DADANCO

... Breathing Life Into Your Building ...®

LABORATORY SOLUTION

USING ACTIVE CHILLED BEAMS

Laboratory HVAC Systems

Laboratories are energy intensive and can typically consume up to 10 times the energy of office buildings. The amount of energy for HVAC purposes in these laboratories is typically 50-80% of the building's total energy consumption. This energy usage is driven by high equipment and lighting loads, as well as the large amount of outdoor air needed in laboratory applications. The amount of outdoor air can be driven by the air changes required and by the amount needed for make-up of the fume hood exhausts.

In many labs, however, the airflow requirements are often being driven by the cooling loads as opposed to that needed for air changes and fume hood exhaust make-up. In these circumstances Active Chilled Beams can dramatically reduce both the laboratory's fan energy consumption and reheat energy.

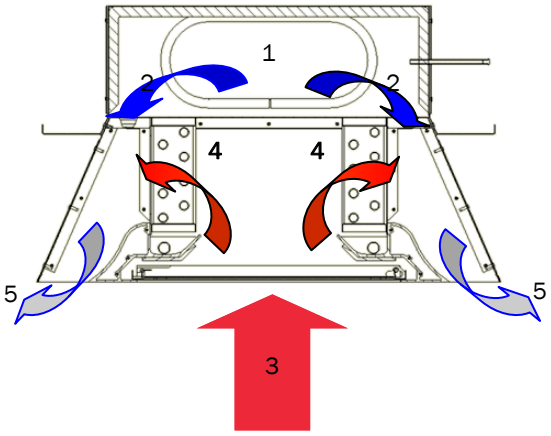
As an example a lab might have variable air change rate requirement of 6 to 10 air changes when occupied, while only 3 air changes when unoccupied. The design cooling loads, however, in a conventional "all air" system might require a higher airflow rate to satisfy the cooling loads than that needed to satisfy the air changes needed.

In these cases, the full cooling capacity can often be provided by the Active Chilled Beams sized using primary airflows equal to the minimum air change rates. The additional airflow needed when the air change rate exceeds the minimum is provided by a second air handling system providing a variable air flow delivered at a thermally room neutral condition.

In effect the rooms cooling requirements are de-coupled from the air change rates required.

Active Chilled Beam Solution

Active Chilled Beams are continuously supplied with primary air by a central air handling system. The primary air is cooled or heated to handle a portion of the temperature-driven room sensible loads, while in the summer it is cooled and dehumidified sufficiently to handle all of the internally generated moisture-driven lab latent loads.



Primary air (1) is introduced into the Active Chilled Beam through a series of nozzles (2). Due to the fluid dynamic properties of nozzles, room air (3) is drawn into the Active Chilled Beam through a secondary water coil (4) by an induction process.

Induced room air is cooled or heated by the Active Chilled Beam's water coil to the extent needed to control the lab room temperature. Induced room air (now cooled or heated) is then mixed with the primary air and the mixed (supply) air (5) is then discharged into the lab.

Benefits

Benefits of an Active Chilled Beam system in a laboratory application are numerous.

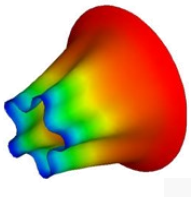
- A constant volume of air is delivered to the Active Chilled Beams at the minimum air change rate, and the Active Chilled Beams provide the full cooling capacity required at this low airflow rate.
- A second air handling system provides a variable airflow of room neutral air based on the air change rate required in excess of the minimum. The fan energy consumption is significantly reduced when less than the maximum air change rate is required.
- By varying the air change rate, the amount of reheat energy is also significantly reduced when the cooling load in the lab is less than the full design cooling load.
- Active Chilled Beams improve the removal effectiveness of gases and airborne particles through netter mixing of the air throughout the room
- Improved thermal comfort and very low noise levels.
- Maintenance is reduced as Active Chilled Beams have no moving parts.

For a thorough review on the use of Active Chilled Beams in Laboratories, refer to the study by NIH and Flomerics which can be found in the literature library section on our website.

http://www.dadanco.com/ACB/air_conditioning_literature.asp?productLineID=30

DADANCO Technology and Advantages

DADANCO Active Chilled Beams utilize unique nozzle and unit fluid dynamics technology. This patented technology provides very high air entrainment ratios at low operating static pressures.



Due to the new nozzle design and increased entrainment ratios, DADANCO is able to utilize more heat transfer surface. This dramatically increases cooling and heating output of the DADANCO units for the same primary airflows.

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DADANCO units are produced in our factories in Wyalusing, PA and Westfield, MA

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DADANCO—MESTEK Joint Venture, LLC.

Mestek is a diversified manufacturer of HVAC products with sales of over $400m. Mestek's HVAC companies include Smith Cast Iron Boilers, Hydrotherm, RBI Boilers & Water Heaters, Sterling, Vulcan, Airtherm, Applied Air, Anemostat, Air Balance, Arrow United, L. J. Wing, Lockformer and many others.

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