



Chilled Beam Solutions

ADVANCING THE SCIENCE OF AIR DISTRIBUTION



k-12 education

woodgrains

dual-function

energy solutions



The CBAL-24 is a linear active chilled beam that mounts into the ceiling. It features either a one- or two-way air distribution pattern and is used for heating and/or cooling applications. This model can contribute toward achieving LEED EA Credit 1: Optimize Energy Performance; IEQp1: Minimum IAQ Performance.

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Overview – Chilled Beams

NEW OPTIONS FOR A NEW GENERATION

The Titus chilled ceiling product line is comprised of chilled beams, both active and passive, radiant ceiling panels, and radiant sails. These products offer optimized performance and provide high levels of thermal comfort for the occupant. In addition to increased occupancy comfort, use of the chilled ceiling products reduce the amount of energy required to heat and cool a building.

The chilled ceiling products provide sensible cooling and heating to the space by utilizing the more efficient heat transfer capacity of water, as opposed to air. This decouples the latent and sensible loads, reducing the energy cost of sensible cooling. With passive beams and radiant products, an additional system is necessary to meet the ventilation and latent cooling needs of the space. The Titus active chilled beams integrate the supply of ventilation air creating an active diffuser. Using the ventilation air to pressurize a plenum with aerodynamically designed nozzles, high velocity jets of air are created forcing induction of room air over the water coils integral to the units. Forced induction dramatically improves the heating and cooling capacity over passive beams and radiant products. Titus active chilled beams harness the energy of the supply air to further reduce total energy consumption.

Titus offers a chilled ceiling product to meet the requirements of any design or installation. Just a single model of passive beam accommodates both exposed and recessed mounting applications. Active chilled beams

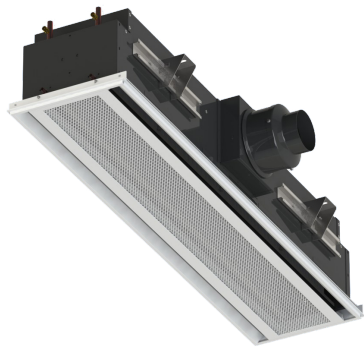
are available in 1, 2, and 4-way throw patterns. There is even a model for high sidewall applications. In addition to the variety of product solutions available, the appearance of the units can be customized through standard options, which enables seamless integration into any architectural style, traditional or contemporary.

linear active chilled beams



CBAL-24

The CBAL-24 is a ceiling mounted, linear active chilled beam capable of being mounted either Tegular or Lay-In into the ceiling. It has a 1-way or 2-way air distribution pattern and is used for heating and/or cooling applications. It is available in lengths from 2 to 10 ft.



CBAL-12

The CBAL-12 is a ceiling mounted, linear active chilled beam capable of being mounted either Tegular or Lay-In into the ceiling. It has a 1-way or 2-way air distribution pattern and is used for heating and/or cooling applications. It is available in lengths from 2 to 10 ft.



DISA V

The DISA V is a sidewall chilled beam diffuser with a 2-pipe or 4-pipe system with a horizontal throw pattern. It is used for heating and/or cooling applications.

floor mounted - under the sill



All Titus Chilled Beam products can contribute toward achieving LEED EA Credit 1: Optimize Energy Performance; IEQc2: Increased Ventilation; and IEQc7.1: Thermal Comfort - Design.

The TAO is an under the sill active chilled beam that provides the right proportion of heating/cooling to the perimeter wall, while maintaining the necessary displacement ventilation, humidity control, and temperature level of the room within the desirable acoustic levels that are expected in classrooms or theaters.

linear passive chilled beams



The SPB is a passive chilled beam diffuser that can be mounted flush with the ceiling or suspended below the ceiling for exposed applications.

radiant ceiling products



The ALPETY FKL is a water-driven radiant ceiling system that creates a high degree of thermal comfort through draft free cooling and even temperature distribution in the space. The system operates with low energy consumption and low noise levels.



ALPETY HKL

The ALPETY HKL is a water-driven radiant ceiling system that creates a high degree of thermal comfort through draft free cooling and even temperature distribution in the space. The system operates with low energy consumption and low noise levels.



ALPETY SKS

The ALPETY SKS is a water-driven radiant ceiling system that creates a high degree of thermal comfort through draft free cooling and even temperature distribution in the space. The system operates with low energy consumption and low noise levels.



Benefits of Titus' Chilled Beam Products

REDUCE COSTS. IMPROVE COMFORT. SAVE ENERGY.

BENEFITS OF CHILLED CEILING SYSTEMS

Chilled Ceiling Systems are designed to provide superior occupancy comfort. These systems require less energy to operate, and reduces maintenance cost in comparison to conventional all air systems. Tempered and dehumidified air is supplied to the space to meet ventilation requirements and handle the latent load. The majority of the sensible load is addressed with the chilled ceiling products. Decoupling the latent and sensible loads takes advantage of the superior volumetric heat capacity of water. The reduced volume of air that must be delivered to the space results in reduced air handler capacity and size, smaller duct sizes, and overall energy savings. A higher supply temperature contributes to increased occupancy comfort.

FIRST COST BENEFITS:

- Shallow unit profiles allow for reduced ceiling space requirements; they typically require 60% less vertical space than conventional all air systems
 - Reduced slab-to-slab spacing, reducing material costs per floor
 - Easily integrated into retrofit applications where space is limited
- Low volume of supply air required for active beams enables reduction of the total amount of air processed at the air-handler by an all air system up to 50%
 - Reduced air-handler size/capacity, and duct work size

COMFORT AND IAQ BENEFITS:

- Active beams typically supply a constant volume of primary air, decreasing occurrences of dumping and changes to the air motion in the space - issues common to typical VAV systems

- When supplied with primary air from a dedicated outside air system (DOAS), 100% fresh air is supplied to the space
- Dry-coil sensible cooling, eliminates bacterial, fungal, or mold growth associated with fan coils and other unitary products with condensing coils
- Constant primary air volume ensures ventilation requirements are met and helps maintain relative humidity levels in the space

ENERGY EFFICIENCY AND OPERATIONAL BENEFITS:

- Utilizing the heat transfer capacity of water also takes advantage of the superior operational efficiency of pumps as compared to fans.
 - A 1" diameter pipe can deliver the same cooling/heating capacity as an 18" x 18" duct
 - Reduction of fan energy by a factor of 7 to deliver the same cooling to the space
- Higher supply water temperatures compared to conventional systems allow for use of water side economizers
 - Increased opportunities for free-cooling
- Significant reduction in maintenance costs and labor as compared to conventional all air systems
 - No moving parts - no blowers, motors, damper actuators to replace
 - Dry-coil operation - does not require regular cleaning and disinfecting of condensate pans
 - Recommended cleaning of coils once every 4 to 5 years, more frequently in hospitality rooms where linens are frequently changed (i.e. hospital patient rooms and hotel rooms)



Introducing the TAO – Temperature Ambient Optimizer UNDER THE SILL ACTIVE 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

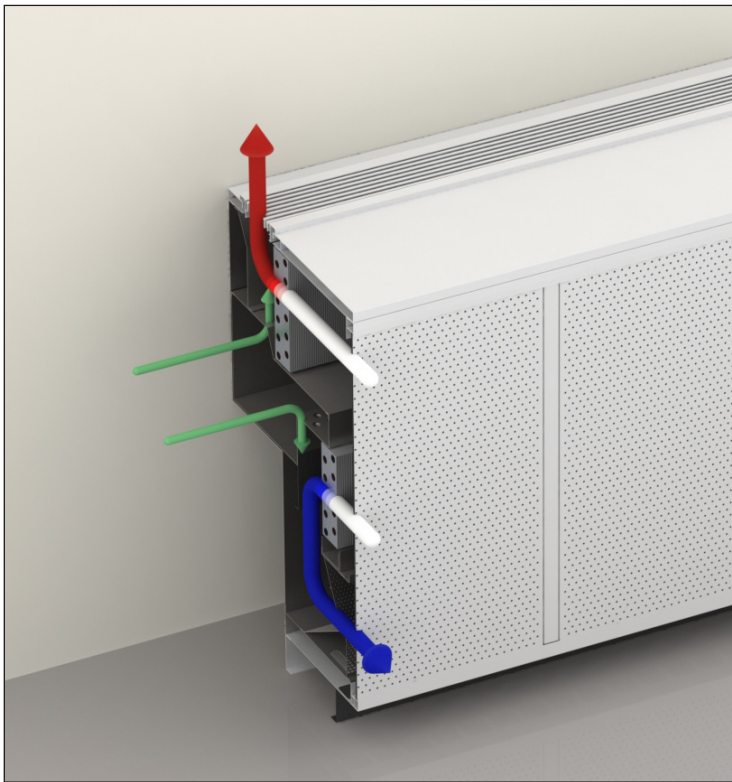


pool of fresh air spreading over the entire floor. The convection from the occupants and other heat sources causes the fresh air to rise and create very comfortable conditions in the occupied zone.

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 convection 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

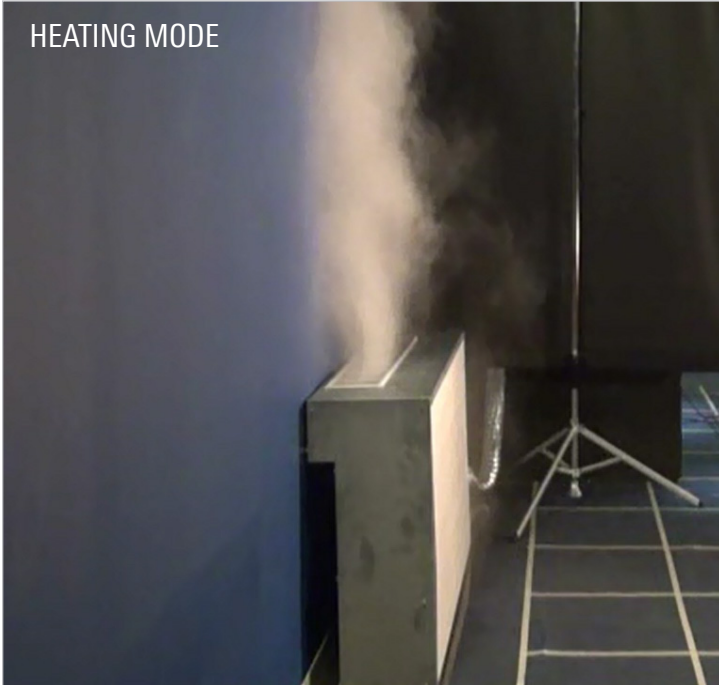
- Easier to coordinate
- Higher labor productivity
- Takes advantage of prefabrication and modularization

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.



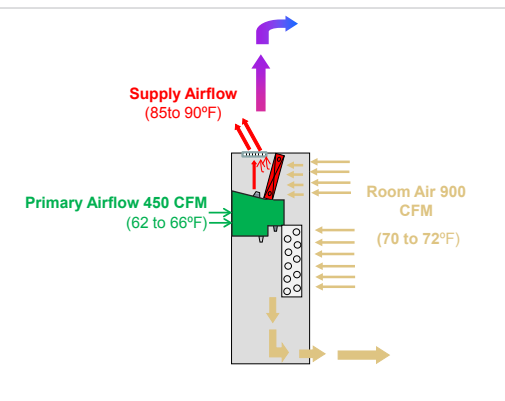
A rendering of the TAO in a classroom environment providing the right proportion of heating/cooling to the perimeter wall while taking care of the room load.

The number of and size of units required is determined by the heating requirements of the environment in which they are operating. Only the minimum amount of terminals required to satisfy the space heating load should be fitted. This maximum amount of supply air will continue to discharge in a displacement fashion.



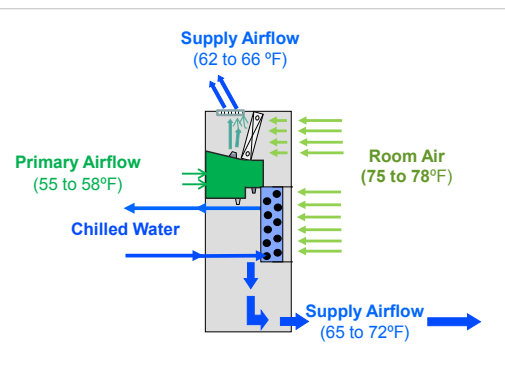
HEATING MODE

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.



COOLING MODE

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.





Introducing the CBAL Product Line

THE NEXT STEP FOR TITUS CHILLED BEAM PRODUCTS

Chilled Beam is growing in popularity as engineers and design professionals are seeking to follow the statutory green products to meet the minimum LEED or CHPS certification levels. To address the market and our representative's needs, Titus is introducing a USA built Active Chilled Beam product line which will give us the competitive edge that we have been lacking until now.

Titus Ceiling mounted Active Beam, CBAL are designed to meet the room's heating and cooling load demands, maximize room comfort while simultaneously supplying fresh air to the occupied area. The whisper-quiet air conditioning for almost any application can be installed in suspended ceilings or T-bar ceilings and is available in various widths and lengths.

CBAL-12 AND CBAL-24 LINEAR ACTIVE CHILLED BEAM

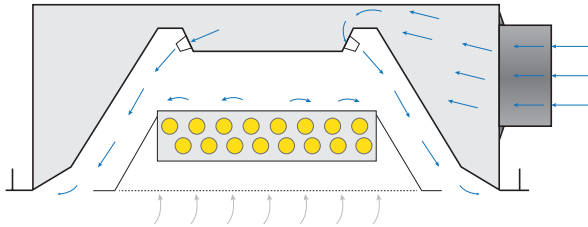
Titus chilled beams features the aerodynamic properties of Titus ceiling diffusers with the extra benefits of using hydronic coils and induced air to reduce the high sensible thermal loads. The primary air from the DOAS is supplied to the CBAL and is discharged through a series of nozzles located along the length of the beam. This causes room air to be induced through one or two coils and then mixes with the primary supply air. This mixture of air is then discharged into the space through the ceiling slot diffusers providing high cooling outputs with low amounts of primary air. The CBAL's are offered in 12" and 24" and can be easily integrated into suspended and drywall ceilings.

FEATURES

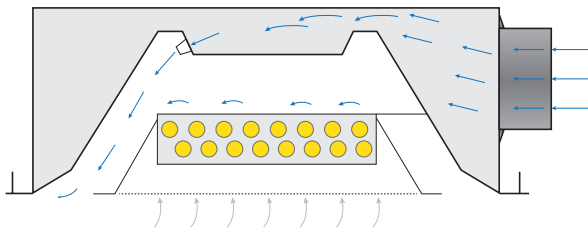
- 1 way and 2 way air pattern
- 2 to 10 foot chilled beam length in 1 foot increment
- 2 and 4 pipe coil configurations
- Cooling and/or heating coils
- Left or right hand pipe configurations
- ½" SWT or MNPT water connections
- Air vent
- Multiple nozzle sizes are available to vary the primary air supply and chilled beam performance
- Perforated round or linear bar return grille facing
- Hinged access return grille panel for easy room side access to the coil
- Heavy gauge, galvanized steel casing
- Top or side air inlet; several diameters available
- Contributing sound levels below NC30
- Adjustable mounting brackets
- Internally painted surface
- Pressure port for air-side balancing and flow verification
- Polyester painted white (RAL 9010)



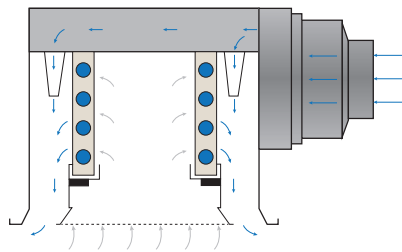
CBAL-24 *2-WAY*



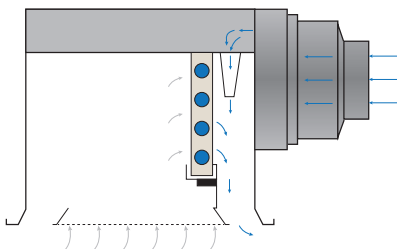
CBAL-24 *1-WAY*



CBAL-12 *2-WAY*



CBAL-12 *1-WAY*



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