

Evaporative Cooling Product Catalog

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What is **Humidity**?

Absolute humidity is described as the weight in grams of moisture found in 1 m³ of air.

Maximum humidity refers to the amount of moisture that 1 m³ air can carry at a given temperature. The amount of moisture that the air can carry increases as the temperature rises. In hot places, the maximum humidity is high, while in cold places it is low.

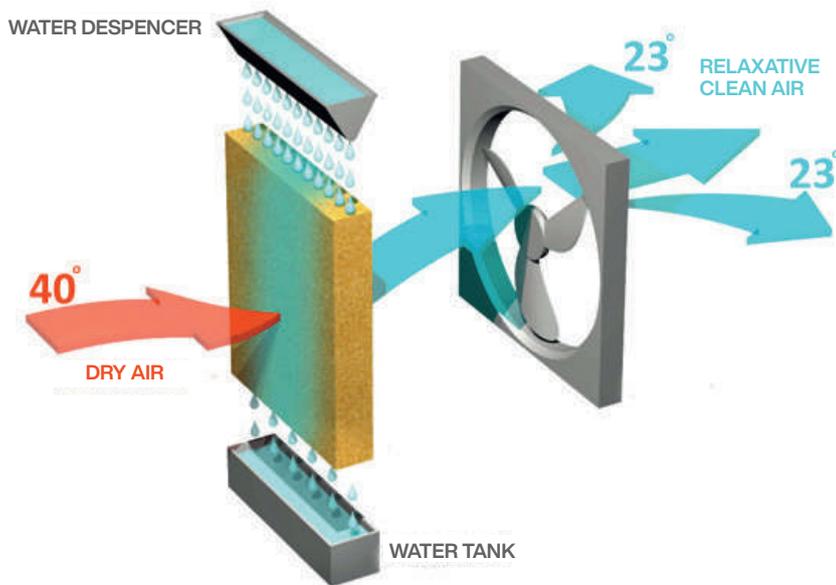
Relative humidity is defined as the ratio of absolute humidity to the maximum amount of humidity in the air. The relative humidity is expressed in percent (%).

The humidity gap in the air is eliminated when the relative humidity reaches 100%. This is referred to as saturated air.

The humidity gap is the difference between absolute humidity and maximum humidity in the air. The lower the humidity gap, the higher the relative humidity.

What are **Evaporative Cooling** Systems?

Evaporative cooling is generally the process of lowering the temperature and reducing the ambient temperature by bringing hot and dry air into contact with water. Technowell Evaporative coolers have large surface cooling pads. Pads stay wet continuously with the water flowing through the channels. The hot, dry air brought inside comes into contact with the moving water as it moves through the pads, thanks to the powerful and quiet fan. Heat transfer occurs between air and water during the passage of air. Cool and humid air is given to the environment to be cooled. The natural evaporation process provides a comfortable working atmosphere by providing fresh and cold air.



What are the Advantages of **Evaporative Cooling** Systems?

- Provides 100% fresh air and optimum cooling.
- It consumes 90% less energy than gas systems.
- Installation cost is 50% cheaper than system air conditioners.
- There is no compressor unit, maintenance costs are low.
- It is an environmentally friendly cooler, it does not emit any harmful gas to the environment.
- Evaporative coolers filter bacteria, dust, pollen, and fumes from the outside air, resulting in cleaner and healthier indoor air.
- Unlike gas air conditioners, evaporative coolers do not dry the surrounding air.
- Evaporative coolers provide fresh air at all times and humidify the environment by providing air circulation.
- The mounting position can be easily changed if desired.

Where Are **Evaporative Cooling** Systems Used?

The history of evaporative cooling predates air conditioning. It is known as "Desert Cooler" in Central Asia and is used in many areas today. There are many types and models for use in small or large volumes, in open or closed environments. The capacities are increased by increasing the fan flow and evaporative honeycomb sizes according to the size of the area.

Evaporative cooling units can be used anywhere and in any environment. Climates with dry, dry air, on the other hand, are where this system performs efficiently. The simpler it is to cool the environment when the intake air has less moisture.



Textile



Hotels



Food



Warehouses



Automotive



Entertainment centers



Foundry



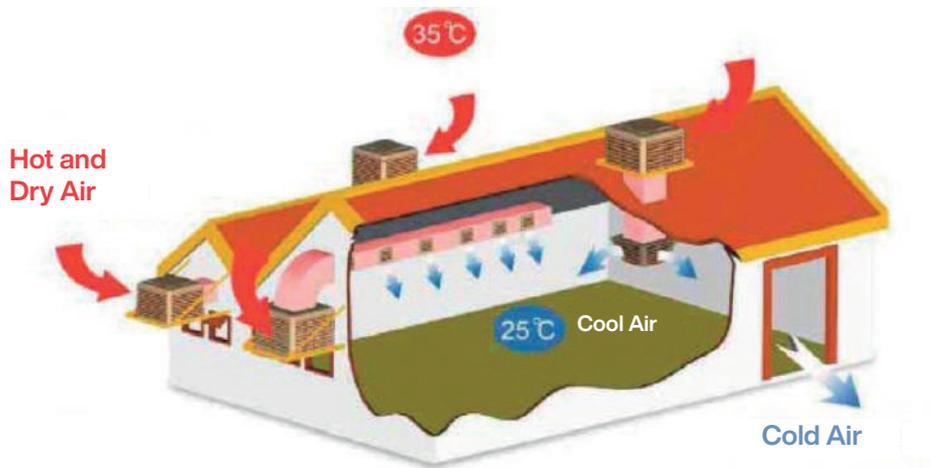
Restaurants



Farms

What are the Benefits of **Evaporative Cooling** Systems?

100% fresh air is used in evaporative cooling units. Unlike traditional air conditioners that use refrigerant gas, they do not recirculate the air in the atmosphere. As a result, the environment is ventilated as well as the cooling effect is ensured by sending filtered fresh air to the environment. Fresh air helps increase productivity and ensures high concentration.



What are the Health Effects of **Evaporative Cooling** Systems?

Legionella bacteria are microorganisms that can be present in natural waters. Legionella is also commonly found in man-made water systems. Legionella becomes a major concern when the water temperature remains between 25 and 55 °C for an extended period. While a strong flow of water will prevent bacteria from growing, if this flow is not consistent in the hot water system, dead spaces can form in places where the water stagnates. Dead spaces make it easier for bacteria to settle, increasing the risk. Because of the use of evaporative cooling units, no cases of Legionella bacteria have been reported. According to the research, this bacteria cannot be transmitted by evaporation. Evaporative coolers merely cool the air to a temperature equivalent to that of a wet bulb. As a result, the system only increases the water temperature to Legionella risk levels on rare occasions. Furthermore, since the water within the unit continues to drain, it does not become stagnant, and the water temperature does not remain between 25 and 55 °C for an extended period.



How is the Capacity Calculated in Evaporative Cooling Systems?

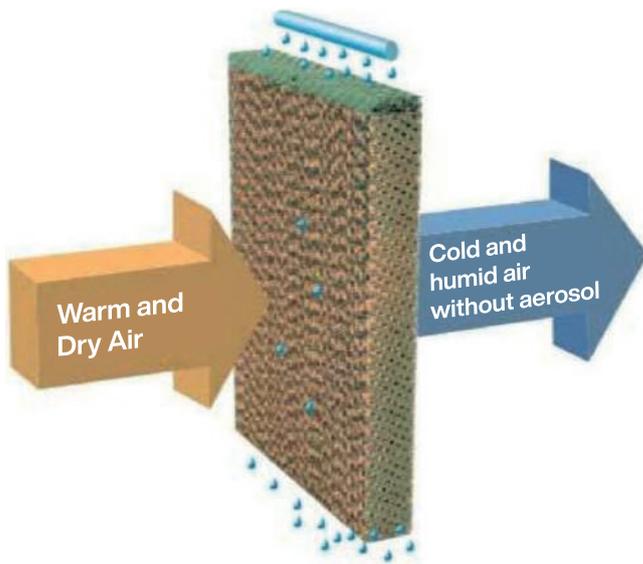
The cooling capacity of the evaporative cooling unit is primarily based on the inlet air temperature and the absolute humidity therein but is also calculated according to the air-flow rate of the fan in the unit. The flow rate of a fan is usually measured in m³/hour. This criterion is related to the amount of air that the evaporative cooling unit will transfer to the environment per unit time.

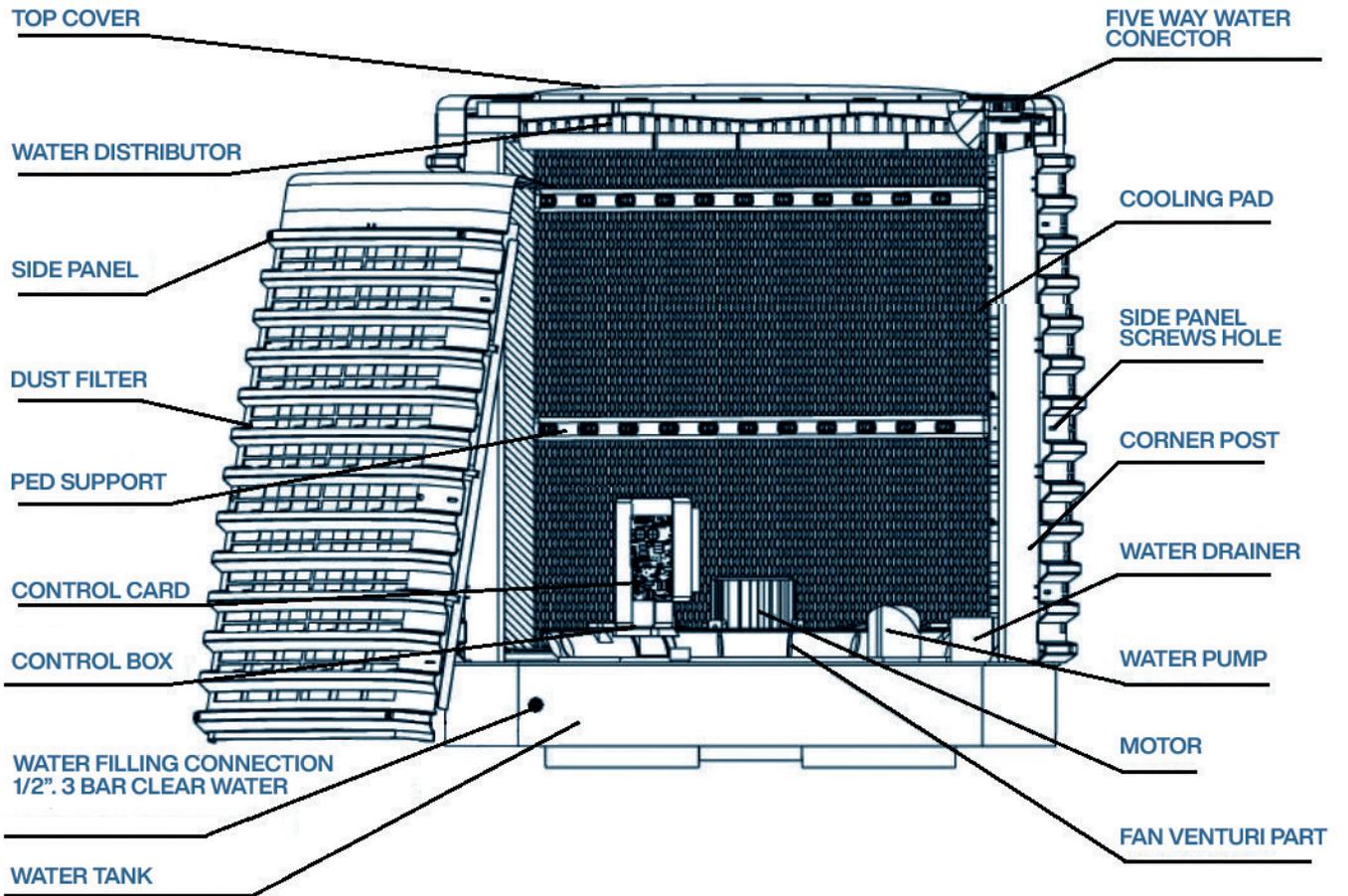
Area of the Indoor Area to be Cooled (m²) x Height of the Indoor Area to be Cooled (m) x The Amount of Air Exchange per Hour (1/h) = Air-Flow of the Evaporative Cooling Unit (m³/h)

REQUIRED FIELD FEATURE	AIR EXCHANGE AMOUNT PER HOUR
NORMAL AREAS	20-30
CROWDED AND PUBLIC AREAS	25-40
HIGH TEMPERATURE AREAS	35-45
SMELLY AND FILTHY AREAS	44-55

When to Replace Evaporative Honeycombs?

The type of materials used in the construction of evaporative honeycombs is one of the factors that determine whether the honeycomb will need to be replaced years later or whether it will continue to function for years to come. In general, the honeycombs may not need to be changed every year. However, if the evaporative honeycomb has lost its thickness or the material is worn out, it is most affordable to buy a new honeycomb. The evaporative honeycomb should be replaced if the evaporative cooling unit does not cool as well as it used to. Thinning, filthy, or aged honeycombs may be the source of this problem.





Industrial Type Evaporation Cooling Unit

The evaporative air conditioning system, on the other hand, supplies the environment with fresh and cold air; the bad air in the environment is evacuated, it is ensured that the environment still has FRESH and COOL AIR. Air ducts transport the cold and fresh air provided by industrial type evaporative cooling units to the indoor climate.

Evaporative coolers use less energy than conventional air conditioners to provide cooling and fresh ventilation in large enclosed areas (warehouses, manufacturing facilities, hangars, etc.). It can be easily mounted on roofs and walls. It only needs water to provide cooling.

Evaporative coolers from Technowell are designed for high performance, low-pressure loss, and long-term reliability.



MODEL**LPEC-20****LPEC-30****LPEC-40**

AIR VOLUME

20.000 m³/h30.000 m³/h40.000 m³/h

RATED POWER

1,5 kW

3 kW

4 kW

EXTERNAL
PRESSURE LOSS

230 Pa

320 Pa

360 Pa

OPERATION
CURRENT

7 A

8 A

10 A

POWER SUPPLY

220-240 V / 50 Hz

380V / 50 Hz

380V / 50 Hz

FAN TYPE

Axial

Axial

Axial

FAN DIAMETER

630 mm

800 mm

800 mm

FAN STAGE

12

12

12

COOLING
PAD SURFACE

(770x870x100 mm) x 4

(940x910x100 mm) x 4

(1000x1050x100 mm) x 4

TANK CAPACITY

40 lt

80 lt

80 lt

DRAINAGE

Automatic

Automatic

Automatic

DIMENSIONS

1100x1100x1150 mm

1300x1300x1200 mm

1500x1500x1450 mm

WEIGHT

75 kg

120 kg

120 kg

WORKING
WEIGHT

115 kg

170 kg

170 kg

CHANNEL
DIMENSIONS

660x660 mm

900x900 mm

900x900 mm

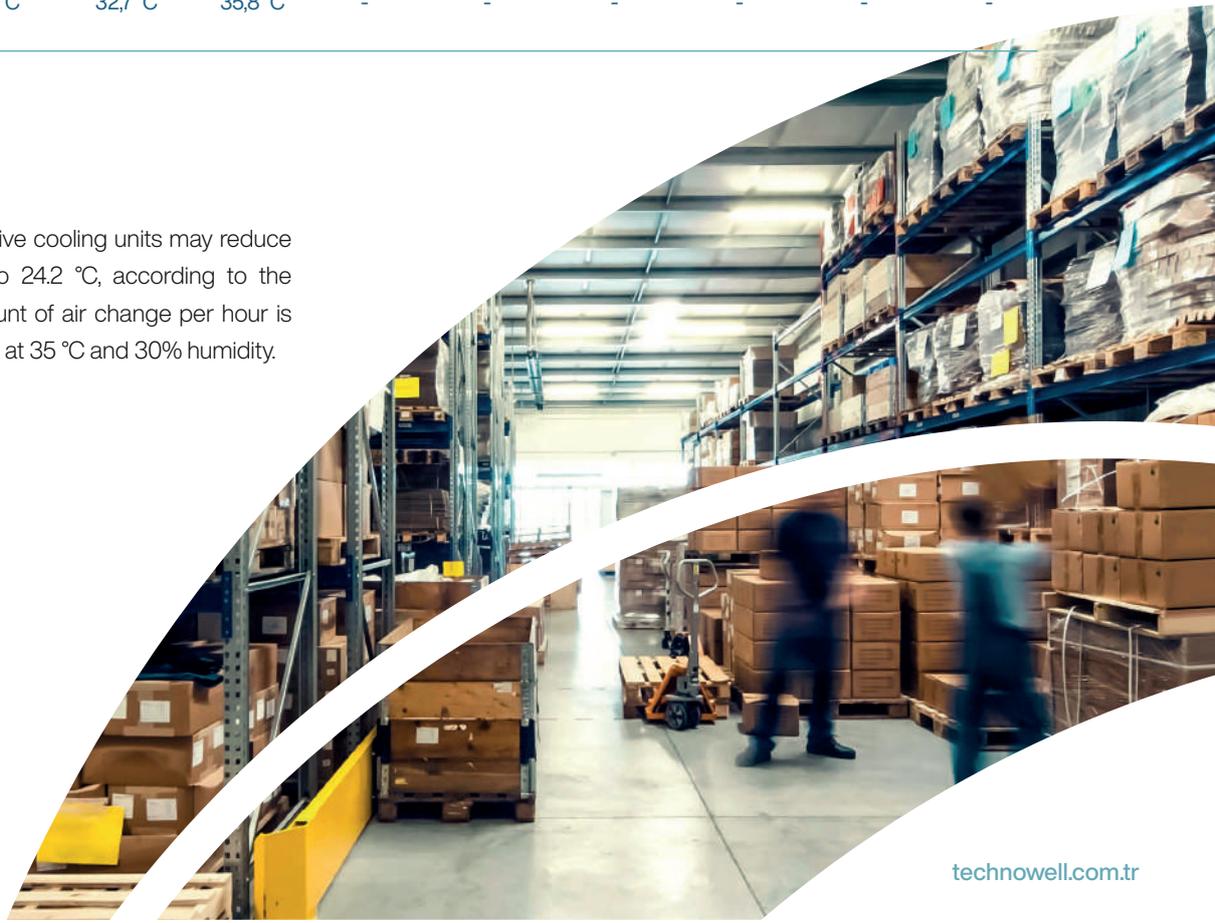
% Outdoor Relative Humidity

Outdoor Temperature

	%10	%20	%30	%40	%50	%60	%70	%80	%90
10 °C	3,2 °C	4 °C	4,8 °C	5,6 °C	6,4 °C	7,2 °C	8 °C	8,6 °C	9,4 °C
15 °C	6,6 °C	7,1 °C	8,8 °C	9,8 °C	10,8 °C	11,8 °C	12,6 °C	13,4 °C	14,3 °C
20 °C	10,1 °C	11,4 °C	12,8 °C	13,9 °C	15,2 °C	16,2 °C	17,2 °C	18,2 °C	19,2 °C
25 °C	13,4 °C	15 °C	16,6 °C	18 °C	19,4 °C	20,6 °C	21,8 °C	22,9 °C	24 °C
30 °C	16,6 °C	18,6 °C	20,4 °C	22 °C	23,6 °C	25 °C	26,4 °C	27,7 °C	28,9 °C
35 °C	19,8 °C	22,2 °C	24,2 °C	26,2 °C	28 °C	29,6 °C	31 °C	32,4 °C	33,7 °C
40 °C	23 °C	25,6 °C	28,1 °C	30,4 °C	32,3 °C	33,9 °C	-	-	-
45 °C	25,9 °C	29,2 °C	32 °C	34,4 °C	-	-	-	-	-
50 °C	29 °C	32,7 °C	35,8 °C	-	-	-	-	-	-

EXAMPLE:

Our industrial style evaporative cooling units may reduce the ambient temperature to 24.2 °C, according to the above table, when the amount of air change per hour is chosen correctly, outdoor air at 35 °C and 30% humidity.





Portable Type Evaporative Cooling Unit

Due to their ease of use and maintenance, our compact evaporative coolers have a higher cooling performance than larger gas cycle coolers. It is ideal for both indoor and outdoor use due to its elegance and compact dimensions.

An evaporative cooler is a device that cools the air through the evaporation of water. Vapour cooling is not the same as typical air conditioning, which uses vapour compression or absorption cooling cycles. During the transfer of liquid water to water vapour (evaporation), the temperature of the dry air can be greatly lowered; this process cools the air with much less energy.

With their wheeled designs, portable evaporative cooling units are easy to transport. It is widely used in cafes, stations, factories, supermarkets, etc. Ideal for healthy and energy-efficient cooling.



General Features

- Three-speed fan stages
- Low carbon environmentally friendly product
- Dust filter and cooling pad filter
- Water pump protection function against low water level
- Healthy negative ionizer, long-life water pump
- Affordable price, low installation and maintenance costs
- Low power consumption
- Time settings
- Control by remote control



MODEL	PEC-45	PEC-80
AIR VOLUME	4.500 m ³ /h	8.000 m ³ /h
AREA OF USAGE	35 m ²	70 m ²
RATED POWER	160 watt	380 watt
FAN TYPE	Axial	Axial
FAN STAGE	3	3
CONTROL TYPE	LED + Remote Control	LED + Remote Control
TEMPERATURE DISPLAY	Available	Available
HUMIDITY INDICATOR	Not Available	Available
IONIZER	Available	Available
WATER TANK	40 lt	57 lt
WATER CONSUMPTION	4 kg/h	9 kg/h
SOUND LEVEL	≤ 59 dB(A)	≤ 59 dB(A)
POWER SUPPLY	220 V – 50 Hz	220 V – 50 Hz
WATER INLET	Automatic	Automatic
DRAINAGE	Manual	Manual
DUST FILTER	Available	Available
PUMP PROTECTION	Available	Available
HONEYCOMB SIZE	625x440x100 mm	715x640x100 mm
NET WEIGHT	22 kg	31 kg
DIMENSIONS	712x466x1180 mm	800x480x1380 mm
BOX SIZE	722x476x1190 mm	810x490x1390 mm

% Outdoor Relative Humidity

Outdoor Temperature

20 °C

10,1 °C 11,4 °C 12,8 °C 13,9 °C 15,2 °C 16,2 °C 17,2 °C

25 °C

13,4 °C 15 °C 16,6 °C 18 °C 19,4 °C 20,6 °C 21,8 °C

30 °C

16,6 °C 18,6 °C 20,4 °C 22 °C 23,6 °C 25 °C 26,4 °C

35 °C

19,8 °C 22,2 °C 24,2 °C 26,2 °C 28 °C 29,6 °C 31 °C

40 °C

23 °C 25,6 °C 28,1 °C 30,4 °C 32,3 °C 33,9 °C -

EXAMPLE:

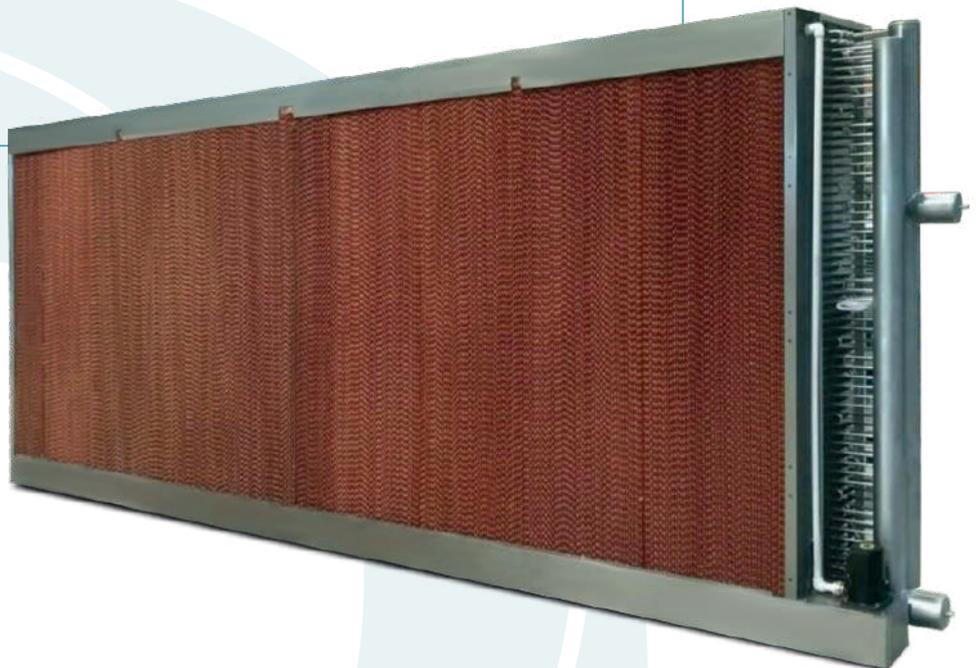
When the indoor area is selected according to the table above, our portable type evaporative cooling units can reduce the ambient temperature to 20.4 °C when the indoor air is 30 °C and 30% humidity.



Evaporative Pre-Cooling Unit

ince high-temperature intake air generates problems in air-cooled mechanical air conditioners, the temperature of the air entering the system is needed as low as possible. As high-temperature intake air is delivered directly to system components, the amount of heat transferred is reduced. It also increases electricity consumption by forcing system components to operate under more demanding conditions.

Implementation of evaporative pre-cooling by means of Technowell adiabatic cooling units to be installed on the condensers of the systems in air-cooled groups; by cooling the inlet air to the condensers, an increase in the cooling capacity of the compressor and saving in energy consumption is achieved. Technowell units are used in mechanical cooling systems to improve performance in larger capacity systems by lowering the inlet air's sensible heat load.

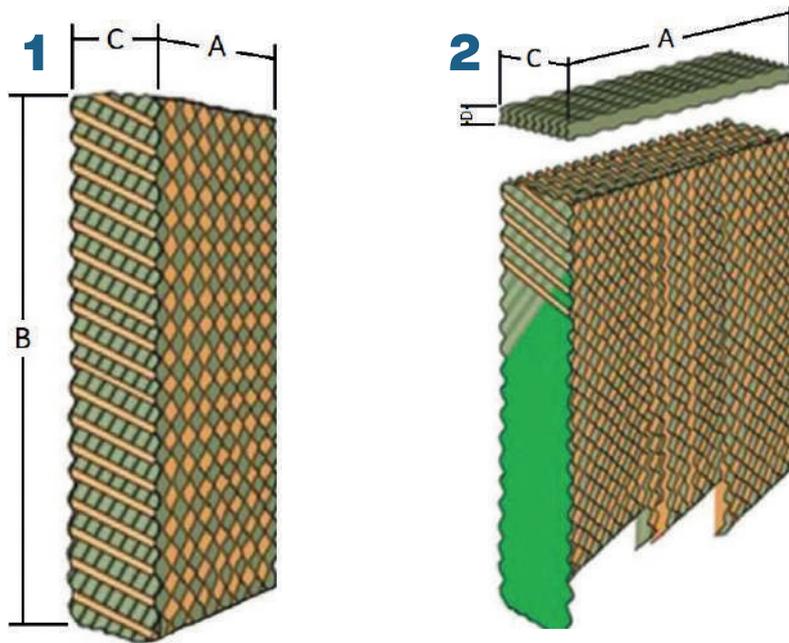


Advantages

- All evaporative pre-cooling units use Technowell honeycomb heat exchangers with high evaporation performance.
- It is the cheapest system solution, it costs as much as the water need of the honeycombs and the energy consumption of the pump (0.37-1.5kW).
- In terms of benefit and initial investment expense, the depreciation period is very short.
- Using evaporative pre-cooling units in cooling groups would not void the cooling group's warranty, and the condenser coil does not get wet or lime.
- When the cooler honeycombs are properly designed, properly used and well maintained, they do not require replacement.
- The Technowell evaporative pre-cooling unit sends low-temperature air generating from pre-cooling to the condenser line in a uniform manner.
- Operates with mains pressure and does not require high operating pressures.

Principle of Working

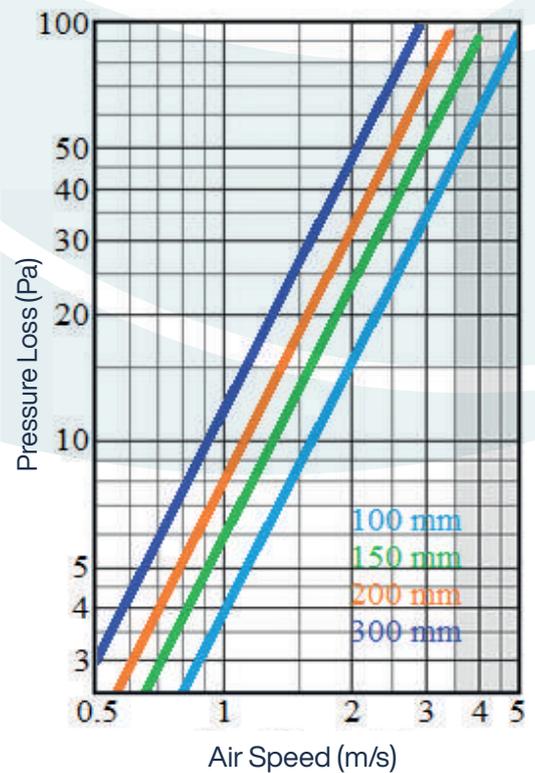
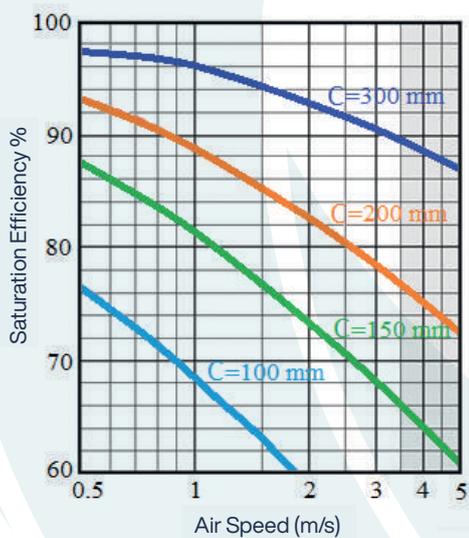
The dry-bulb temperature of the air flowing over the condenser fins is brought closer to the wet-bulb temperature by a high-efficiency cooling honeycomb whose surface is kept wet in the working principle. The non-evaporating water collected on the cooling honeycomb is collected in a reservoir and pumped back into the system through a pump, allowing the water to circulate in the system. The water is cooled by adiabatic saturation, which is achieved thanks to the air-flow provided by the condenser fans. With this process, adiabatic cooling (evaporative cooling) is provided. This process does not cause any adverse situation related to corrosion in fins.



	Standard Heights	Standard Width	Standard Depths
1 Evaporative Heat Exchanger	B: 1500 mm – 2000 mm	A: 600 mm	C: 100 mm – 150 mm C: 200 mm – 300 mm
2 Water Distribution Pad	D: 30 mm	A: 600 mm	C: 100 mm – 150 mm C: 200 mm – 300 mm

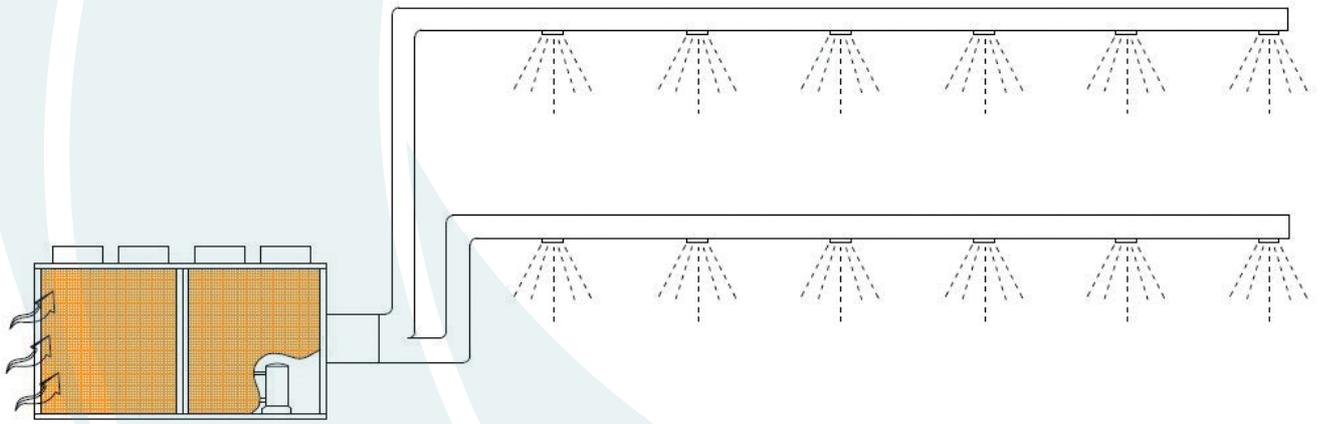
Heat exchanger when high efficiency is required depth may vary, contact Technowell for information.

HONEYCOMB EFFICIENCY AND AIR SIDE PRESSURE DROP



Please contact Technowell for heat exchangers of different depths (efficiency).

EVAPORATIVE PRE-COOLED UNIT RESULTS



Outdoor dry-bulb temperature 45 °C, relative humidity 30%

Data of fresh air input to the condenser coil: Dry bulb temperature 29.5 °C, relative humidity 91%

RESULT:

It provides energy savings of up to 30% by increasing the cooling capacity and COP value of the device to which it is applied. It helps to extend the life of the device by reducing the compressor pressure.





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