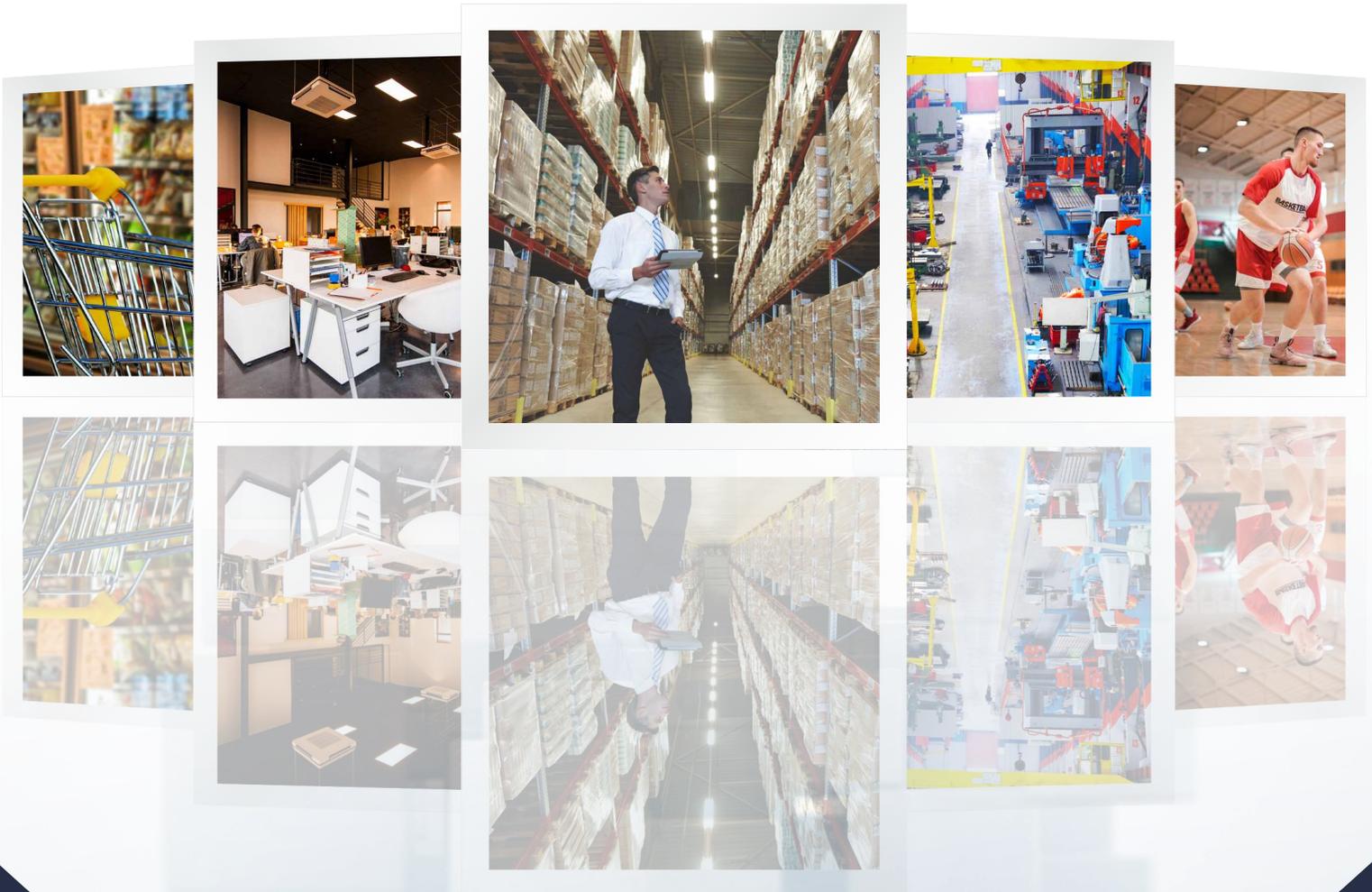


# Indirect Evaporative Cooling Based Solutions

for Energy Efficient & Healthy Buildings



# Built around renowned DAMA technology

## DAMA, optimized for Indirect Evaporative Cooling (IEC)

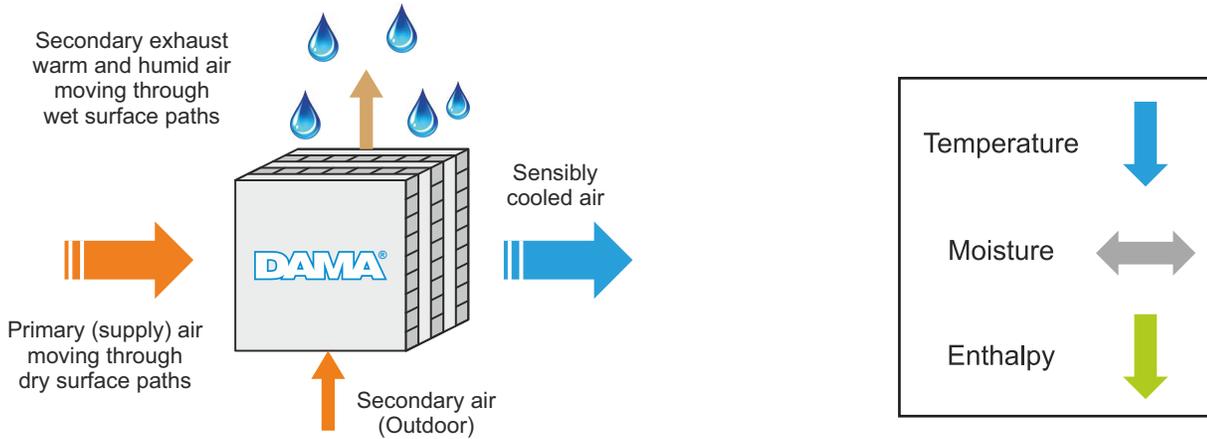


Figure 1: DAMA

DAMA is a building block for energy efficient cooling systems that provide comfort, high air quality *and* are eco-friendly. DAMA is a high efficiency, plate-type polymeric heat exchanger, which is optimized for Indirect Evaporative Cooling (IEC).

The primary air stream flows through DAMA's dry channels. A secondary air stream flows through the wet channels of the DAMA. The primary (supply) air stream exchanges heat through the thin separating wall with a thin film of water on the wet side. The heat rejected by the primary air enables evaporation of the thin water film, and in the process, the primary air is cooled without the addition of moisture. The secondary (exhaust) air stream is in direct contact with the water film and becomes very humid. It is therefore exhausted. Thus IEC of the primary (supply) air in the DAMA is purely a sensible cooling process.

## What sets DAMA apart from similar heat exchangers?



DAMA is the result of 20+ years of research and engineering put together to provide **high performance cooling with proven reliability.**



The DAMA design, including integral counter-flow water distribution, ensures **low fouling and consistent performance over many years of use.**



Robotic manufacturing ensures **high reliability and low leakage** between air streams.



DAMA is **optimized for sensible cooling.**



DAMA performance has been **type-tested by Underwriters Laboratories (UL).**



HMX's unique DAMA technology has been **granted patents** in the US, Australia and India.

# Indirect Direct Evaporative Cooling

## A proven method for increasing health and productivity in medium and large industrial and commercial spaces

Providing comfort to people in medium and large spaces like an industrial shed or a commercial building can be tricky. The most commonly selected options, till now, have been either Air-conditioning or Direct Evaporative Cooling.

Air-conditioning is an extremely energy intensive option and also uses recirculated air. This leads to a drop in Indoor Air Quality and poses a health risk to the occupants of a building.

Direct Evaporative Cooling, even though is economical and works on 100% fresh air, fails to provide the required level of comfort to the occupants of a building during peak summer and on humid days.

With DAMA, a heat exchanger optimized for Indirect Evaporative Cooling, at its core, HMX Indirect Direct Evaporative Cooling (IDEC) is an ideal solution for applications where large spaces like manufacturing units or shopping malls have to be cooled at an affordable cost and without compromising on the health of the occupants.

*HMX Indirect Direct Evaporative Cooling (IDEC) is an ideal solution in such cases.*

It strikes a perfect balance between comfort and productivity of occupants on one hand and power consumption on the other, making it a widely accepted solution.

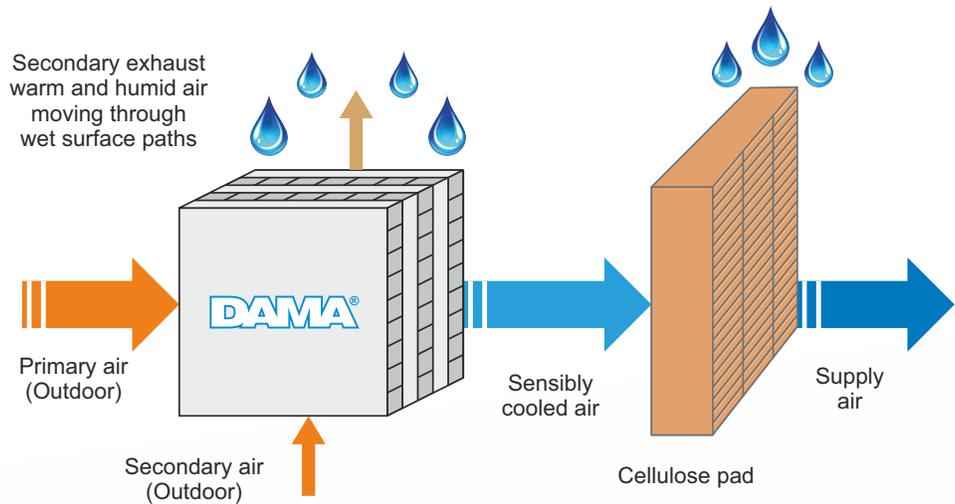


Figure 2: IEC + DEC

- Up to 120% overall wet bulb efficiency
- Up to 60% less power consumption compared to an air-conditioning system
- Up to 60% less moisture addition in supply air as compared to DEC alone

## Temperature drop chart for HMX-IDEC

The reduction in temperature possible will depend on both the prevailing Dry Bulb Temperature (DBT) and the Relative Humidity (RH). The table below shows the temperature at the IDEC unit outlet for various combinations of DBT and RH.

Hot & dry climate (e.g. Riyadh) – Outlet temperature that HMX-IDEC can reach												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AMBIENT -DBT °C	28.1	31.2	35.1	35.1	43.3	45.2	46.0	45.6	43.8	39.2	33.2	28.2
AMBIENT -WBT °C	14.1	15.2	15.1	15.1	18.0	18.8	19.3	19.7	18.9	17.6	16.0	14.5
Machine Outlet -DBT °C	10.5	11.0	10.0	10.0	12.0	14.5	13.0	14.0	13.0	12.5	11.5	11.0

Hot & humid climate (e.g. Dubai) – Outlet temperature that HMX-IDEC can reach												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
AMBIENT -DBT °C	28.6	33.0	36.0	39.8	42.6	44.1	45.1	45.1	42.2	38.9	34.2	30.1
AMBIENT -WBT °C	17.7	17.9	18.3	19.9	21.0	22.5	23.6	23.2	22.7	21.4	19.3	18.7
Machine Outlet -DBT °C	15.5	14.3	14.0	15.4	16.3	18.1	19.4	18.9	18.8	17.7	16.0	16.3

Basis – Ambient Weather Source: ASHRAE climatic design conditions 2021 (ashrae-meteo.info)  
Max DB & Co-incident WB condition considered.

# Schematic of HMX-IDEC

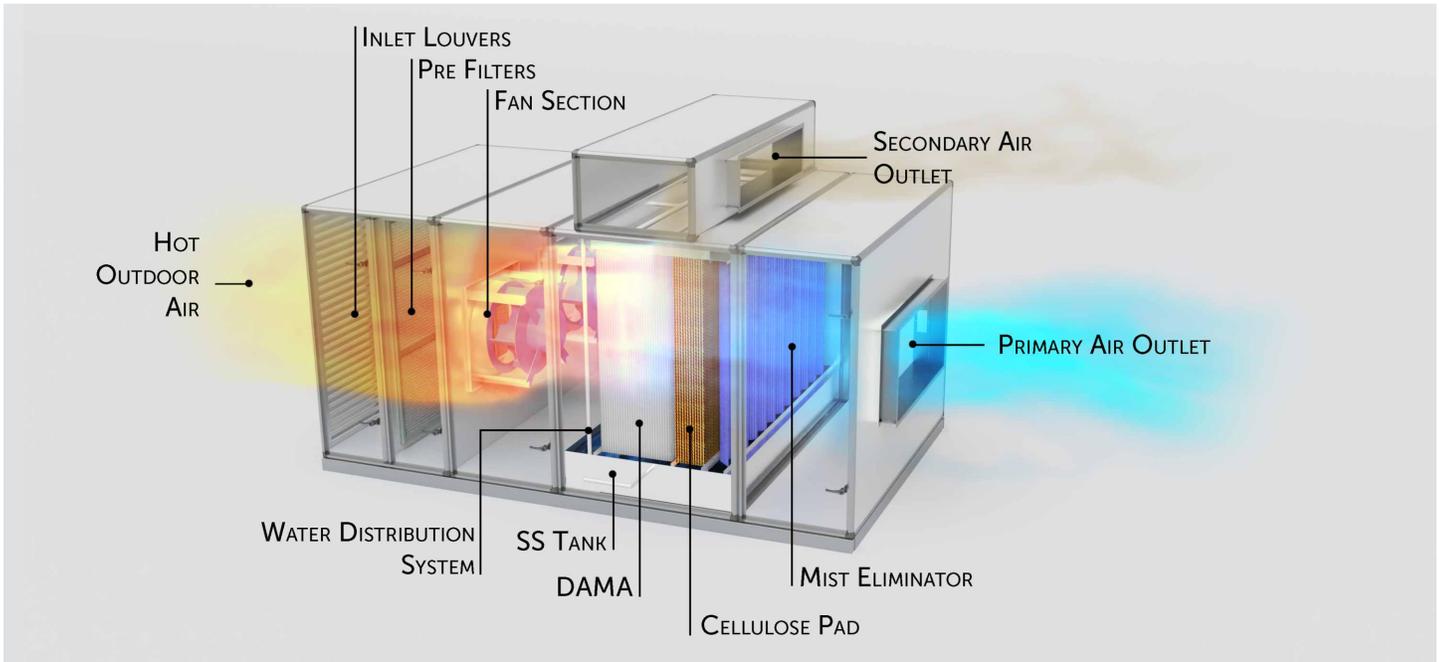


Figure 4

## Get the HMX-IDEC advantage



Cool and filtered outdoor air with low moisture content helps maintain excellent indoor air quality (IAQ)



Upgrade over conventional direct evaporative coolers



Energy efficient alternative to air-conditioning



World class product with robust construction and smart controls with options of receiving real time monitoring reports through IoT



Best in class comfort for suitable climates



Capacities available – starting from 500 CFM to 2,00,000 CFM

## HMX-IDEC is extensively used in a wide variety of settings



Automobile & ancillaries



Engineering & capital goods



Food & beverages



Print & packaging



Commercial kitchens



Educational institutes



Healthcare



Hospitality



Indoor sport arenas



Malls & marts



Office buildings



Religious establishments

# Treated Fresh Air (TFA)

## Save by pre-cooling while introducing outdoor air into a centrally air-conditioned building to improve air quality!

Normally 30% of the overall cooling load in a centrally air-conditioned space is taken up by the cooling of outdoor air being fed into the conditioned space to maintain healthy indoor air quality.

HMX's TFA units effectively pre-cool outdoor air being supplied to a building in an energy efficient and hence economical manner. The output of HMX's TFA can be supplied directly to the conditioned space or further cooled through a chilled water or a DX coil. Either way, there is significant overall energy saving.

The HMX-TFA can be retrofitted to existing fresh air handling units or can be supplied to individual AHU rooms.

HMX-TFA is built around DAMA, a heat exchanger optimised for Indirect Evaporative Cooling (IEC). DAMA has been extensively deployed by HMX in IEC applications for air cooling, with supplies of 100+ million CFM covering 20 million sq. ft. in 10+ countries.

It strikes a perfect balance between good indoor air quality on one hand and energy efficiency on the other, making it an ideal solution.

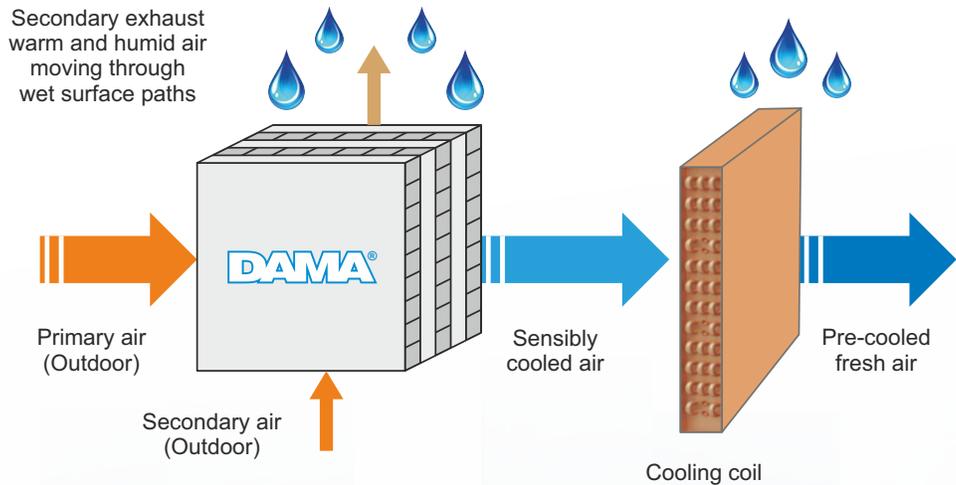


Figure 5

## How HMX-TFA scores over a conventional TFA/ERW\*

Parameters	Conventional TFA/ERW	HMX-TFA (IEC based TFA)
Requirement of return air/exhaust air	Yes (Conventional TFA)	No
Contamination of fresh air	High possibility (ERW)	Zero possibility
Odour transfer	High possibility (ERW)	Zero possibility
CapEx	High (Both)	Moderate
Power consumption	High (Conventional TFA)	Moderate

\* ERW: Energy Recovery Wheel

# Schematic of HMX-TFA

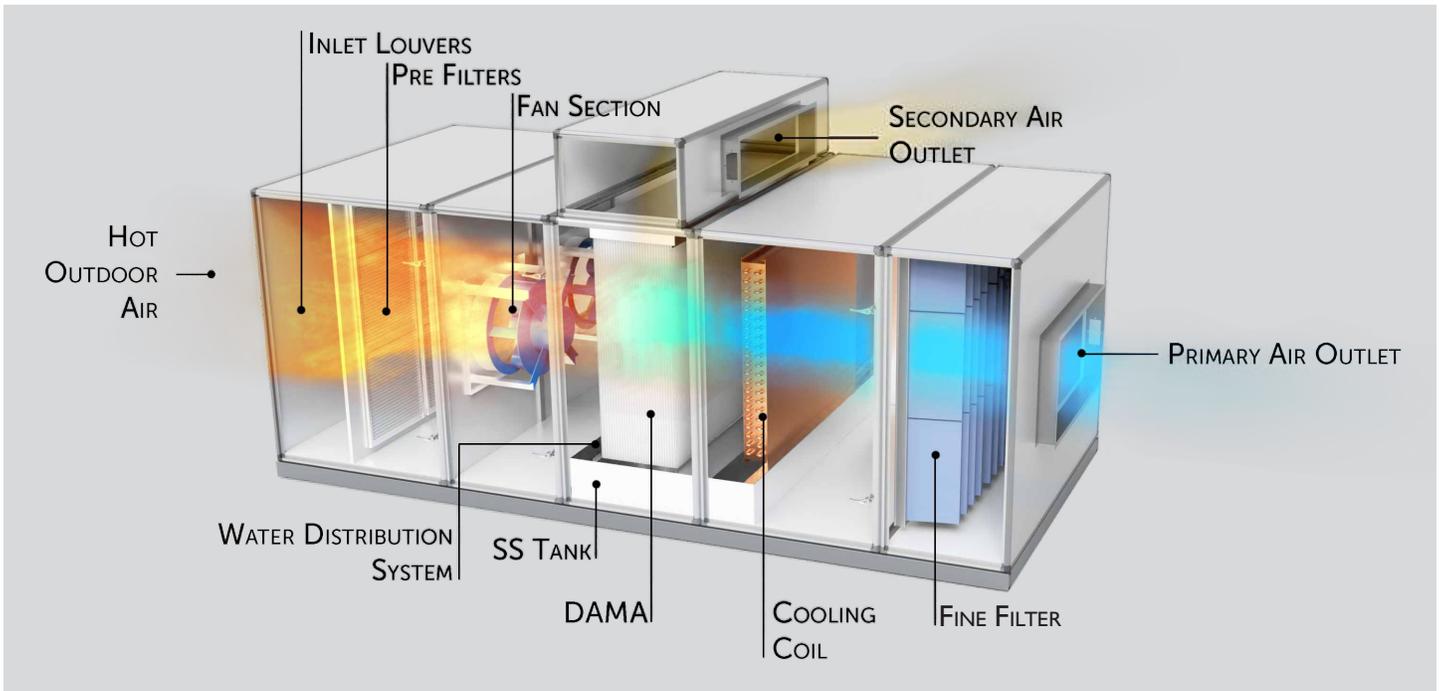


Figure 6: Schematic of the HMX-TFA

## Get the HMX-TFA advantage



Pre-cooled outdoor air with zero moisture addition reduces the TR load on existing air conditioning systems



Energy efficient alternative to energy recovery wheels, heat pipes, air-to-air heat exchangers, etc



Low life cycle costs due to low maintenance requirements



Zero possibility of cross contamination



Zero possibility of odour transfer since return air is not required



Can be used as a stand-alone system or retrofitted to existing AHUs



Capacities available from 2,000 CFM to 30,000 CFM



Available with plug type or EC fans

## HMX-TFA is extensively used in a wide variety of settings



Auditoriums and banquet halls



FMCG



Food & beverages



Healthcare facilities



Hotels and restaurants



Indoor sport arenas



Malls & marts



Buildings

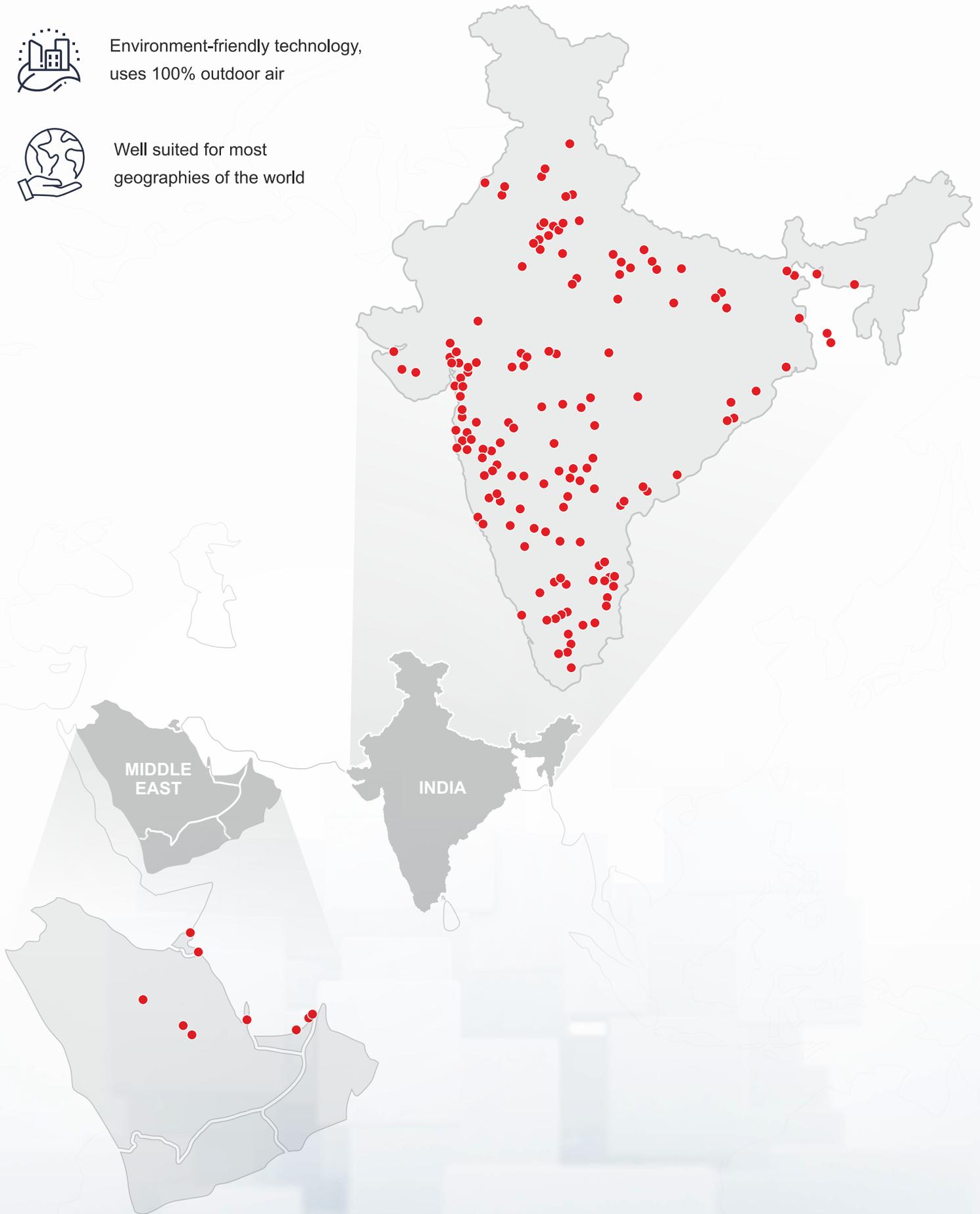
# Our footprint in India and Middle East



Environment-friendly technology,  
uses 100% outdoor air



Well suited for most  
geographies of the world



## Our valued customers


**HMX – a part of the A.T.E. Group –** designs and manufactures energy efficient, environment-friendly cooling and solar thermal solutions for industrial and commercial applications. The low carbon technologies are suitable for several applications and for most geographical locations across the globe.

## What makes HMX a trusted brand?



**10+ countries** with installations



**550+ happy customers** worldwide



**20 million sq ft** area cooled



**100 million CFM** installed across the globe

**Manufactured by:**



**A.T.E. ENTERPRISES PRIVATE LIMITED**

(Business Unit: HMX)

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**Partner:**

