

## Case Study

## Bosch ensures comfortable working conditions with HMX cooling solutions

A comfortable working environment can do more than make workers more happy; it can boost the energy of the workforce leading to more and better output. There is always a debate on what constitutes a “comfortable working environment”, but there is one factor that nobody argues about: that temperature is a key factor. At a comfortable temperature, more work is likely to get done efficiently and at ease.

Understanding the importance of the right temperature for people comfort, Bosch Rexroth (India) decided to install the best cooling and ventilation solutions at its factory in Karnataka, where external temperatures soar up past 40°C for many days a year.

### Background

Established in 1975, Bosch Rexroth (India) Ltd., provides a complete range of world-class products, systems and services for drive and control technologies in various industries such as machine tool, press, plastic processing equipment, steel mill, civil engineering, materials handling, etc. in India, Bangladesh, Nepal and Sri Lanka. It has 14 manufacturing facilities in India.

### Challenges

In 2014 Bosch shifted its operation to its new plant in Bidadi from Adugudi (both in Karnataka), which was spread over a sprawling 125,000 square feet area. Its primary concern was providing a comfortable working environment for its employees. Bosch's experience with conventional air-washers at its previous plant in Adugudi wasn't satisfactory as the air-washers failed to achieve the desired temperature much of the time. This forced the management to look for other cooling solutions for the new plant.

The management wanted to maintain the temperature not more than 27°C on the shop floor throughout the year to ensure high level of employee comfort and improved productivity. However, they faced two major issues during the selection of alternate cooling technology:

1. Indirect Direct Evaporative Cooling (IDEC) – with this technology, there is a limitation in maintaining the desired temperature during the monsoon season.
2. Air-conditioning – due to the generation of fumes on the shop floor, preventing recirculation of air, air conditioning becomes extremely energy intensive and hence unviable.

### Solution

This is when Bosch approached HMX. Based on the inputs received from HMX, the company decided to install a three stage hybrid cooling system – HMX-DMA – to ensure that the desired temperatures are maintained throughout the year.

The system comprised of:

1. Indirect evaporative heat exchanger (DAMA) in the first stage
2. Direct evaporative heat exchanger (cellulose) in the second stage
3. Chilled water cooling coil in the third stage

### How does the systems operate?

HMX-DMA works in the following modes:

1. Indirect direct evaporative cooling mode with 100% fresh air
2. Indirect evaporative cooling + cooling coil mode with 100% fresh air (once through without any recirculation of air)

Based on the ambient weather conditions, the machine works in either of these two modes to maintain the desired conditions on the shop floor.

**Result**

Bosch installed 16 HMX's DMA units each of 35,000 CFM capacity with a chilled water cooling coil of 60 TR capacity. The table below shows the excellent performance of the DMA unit in the monsoon season. The unit was working in the indirect evaporative cooling + cooling coil mode (once through with 100% fresh air)

**Temperature readings taken on 26 August 2015**

Unit details	Time	Ambient		Room
		DBT (°C)	WBT (°C)	DBT (°C)
HMX-DMA 35000 with 60 TR cooling coil	11.30 am	35°C	26°C	28°C
	1.30 pm	37°C	26°C	27°C

With the installation of HMX's DMA units, maintaining the desired ambient temperature in the Bosch plant has become quite easy. The management is happy with the excellent performance of the HMX units. They appreciated HMX' efforts in completing the project within the specified timeframe and also complimented the company for its commitment to customer satisfaction.



Shopfloor at Bosch's Bidadi plant