in areas where high ventilation loads are needed, such as educational facilities. It combines the benefits of both chilled beam and displacement units, rolled into one system perfect for extreme climates.

ADVANTAGES

- Maximizes the displacement ventilation benefits and enhances the removal of space respiratory contaminants
- Dedicated heating coil to neutralize the thermal load of the window or perimeter wall
- 2 x 2 pipe vertical mounted coil with removable condensate tray for cooling during the Summer and to provide supplemental heating for the Winter
- Optional integral primary air parallel duct connection to minimize air pressure drop, noise and ease of installation





The Case for Chilled Beams in Schools HEALTH + FRESH AIR = BETTER PERFORMANCE FOR STUDENTS

We all know the importance of comfort in schools and comfort's relationship with student performance. While temperature gets the lion's share of attention, equally important are noise, humidity, and ventilation. Efforts to update standards to address noise, humidity, and ventilation have made it harder for traditional HVAC equipment to establish and maintain comfortable learning environments in schools.

Enter chilled beams.

In a chilled-beam system, zone-based hydronic heating and/ or cooling devices complement the primary air ventilation system, enabling the optimization of all heating, cooling, and ventilation functions. Chilled beams are quiet, can reduce energy consumption and maintenance, and take up less ceiling-cavity space while contributing to conditions that increase occupant performance.

NOISE

Think back to when you were a kid in math class. There probably were a number of distractions: a class clown, paper airplanes, someone passing notes.

One disruption that does not get the attention it deserves is unnatural or excessive background noise, which studies have shown can significantly hinder student performance. Conventional HVAC systems rarely meet prescribed background-noise-level requirements. ANSI/ASA S12.60, Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, requires a maximum backgroundnoise level of 35 dBA (about NC 27)—difficult, if not near impossible, to attain with traditional classroom HVAC equipment. Chilled beams do not rely on internal motors or blowers to recirculate and recondition room air and, thus, can be utilized to maintain HVAC background-noise levels in accordance with ANSI/ASA S12.60.

HUMIDITY AND VENTILATION

HVAC systems that modulate supply airflow rate during occupied operation often do not maintain outdoor airflow rate within the requirements of ANSI/ASHRAE Standard 62.1-2013, Ventilation for Acceptable Indoor Air Quality. Additionally, with all air systems, minimum ventilation airflow rate establishes minimum supply airflow rate. During off-peak operation, this airflow rate exceeds what is required for cooling, necessitating the reheating of supply air before it enters a space.

Active chilled beams served by a dedicated outdoor-air system (DOAS) utilize ducted variable-temperature outdoor air to induce room air through an integral hydronic heattransfer coil. Classroom cooling/heating demand is met by modulation of the rate of water flow through the coil while the rate of airflow remains constant. The coil's effect on space conditioning allows ducted-airflow temperature to be reset seasonally, resulting in significant reheat energy savings.

Active beams can be located either within a ceiling grid or floor-mounted adjacent to an outside wall. When active beams are floor-mounted, ventilation air can be delivered to a classroom in a displacement-ventilation manner. This method of delivery can reduce classroom carbon-dioxide levels and the resultant risk of the spread of respiratory diseases by more than 50 percent.

ADDITIONAL BENEFITS

Not only do chilled beams benefit students by being quieter and more adept at adjusting to fluctuating humidity and heat conditions, they benefit schools by reducing costs. While most conventional HVAC systems depend on the delivery of large volumes of air to condition classrooms, chilled-beam systems reduce ducted-air requirements by up to 60 percent by relying on their integral heat-transfer coils to offset the majority of space sensible-cooling and heating requirements. And because water is more efficient for space cooling and heating than air, chilled beams use considerably less energy overall than do other options.

In DOAS, chilled beams reduce classroom ducted airflow to the rates required for space ventilation and latent cooling, which allows for a constant volume of ventilation air. Also, they can contribute to the achievement of LEED certification through Energy and Atmosphere Credit 1, Optimize Energy Performance, and Indoor Environmental Quality Prerequisite 1, Minimum Indoor Air Quality Performance.



Introducing the TAO – Temperature Ambient Optimizer FLOOR MOUNTED DISPLACEMENT CHILLED BEAM

Titus, TAO Temperature Ambient Optimizer, targets educational facilities in climate zones with heat loads > 200 BTUH per foot. The unit can help find the path to a balanced and healthy system by providing the right proportion of heating or cooling to the perimeter wall to take care of the majority of the room load, while maintaining the necessary displacement ventilation, humidity control, and temperature level of the room within the desirable acoustic levels that are expected to be in classrooms or theaters.



- Allows the supply of 100% outside air
- Operates at near-minimum ventilation rate for the classroom
- Conforms to ANSI Standard S12.60 sound levels, acceptable to education facilities
- Reduces energy consumption
- Features customizable cabinets in a variety of wood finishes and colors

According to BOMA, energy averages 60% of a building's total operating costs. With oil and electricity prices on the rise, it is no surprise that there is an increased focus on renewable energy, green products, and LEED certified buildings, resulting in a greater demand for a product that combines comfort, indoor air quality, and energy efficiency. The TAO, a combination chilled beam/displacement unit and radiator, is the perfect solution to help address these issues.



The TAO is an excellent choice for schools and theaters where air quality is a concern. The required ventilation air for the classrooms is already pretreated before it is brought into the unit. With the TAO unit, part of the supply air is discharged into the space, with low air velocity, as close to the floor as possible. This provides a very low and slow moving pool of fresh air spreading over the entire floor. The convection from the occupants and other heat sources causes the fresh air to rise and create very comfortable conditions in the occupied zone.

By redirecting a portion of the treated supply air at very low velocity towards the cold, outside wall or window, it neutralizes the heat load and creates a thermal curtain. This reduces the convention and radiation from the cold wall or window, providing a more uniform temperature distribution and comfortable environment.

Since there are no blowers and motors operating within the TAO unit, the sound levels are further reduced and the overall energy consumption of the system can be improved.

This revolutionary product takes advantage of all LEED certification requirements to obtain energy credits. In addition, the stricter ASHRAE Standards of thermal comfort (Std. 55), energy savings and perimeter heating (Std.90.1) can be easily achieved with the addition of this product.





DESCRIPTION OF OPERATION

TAO – A hybrid unit that takes advantage of the displacement, chilled beams and radiation principles.

The unit does not have any moving parts; instead it has two sets of coils and two sets of nozzles to neutralize the two major loads within the zone.

The units are provided with a constant volume flow of conditioned outside air between 55 to 66°F supply air temperature. This primary supply air pressurizes the induction plenum of the TAO terminal unit and major portion of it will flow through the primary set of nozzles located in the lower part of the unit and displaced into the room. As the conditioned air leaves the nozzle it will also induce room air through the water coil to heat or cool the return air. Here it is reconditioned, mixed with primary air, and delivered to the room, at a discharge temperature of 64 to 72°F, providing the necessary ventilation/ air displacement for a very comfortable occupied zone.

The other portion of the primary supply air is discharged through a secondary set of nozzles directed towards the outside wall/window to neutralize the perimeter load. The secondary set of nozzles induces room air through the secondary coil



to increase the temperature of the supply air during the heating mode. The hot air will rise along the perimeter walls and windows to neutralize the thermal load by creating a warm air curtain.

Comfort (temperature and air movement) is met by optimizing the air path where the two major loads are located. At the same time the unit meets minimum ventilation requirements.

Classroom latent loads as high as 200 BTUH per linear foot of exposure can be satisfied while operating with chilled water temperatures high enough to avoid condensation on the integral terminal cooling coil. Higher latent loads may require that some degree of condensation be employed as a means of removing moisture from the recirculated room air. Although the units are furnished with a condensate pan, Titus suggests that all latent loads are handled by the primary air.

This revolutionary new product is specifically designed for the high ventilation loads that are normally required in all the educational facilities, theaters and long hallways with perimeter walls or windows.

- TAO takes advantage of the new, non-condensing, low temperature, high-efficiency boilers that operates at 140 deg. F instead of 180 degrees, thus reducing energy consumption
- Allows for the reduction of the fresh air guidelines per ASHRAE 62.1, making its air exchange effectiveness the highest among all HVAC systems and ensures the correct quantity of outdoor air is provided to the space
- Achieves high indoor air quality by using the displacement ventilation strategy so there is no mixing of contaminants which keeps the CO2 levels in the classroom at minimum
- Helps meet fan power limitations prescribed by ASHRAE 90.1



- Provides individual zone control and satisfies both heating and cooling loads in one single unit with no moving parts
- Available to take full advantage of cooling-water side economizer offering energy savings when mechanical cooling is not needed

Opportunities for the contractor who understand DOAS

- Easier to coordinate
- Higher labor productivity
- Takes advantage of prefabrication and modularization

Two unit sizes can be chosen and very well suited to fit under the windowsill adjacent to the perimeter wall. Customized cabinets in a variety of aesthetically-pleasing wood finishes and colors.



Primary air continues to be delivered cooler temperature than the ambient air in the classroom. It is discharged through induction nozzles inducing room air through the integral heat transfer coil. This air is cooled in accordance with space thermostat demands prior to mixing with the primary air. The resultant air delivery to the space is a displacement type mixture of primary and recirculated air at 62 to 68°F.





Primary air is delivered through the induction nozzles. The velocity of the nozzles induces room air through the integral heat transfer coil which is then cooled in accordance with space thermostat demands prior to mixing with the primary air. The use of room air induction and reconditioning allows the use of 100% outside air as the primary air source. The space thermostat regulates the amount of induced air reconditioning in accordance with the room cooling requirements, resulting in a constant volume, variable temperature (61 to 68°F) discharge to the classroom.



Installation Options



LEFT HAND INSTALL

Single and multiple TAO unit installations with piping on the left side





Installation Options





RIGHT HAND INSTALL

Single and multiple TAO unit installations with piping on the right side

Icons



supplies both heating and cooling from one air device

dual-function



finish options that resemble wood grains, perfect for high-profile architectural applications

wood grains



excellent air distribution device for schools and other educational facilities

k-12 education



contributes toward energy savings by reducing operating costs of air distribution devices

energy solutions



Notes









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