

HMX

**WORLD LEADERS
IN
INDIRECT EVAPORATIVE COOLING**





Established in 1998, HMX became a part of the 80 year old A.T.E. Group in 2008

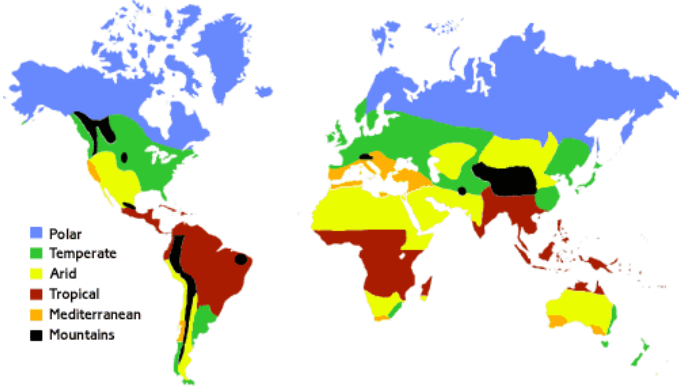
100% fresh air, energy efficient cooling and energy saving solar thermal solutions



Manufacturing facilities spread over 50,000 ft² in Bengaluru & Ahmedabad

World leaders in Indirect Evaporative based cooling solutions. Installations in more than 10 countries

HMX Core Strengths



Technologies ideal for most climate conditions



Understanding of different applications helps suggest the most suited solutions



In-house manufacturing facility, focused on automation



In house laboratory built as per ASHRAE standards



Core technology - DAMA - type-tested by Underwriters Laboratories (UL)



Performance validated against computer models through in-house remote monitoring

Leaders in Indirect Evaporative Cooling

World's largest installed base

of **Indirect Evaporative**

Cooling with more than

65,000,000 CFM

cooling more than

13,000,000 square feet

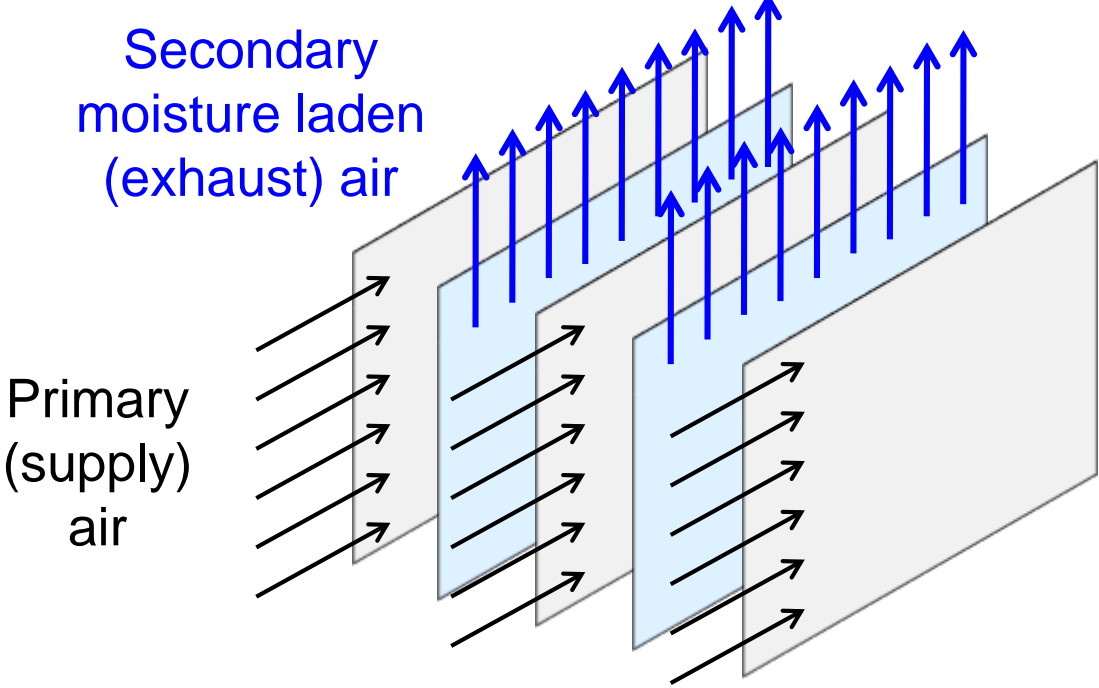
of floor space...

... and still counting



Introduction to New Technology in Evaporative Cooling – Indirect Evaporative Cooling

Indirect Evaporative Cooling (IEC)



Cross Flow Plate Type Heat Exchanger

Cross section of the IEC Pad



Front View – Primary air entry

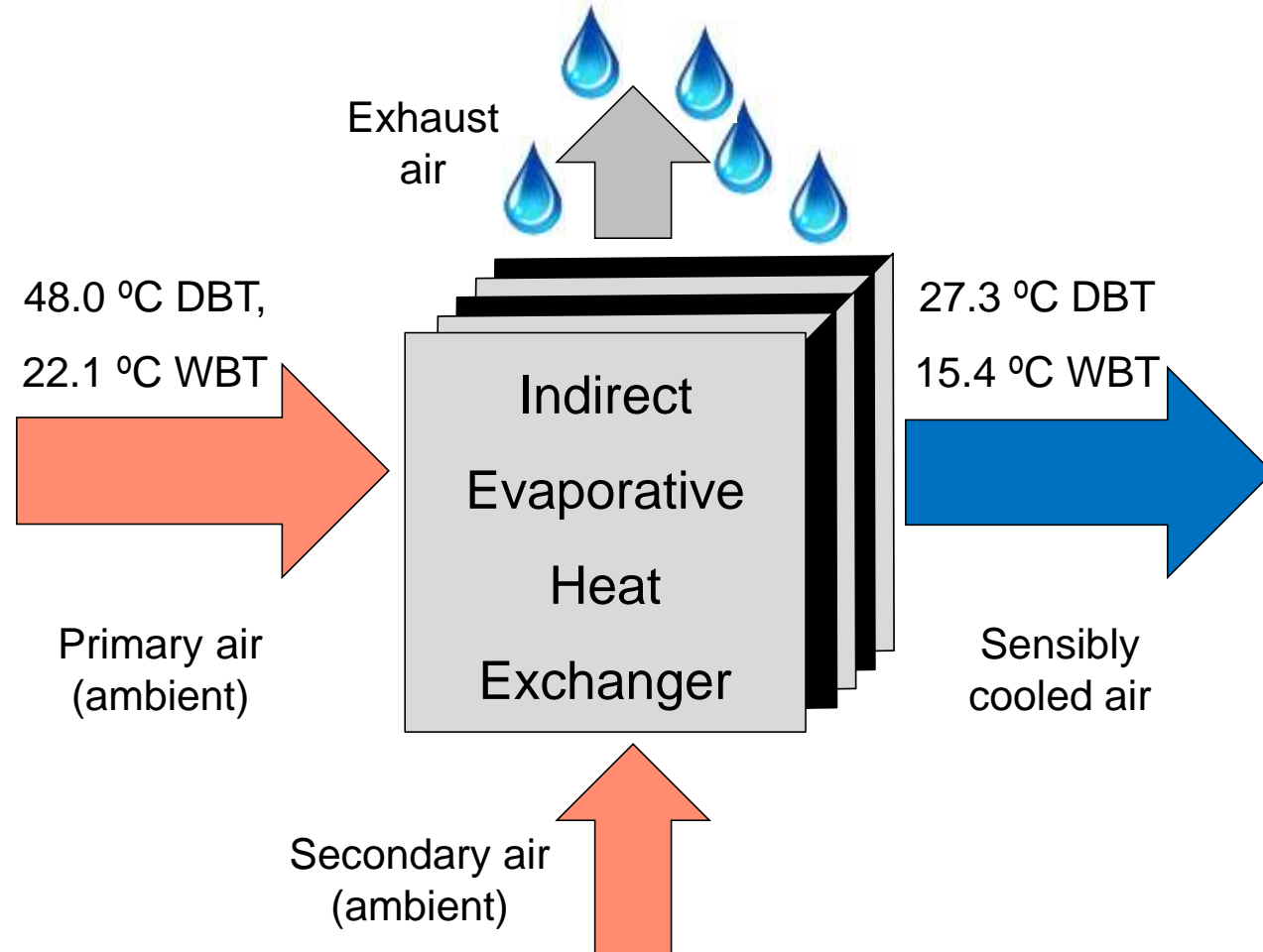


Top View – Water + Secondary air entry

With indirect evaporative cooling, a **secondary** (ambient) **air stream** is cooled by water. The cooled **secondary air** goes through a heat exchanger, where it cools the primary (also ambient) air stream flowing in separate alternate channels as the secondary air.

Since there is no contact of supply (primary) air and exhaust (**secondary**) air, no moisture is passed on through the heat exchanger to the space.

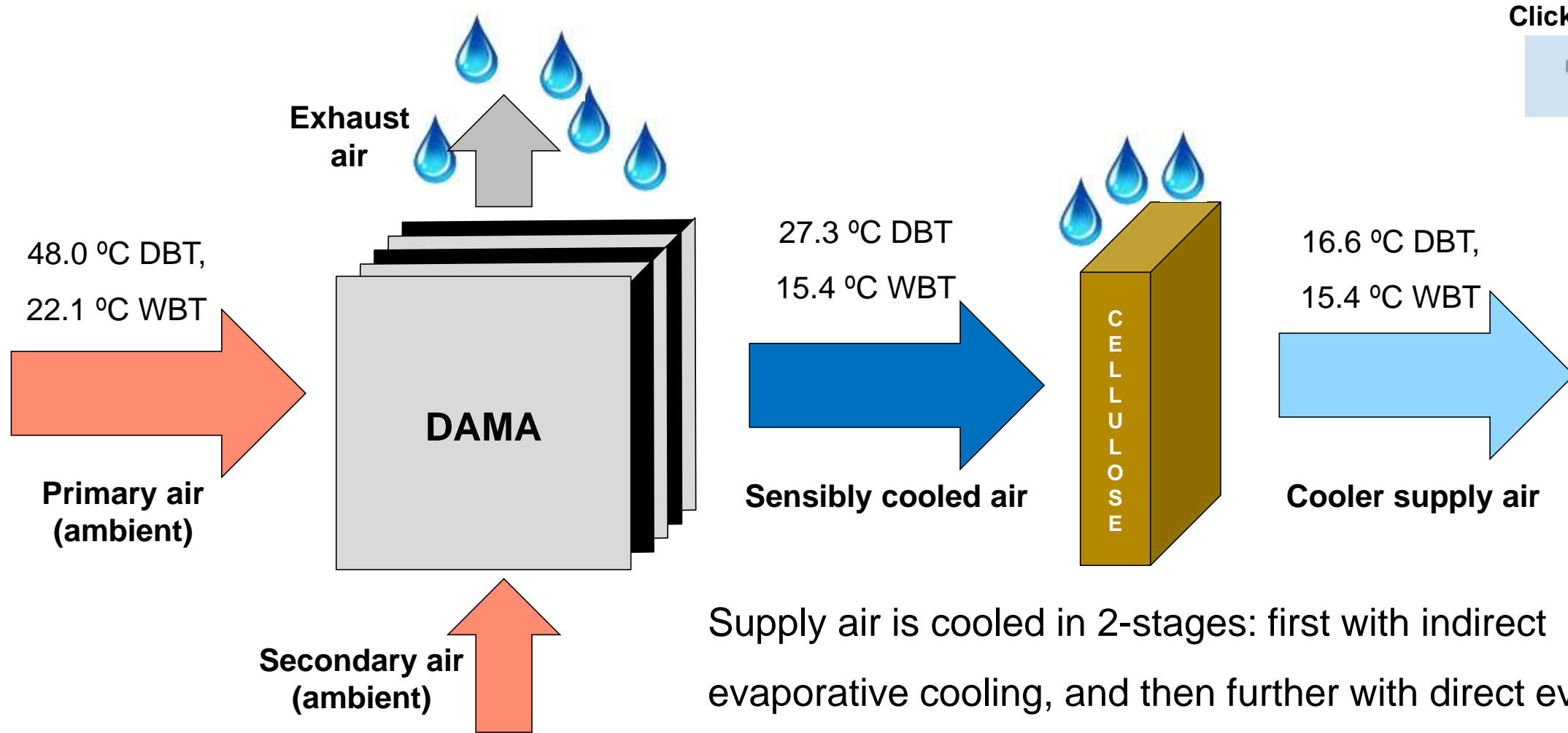
Indirect Evaporative Cooling (IEC)



Indirect Direct Evaporative Cooling (IDEC)

(Combination of Indirect Evaporative Cooling + Adiabatic Cooling)

Indirect Direct Evaporative Cooling (IDEC)



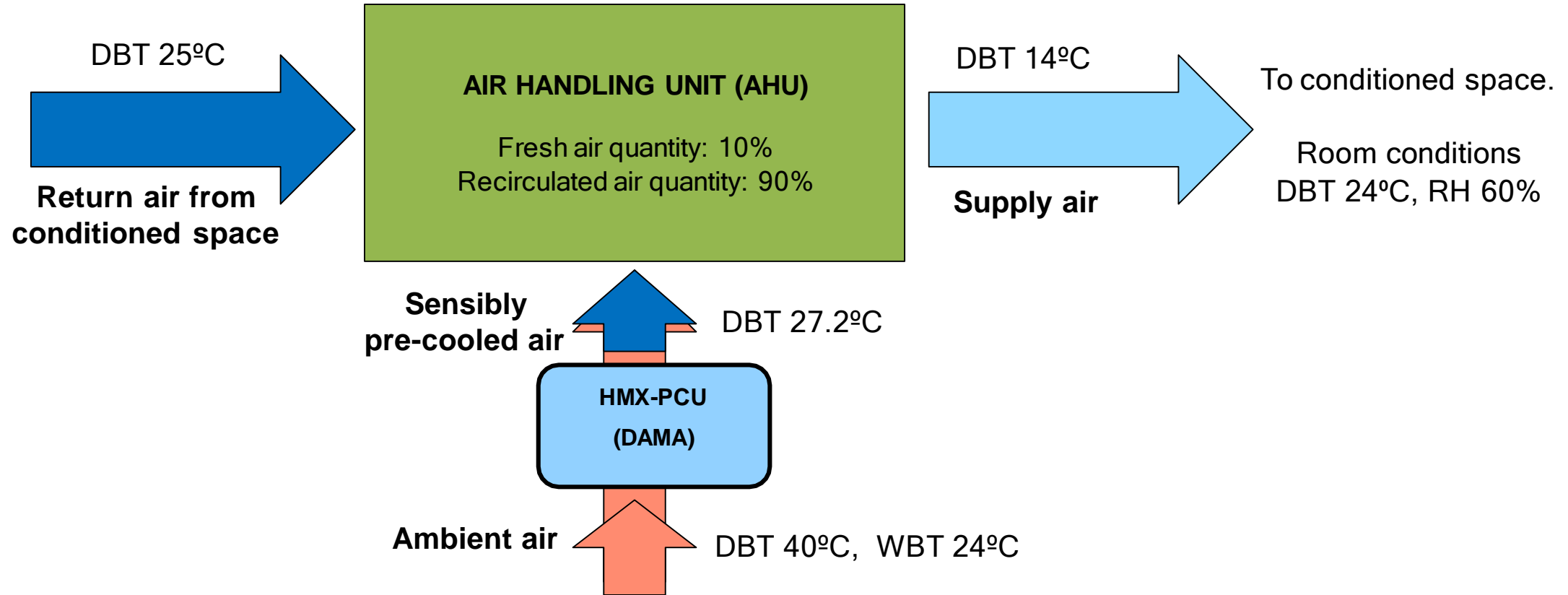
Click the video



Supply air is cooled in 2-stages: first with indirect evaporative cooling, and then further with direct evaporative cooling

Other Applications

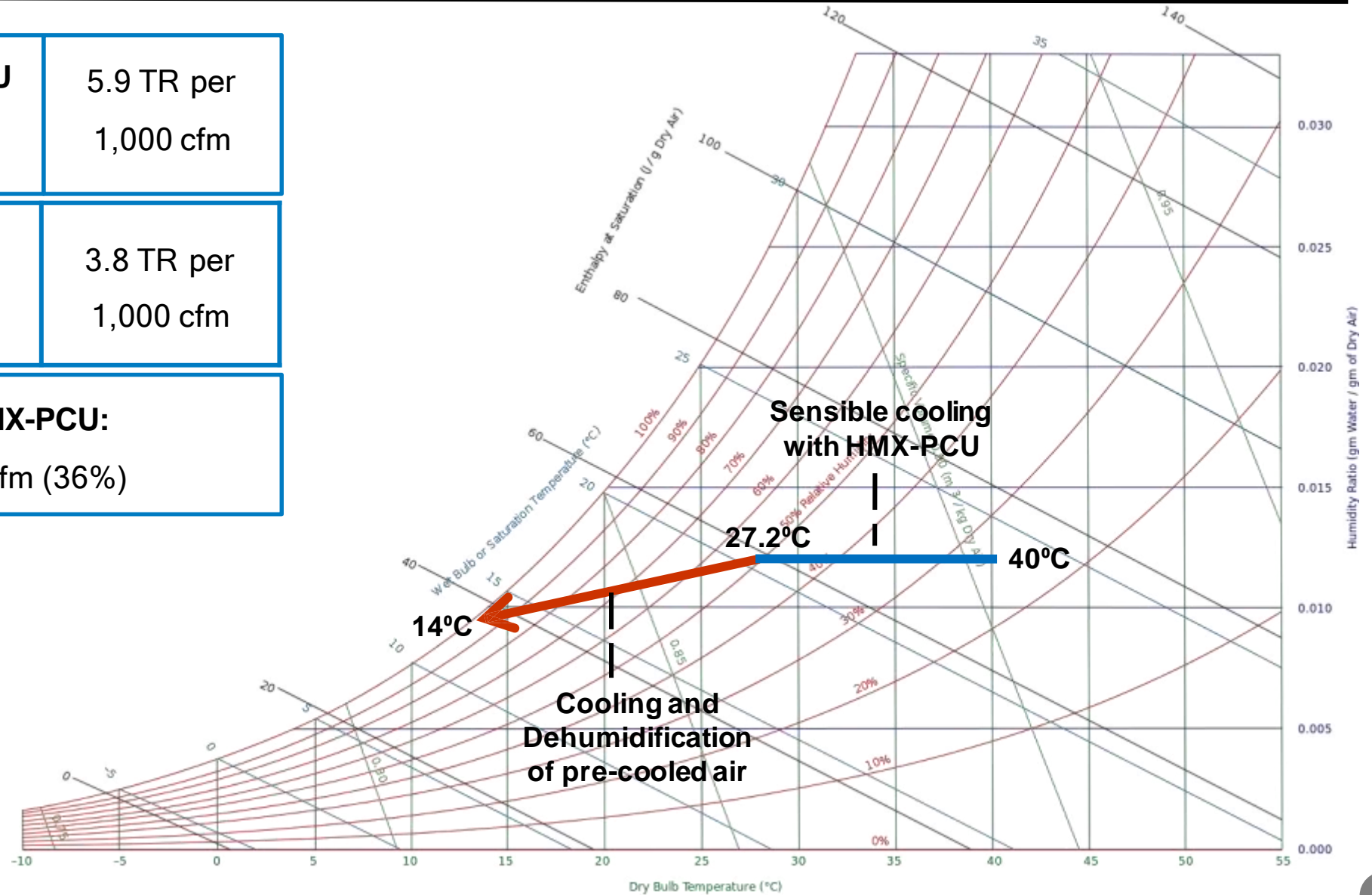
HMX PCU (Pre-Cooling of Fresh Air)



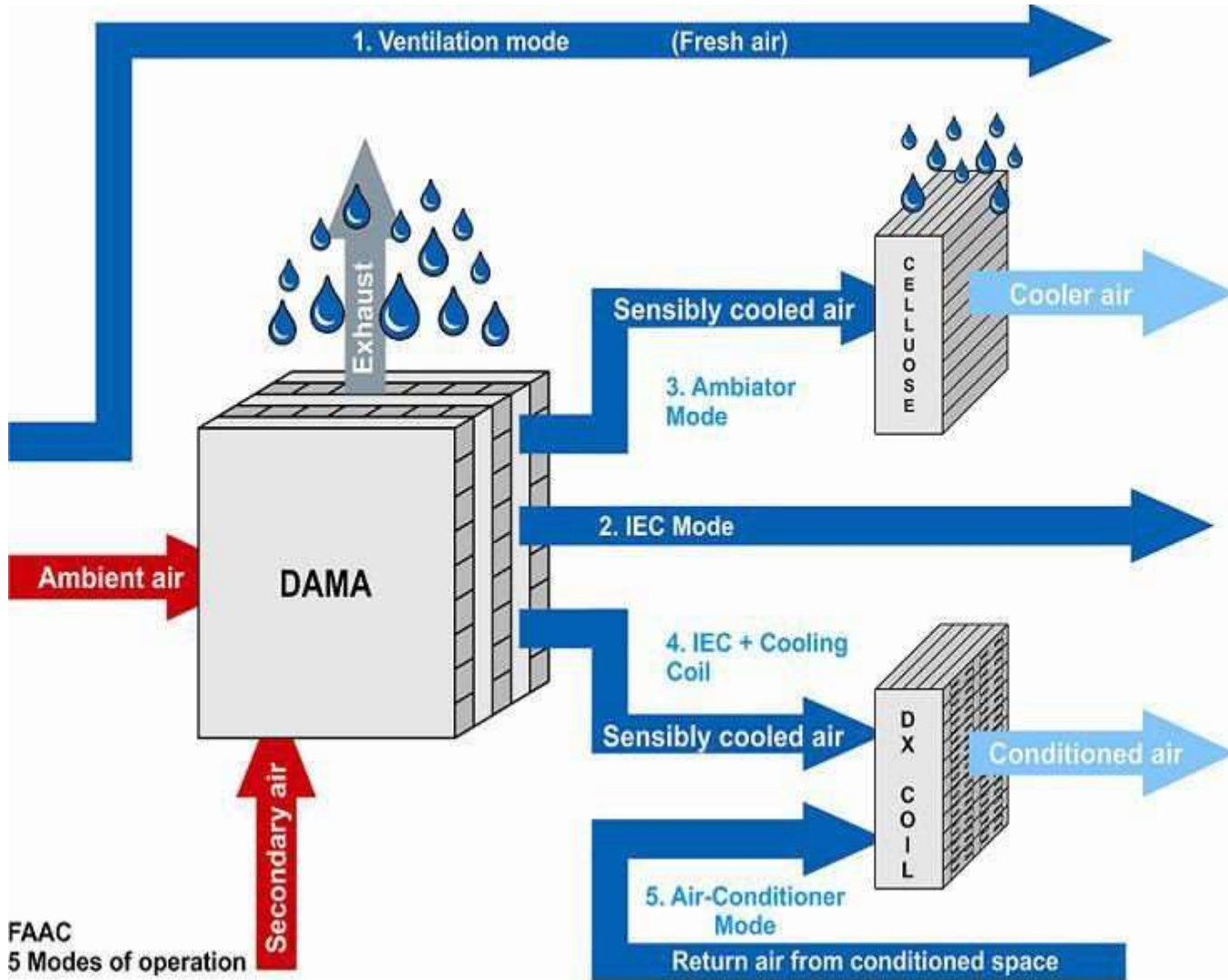
- Fresh air can add up to 30% of the total cooling load in centrally air-conditioned spaces.
- Pre cooling of outdoor fresh air before it mixes with return air reduces cooling load and thus, energy consumed

Psychrometric Representation of HMX-PCU

<p>TR Load without HMX-PCU Ambient: 40°C Coil Outlet: 14°C</p>	<p>5.9 TR per 1,000 cfm</p>
<p>TR Load with HMX-PCU Ambient: 40°C IEC outlet: 27.2°C Coil Outlet: 14°C</p>	<p>3.8 TR per 1,000 cfm</p>
<p>Savings with HMX-PCU: 2.1 TR per 1,000 cfm (36%)</p>	

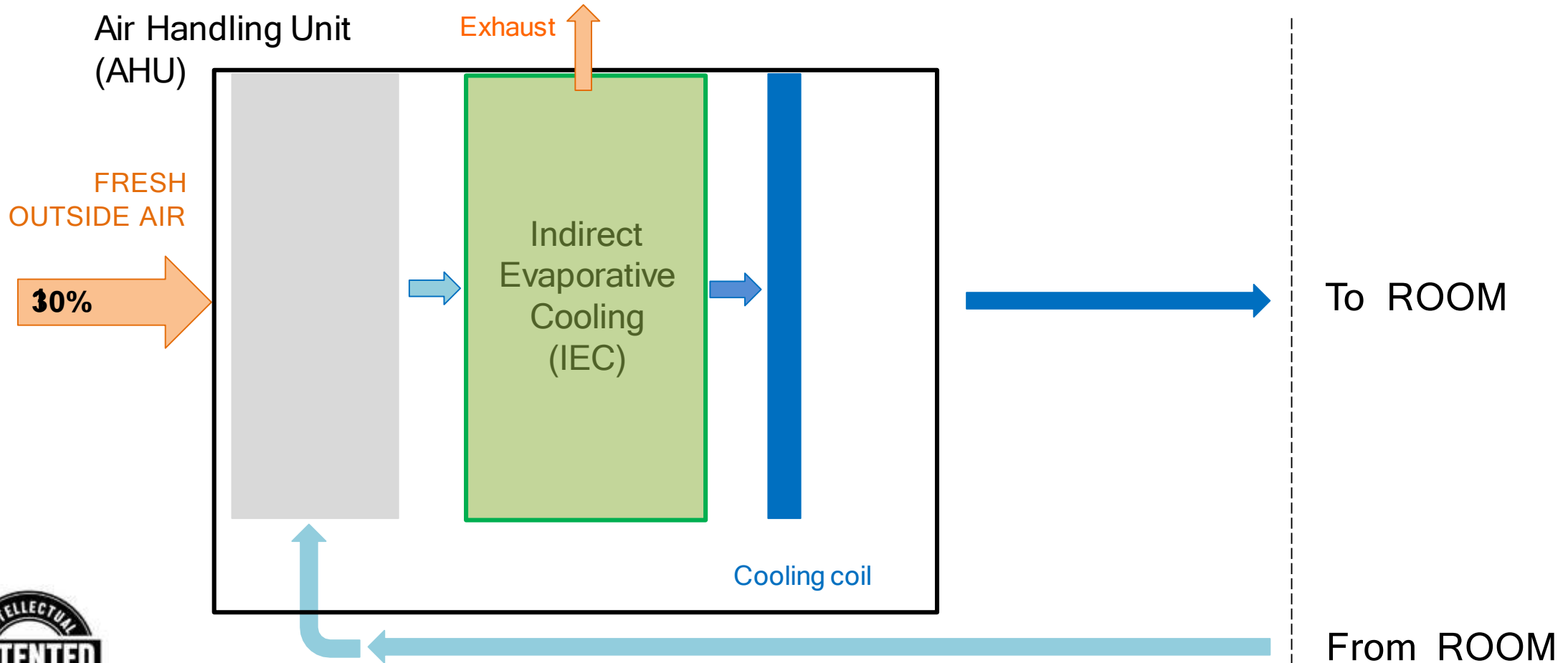


Hybrid Air-Conditioning (HMX FAAC) – The Concept



FAAC 5 MODE OPERATION		
	MODE OF OPERATION	WORKING DETAILS
1	Ventilation	Only fresh air
2	IEC	Only DAMA
3	IDEC (Ambiator)	Indirect direct evaporative cooling
4	IEC + Coil	DAMA + Cooling coil (once through application)
5	Air-conditioning	Cooling coil with re-circulated air

Hybrid Air Handling Unit (More Fresh Air with no extra energy)



Indirect Evaporative Cooling (IEC) uses no refrigerant, and enables the supply of 3 times the fresh air at the same or lower energy consumption

Projects executed in Kuwait

AL KOUT FOODS – Kitchen Hood

Description	Location	2000 cfm	3000 cfm	4000 cfm	5000 cfm
Burger King	Adeliya			1	
Pizza Hut	Ardiya			1	
CRE Mall - Applebees	Mahboula				1
Pizza Hut	Firdous			1	
Burger King	Firdous		1		
Burger King	Jaber Ali	1			
Pizza Hut	Jaber Ali		1		
CRE Mall - Burger King	Mahboula		1		
CRE Mall - Pizza Hut	Mahboula			1	
Pizza Hut	Jahra - Electrozan		1		
Kababji	Jahra - Electrozan		1		
Burger King	Sharq - Waterfront			1	
Pizza Hut	Sharq - Waterfront			1	
Lake Restaurant	Abdally	4	2	1	
		5	7	7	1

AL KOUT FOODS – Kitchen Hood

Description	Location	2000 cfm	3000 cfm	4000 cfm	5000 cfm
Burger King	Al Naseem	1			
Burger King	Wafra	1			
Pizza Hut	Naseem Co-op		1		
Pizza Hut	Wafra Co-op		2		
Burger King	Jabriya Garden		1		
Burger King	Qairawan		1		
Burger King	Sabah Al Ahmed		1		
Kababji	Hawally		1		
Burger King	Shuhada		1		
FF	Adeiliya			1	
Pizza Hut	Wafra Co-op			1	
Pizza Hut	Qairawan			1	
Pizza Hut	Sabah Al Ahmed			1	
Electrozan	Jahra				1
		2	8	4	1

Supplied a total of 35 units to Al Kout Foods

Units were used to supply treated fresh air for Kitchen Hoods

An average reduction of 58% in the ambient temp (48c) achieved at outlet of IDEC unit.

+

17 units on order with factory

Other Jobs

Description	Location	4000 cfm	8000 cfm	12000 cfm	25000 cfm
Jawahrat Kazema	Qurain Market -Kitchen	2			
Mabrook Kitchens	Qurain Market - Kitchen		1	1	
Kuwait Airways	Airport – Hangar				12
Kuwait Airways	Airport – Garage				1
		2	1	1	13

Thank You