Case Study

HMX's eco-friendly cooling helps save energy costs for A.T.E.'s LEED rated Gold office

Background

A.T.E. is a multi-faceted engineering group providing sustainable technological solutions for a wide range of industry verticals. A.T.E. has been in business for more than 75 years, and believes it has grown due to its adherence to its core values. Care for nature and care for the A.T.E. team are some of the values A.T.E. lives by.

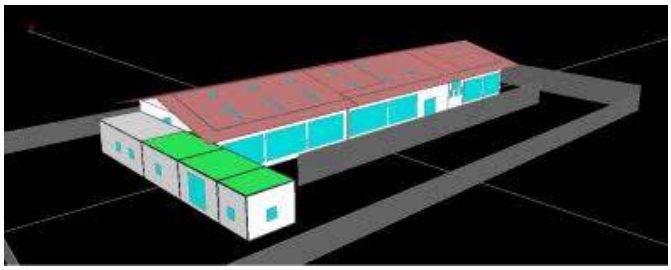
Hence, while planning their new workspace in Pune, India, A.T.E.'s aspiration was to create an environment that enhanced people's comfort and effectiveness at work. The idea was to have an office that was functional, easy to be in, and user-friendly. At the same time, A.T.E. wanted to create an environmentally-conscious office to showcase some of their own 'green' ideas and products. One of the important steps taken to create a sustainable workspace was the incorporation of HMX's Indirect Direct Evaporative Cooling (IDEC) as the primary cooling technology instead of a conventional central air-conditioning system. IDEC technology is environment friendly and does not require the use of any refrigerants whatsoever. Moreover, IDEC systems run on less than half the power required, compared to air-conditioners.

The company's efforts were rewarded when it's team collectively and uniformly appreciated their new environment. Further, this integrated facility at Pune was awarded the Leadership in Energy and Environmental Design (LEED) Gold certification from the Indian Green Building Council (IGBC).

IGBC Gold certificate awarded to A.T.E. Group's Pune facility

Challenges

A.T.E's office area has a ground and mezzanine level and an approximate total open area of 5,000 sq. ft.



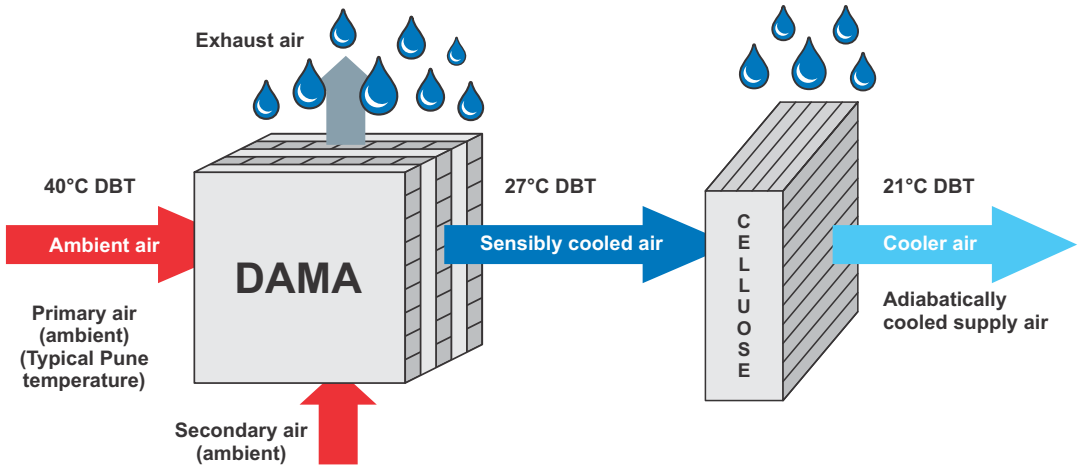
A 3D model of the facility

Office exterior

Office interior

Solutions

IDEC or Two Stage Evaporative Cooling cools the air by combining indirect and direct evaporative cooling of water in series, as shown in the figure below.



The primary air stream is cooled first with indirect evaporative cooling and then cooled further with direct evaporative cooling. The combination of these two stages results in improved cooling, taking the primary air temperature well below the concurrent ambient Wet Bulb Temperature.

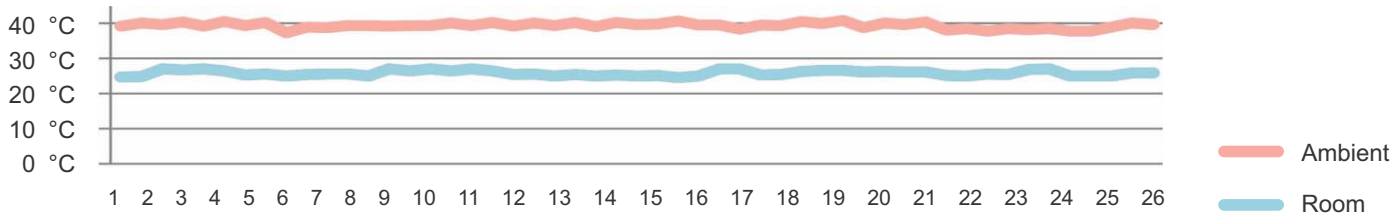
Compared to direct evaporative cooling (DEC), the supply air with IDEC not only contains less moisture but is 4-5°C cooler as well. This technology also uses less than 60% of the power consumed by conventional air-conditioners.

In order to meet the desired comfort conditions inside the office space, internal and external heat factors were taken into account and the required air flow was derived. Two IDEC (Indirect Direct Evaporative Cooling) units of 16,000 CFM capacity each have been installed for the main office area. These units supply 100% fresh air economically.

Each machine has a Variable Frequency Drive (VFD) that modulates the speed of the blower according to the conditions to be maintained inside the room. This helps reduce the energy consumption even further.

The facility also uses three propeller fans (4500 CFM each) in order to cool the building during the night through the introduction of cooler night air. The structural mass of the building absorbs this cooling and helps reduce load on the IDEC systems during the first few hours of the day, thus helping reduce the overall energy consumption.

Ambient vs. room temperature for April 2016



April 2016

Result

A.T.E.'s facility is in operation since January 2014. Apart from maintaining a healthy indoor air quality (IAQ), the HMX-IDEC also helps in diluting viral density in the air, reducing infections. The improved IAQ not only increases employee productivity but also makes them more energetic throughout the day. Apart from energy efficiency and sustainability, all the employees and visitors vouch for the excellent cooling and indoor environmental quality.

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