



ICC Devi Gaurav Tech Park gets a cool atrium with HMX-Ambiators

Background

ICC Devi Gaurav Tech Park is a software technology park located in Pimpri, near Pune in India. The office spaces in the complex are spread over seven floors with a large work area of about 700,000 ft². The campus is equipped with all necessary facilities such as power back-up, recreational spaces, cafeterias, a shopping area etc. A renowned HVACR consultant, Mr R S Kulkarni, was entrusted with the task of HVAC design for the complex.



Challenges

In consultation with Mr Kulkarni, the management at ICC decided to go with energy saving VRF technology for office air conditioning. A major concern was the cooling of the building atrium. The atrium is huge – close to 18,000 ft², with a height of 30 ft – and it serves as a gateway between the entrance and the elevators. The door of this atrium needs to be open at all times to enable the free movement of people.

When the question of air conditioning the atrium came up, the consultant and the owners ruled out any refrigerant based air conditioning as it entailed a big investment and even bigger operating and maintenance expenses. Moreover, with the population of the atrium not being of a fixed nature, and with the need of cooling being mainly to manage the transition from the outdoors, the atrium did not require a very high level of cooling.



Solution

The management then decided to look at other options such as evaporative cooling for maintaining a comfortable environment in the atrium. The air requirement from the heat load calculations worked out to around 120,000 CFM for an air washer (also known as direct evaporative cooling). This is when they approached HMX. HMX suggested its innovative and superior two stage evaporative cooling solution – the highly successful HMX-Ambiator.

The HMX-Ambiator is a stand-alone cooling system working with 100% fresh air, consuming less than half the energy of an equivalent air conditioning system. The principle of operation used in HMX-Ambiators is Indirect Direct Evaporative Cooling (IDEC), which is rapidly becoming popular for a variety of cooling applications that require maintaining healthy indoor air quality. The heat load calculations were reworked and it was found that with the HMX-Ambiator, 80,000 CFM was sufficient to provide the same degree of comfort and cooling as against 120,000 CFM for an air washer!

HMX provided a detailed comparison between an air washer based solution and an HMX-Ambiator based solution, which clearly showed that the HMX-Ambiator was a far better choice. The HMX-Ambiator added 70% less humidity; the power requirement and corresponding power cost was 12% less than with air washers; and the ducting cost was also less than that for air washers by 30%.

Given below is the comparison between air washer and the HMX-Ambiator:

Sr	Particulars	Air washer	HMX-Ambiator
1	Area to be cooled	18,000 ft ²	18,000 ft ²
2	Space temperature to be maintained	30°C	30°C
3	CFM required	1,20,000 CFM	80,000 CFM
4	Humidity in space	High	Much lower than compared to air washers
5	Net water addition in supply air	Summer : 1750 l/h Monsoon: 650 l/h	Summer: 500 l/h Monsoon: 225 l/h
6	Power consumption per hour	54 kWh (0.45 kWh per 1000 CFM)	48 kWh (0.60 kWh per 1000 CFM)
7	Power consumption per year	54x12x300 = 1,94,400 kWh	48x12x300 = 1,72,800 kWh
8	Power cost per year (@Rs 8 per kWh)	Rs 15,55,200/-	Rs 13,82,400/-
9	Approximate ducting cost	Rs 42,00,000/-	Rs 28,00,000/-

Note: Above calculations and savings in capex in general need to be worked out on a case-to-case basis.

Convinced that the HMX-Ambiator was a far better option, the management decided to go for it. Accordingly, 4 x 20,000 CFM HMX-Ambiators was supplied to ICC. Each side of the atrium was fed with 40,000 CFM of 100% fresh cool air. Jet nozzles / diffusers were used to supply air as the air had to travel a long distance to the occupied zone.

Results

During summer when the wet bulb depression (WBD) is high, the HMX-Ambiators provide excellent cooling and at times 40000 CFM is sufficient to cool the entire atrium. In monsoon when humidity is high, the second stage of direct evaporative cooling is switched off and indirect evaporative cooling meets the requirement. The temperatures were monitored regularly and it was found that the temperature never crossed 30°C at any time. With HMX, ICC was not only able to maintain ambient temperature in the atrium, but was also able to make significant savings in power and ducting costs.

In the words of the facility manager – “The HMX-Ambiator provides excellent cooling to the atrium and works even better during the hot and dry summer months of Pune. We are very happy with the product and would most certainly recommend this to all those having a big area where there is no need for a high level of cooling.”

