



OUTDOOR MIST COOLING SYSTEMS FOR LARGE AREAS



Humidification, Dehumidification
and Evaporative Cooling

 **condair**



Water treatment & high pressure pump

Pump station

A pump station and water treatment system purifies the supply water and pressurizes it for supply to the pipework and nozzles. Water is supplied at 70bar for optimum atomization on its release as an aerosol.

A single pump station can treat and deliver up to 1,300 litres per hour to a distribution system. Multiple pump stations can be combined to provide unlimited humidification capacity.

An on-board digital control panel provides a user interface for all operational and hygiene functions but the system can also connect to an external building management system (BMS) using popular BMS protocols.



Long lasting performance
through quality and design

Distribution systems



ML Flex

This discreet nozzle can be mounted within a facade or exposed on a pipeline, with either single direction or bi-directional nozzle heads. Humidification volume can be expanded without restrictions.

ML Flex nozzles are made from high quality stainless steel, are easy to install, and can be individually replaced within a system if required without significant downtime.



ML Solo

Can be suspended from a ceiling or attached to a wall, the ML Solo can incorporate up to two nozzles. An integrated fan unit provides rapid evaporation and can offer up to 5kg/h and around 3.5kW of evaporative cooling.

Condair high pressure humidification provides utmost performance and peace-of-mind for outdoor evaporative cooling in high-profile public areas. The highest quality components combine with a system design that focuses on hygiene management and long-lasting operation.

Flexible design options and a consultative approach to supporting clients, allows Condair evaporative cooling systems to perfectly integrate within a project's architectural environment. Condair's design department will work alongside architects and mechanical engineers

to meet a project's aesthetic and performance specifications.

Global engineering teams can support clients through the installation, commissioning, training and on-going maintenance necessary for operating a reliable and hygienic evaporative cooling system.



Many environmental factors must be considered to calculate the potential of evaporative cooling

The potential of evaporative cooling

One kilo of moisture evaporated from a humidifier will provide around 0.68kW of cooling to the air. High pressure humidifiers have the capacity to release many thousands of kilos per hour, delivering correspondingly high levels of cooling to an area.

However, the ambient humidity must be low enough to facilitate the evaporation of the moisture and very high humidity must be avoided to prevent discomfort (max. 15g/kg).

Influencing factors

- Ambient temperature
- Ambient humidity
- Solar heat gain
- Shading
- Surrounding environment
- Airflow
- Heat index (perceived temperature)

Condair's experienced sales engineers will work with a client's team to provide accurate projections of how much cooling can be achieved given all influencing factors.

The effect of relative humidity on evaporative cooling

Starting relative humidity	Starting temperature	Humidity after humidification	Temperature after humidification	Actual cooling effect
10%RH	45°C	65%RH	26.5°C	18.5°C
15%RH			28.5°C	16.5°C
20%RH			32°C	13°C
25%RH			33.5°C	11.5°C
30%RH			35°C	10°C

The lower the relative humidity is in an area, the more effective an evaporative cooling system will be in lowering the temperature. This is because more moisture can be absorbed by the air, with correspondingly greater cooling.

Contact Condair for a detailed cooling performance calculation for your project



Hygienic design and operation must be a guiding principle in any evaporative cooling project

Hygienic operation

When introducing aerosols into a public area, there is great responsibility to ensure those aerosols do not pose a risk to health. Microbes can grow in water, particularly when still and in warm conditions. Evaporative cooling systems must incorporate robust features to control microbial growth.

Condair humidifiers are designed and installed with hygienic operation as a central guiding principle.

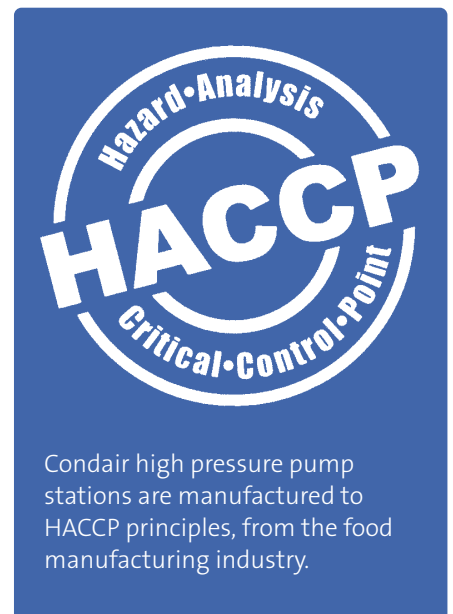
Automated flush and drain cycles ensure water cannot remain in the system to stagnate, even during periods of non-operation. Water filtration and sterilisation systems are also used to ensure the water being supplied to the nozzle lines is pure. The type of water treatment incorporated into a system is project specific but can

include ultra-violet sterilisation, reverse osmosis, double RO, ion exchange or proactive antibacterial hygiene dosing to combat microbial growth.

Inert materials are used in humidifier construction, such as stainless steel or polyester, and pipework is designed with no “dead legs”, where water can settle without flowing back to drain.

Hygiene management must also include service and maintenance schedules, including disinfection and regular water testing for possible contamination levels, as a preventative measure.

Condair can provide maintenance support either directly or via training of on-site technicians in best hygiene practise.



Condair high pressure pump stations are manufactured to HACCP principles, from the food manufacturing industry.



The highest quality components ensure the longest possible service lifetime

High quality for robust, long-lasting performance

A professional evaporative cooling system in a high-profile public area is a substantial investment and is frequently fully integrated into a building's architecture or mechanical services infrastructure. It is therefore vitally important it provides a long service lifetime without the need to frequently replace expensive components or require considerable downtime.

Condair evaporative cooling systems are built using the highest quality components to ensure the longest possible service lifetime. When elements do need replacing, system design ensures it can be carried out in a practical manner, as quickly and conveniently as possible.

All elements that convey water are made from stainless steel or inert plastics, including the pipework connecting the nozzle network.

A stainless steel Danfoss high pressure pump is incorporated with hydraulics that have a completely oil-free design. This minimises the required maintenance and extends product lifetime. Pumps are guaranteed for 8,000 maintenance-free hours of operation.

A Siemens controller provides intuitive user control over all functions.



Danfoss

SIEMENS



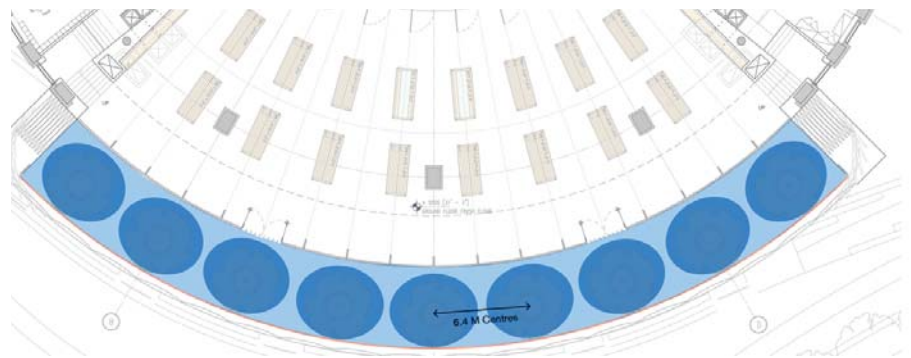


Let Condair's experience guide you through an evaporative cooling project

Full turnkey solution

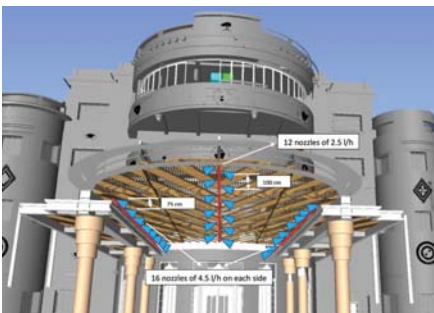
Every Condair evaporative cooling system is delivered as a customer-specific project.

A Condair sales engineer will work with a client's design team to provide detailed calculations on potential cooling capacity. Among other elements this may take into account geography, historic weather data and the surrounding environment. This process can help to inform decisions on other architectural elements, such as canopies and shading.



Possible layout designs are then produced, which will include information on integration with other components and installation options. Other elements included in the design process are water management planning to ensure hygienic performance and maintenance schedules for maximum longevity.

An outdoor evaporative cooling system designed and delivered by Condair will provide the amount of cooling needed, fit seamlessly with the surrounding architecture, and have a long and hygienic service lifetime.



Our spray cooling projects include:



Al Masjid an Nabawi
Prophet's Mosque in Medina



Haramain High Speed Railway
Stations at Medina and Makkah

Technical data

	MLP RO 100	MLP RO 300	MLP RO 500	MLP RO 800
Humidification performance (l/h)* at 50 Hz	100	275	440	750
Dimensions (H x W x D) in mm for pump station	860 x 700 x 1600	860 x 700 x 1600	860 x 700 x 1600	860 x 700 x 1600
Dimensions (H x W x D) in mm for external tank	Internal tank	Internal tank	600 x 600 x 995	790 x 790 x 1250
Weight (kg)	125	130	240	270
At 50 Hz	3 x 400 VAC+GND +N, 1.8KW, 16A or 3 x 230 VAC+GND, 1.8KW, 16A	3 x 400 VAC+GND +N, 2.5KW, 16A or 3 x 230 VAC+GND, 2.5KW, 16A	3x400 VAC+GND+N, 3.1KW, 16A or 3x230 VAC+GND, 3.1KW, 20A	3x400 VAC+GND+N, 3.8KW, 16A or 3x230 VAC+GND, 3.8KW, 20A
At 60 Hz	3 x 208 VAC+GND 1.6KW 16A or 3 x 480 VAC+GND 1.8KW 16A	3 x 208 VAC+GND, 2.7KW, 16A or 3 x 480 VAC+GND 2.7KW 16A	3x208 VAC+GND, 3.1KW, 16A or 3x480 VAC+GND, 3.1KW, 16A	3x208 VAC+GND 4.2KW, 20A or 3x480 VAC+GND, 4.2 KW, 16A

ML Solo

	ML Solo 1	ML Solo 2
Humidification performance (l/h)	1.5 - 2.5	3 - 5
No. of nozzles	1	2
Operating pressure	50 - 70 bar	50 - 70 bar
Operating voltage	24 VAC, 50 - 60 Hz	24 VAC, 50 - 60 Hz
Power input (W)	15 / 16	15 / 16
Weight (kg)	2	2
Dimensions (diameter/height)	180 x 150 x 170 mm	180 x 150 x 170 mm
Installation	Ceiling or wall-mounted	Ceiling or wall-mounted

ML Flex

	ML FLEX
Humidification performance (l/h)	1 - ∞
Operating pressure	35 - 70 bar
Min. distance to ceiling	200 mm
Min. fogging zone	1.5 m