

## DOUBLE INTELLIGENCE

Condair DL Series

Two adiabatic humidification  
principles intelligently combined

### Softener

Optimal water treatment first of all requires the softening of the humidifying water. A softener performs this task reliably.

### Reverse osmosis

A reverse osmosis system supplies mineral-free humidifying water.

### Condair DL control unit

The control unit is the heart of the Condair DL hybrid humidifier. The control and regulating operations take place there.



# Condair DL Series

## Hybrid Humidifier

### Condair DL HygienePlus®

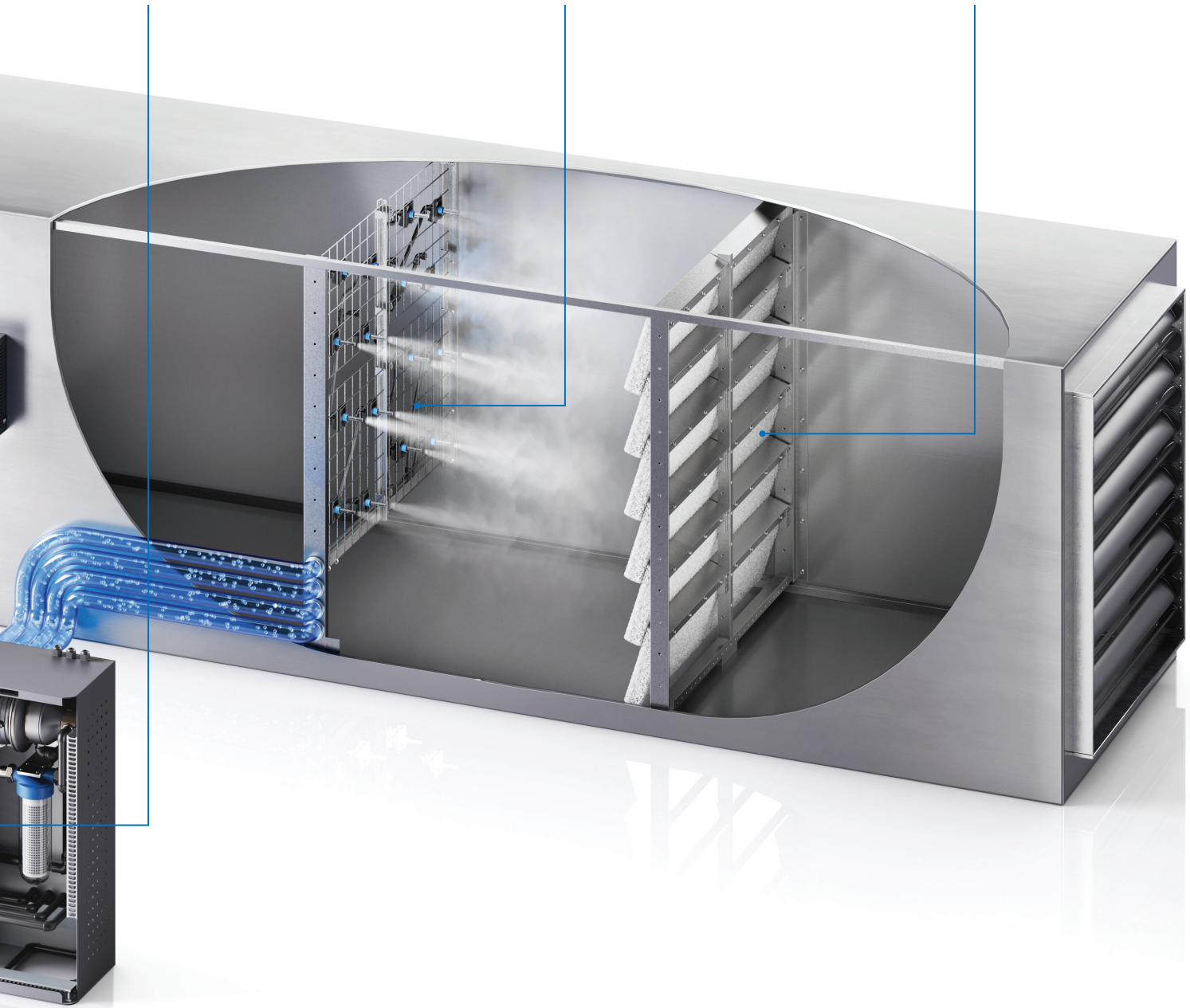
The HygienePlus® silver ionization and the optional sterile filter are used as preventative hygiene measures and offer lasting hygiene safety.

### Condair DL atomizer unit

The optimal layout of the atomizing nozzles ensures uniform humidity distribution. Electrical current consumption is low because of the low-pressure operation.

### Condair DL evaporator unit

The patented ceramic evaporator unit maximizes use of the valuable humidifying water. The separating efficiency of the ceramic ensures hygienic operation.



The Condair DL is the most successful adiabatic humidification system. Its unique hygienic standard has proven itself in operation, earning awards from independent organizations with public responsibility.

The Condair DL was developed with regard to

the highest possible hygiene safety. Intelligent structural and operational features have a preventive effect, guarding against uncontrolled germ growth inside the humidifier.

The HygienePlus® system ensures sustainably healthy air and a hygienic environment. An adequate relative humidity is of great importance. Optimal air

parameters for well-being and health protection are between 70°F to 71.5°F (21°C to 22°C) and with relative humidity between 40 % and 60 %.

A suitable air humidity leads to the best production results and highest quality in the industrial sector.



# Two adiabatic principles intelligently combined!

The Condair DL hybrid humidifier is based exclusively on the advantages of the two humidification principles of atomization and evaporation. This results in the sustainable resolution of key problems which can emerge when these technologies are used individually. The humidification system is therefore the first choice in terms of hygiene, energy efficiency and cost-effectiveness.

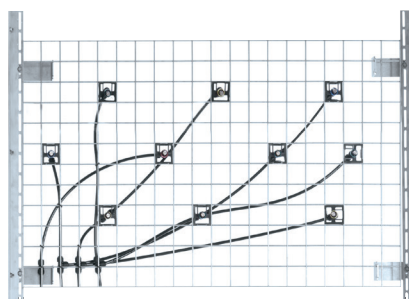
## Atomize

The humidifying water is atomized by stainless steel atomizing nozzles at low pressure. The atomizing nozzles have an adjustable spray output and are optimally distributed over the entire cross-section of the device. A high evaporation efficiency and a uniform humidity distribution are achieved by this layout.

## Evaporate

The evaporator unit made of premium ceramic is placed at the end of the humidification distance. It captures the humidifying water and ensures the best possible reevaporation. The ceramic plates thus allow the most effective utilization of the high-grade humidifying water. At the same time, they prevent water accumulation in downstream components.

Behind the Condair DL humidifier, there is aerosol-free and hygienically humidified breathable air.



Atomize

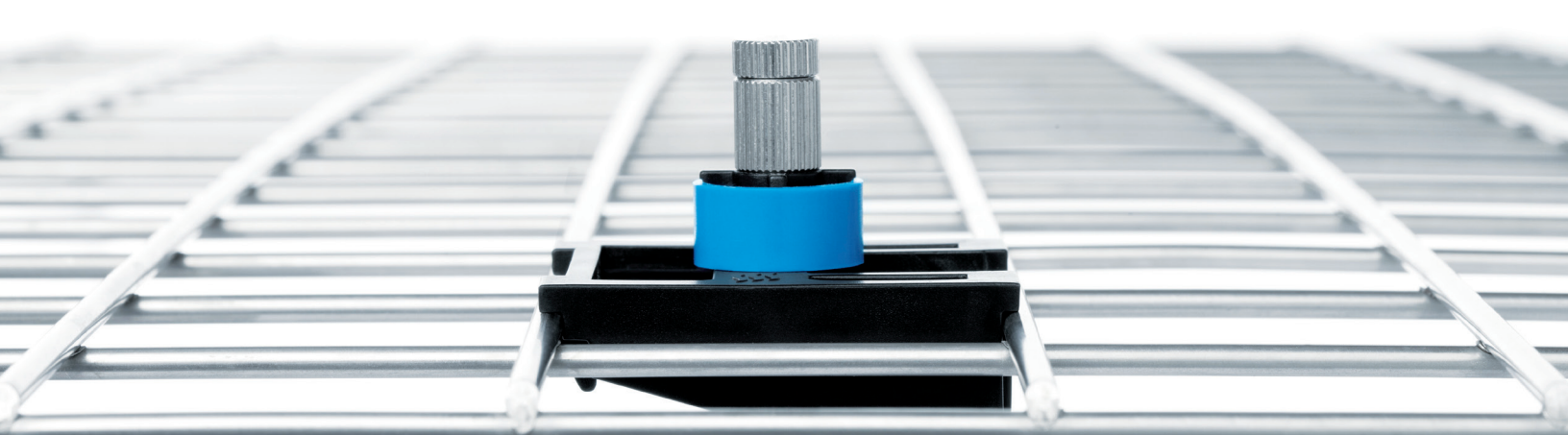
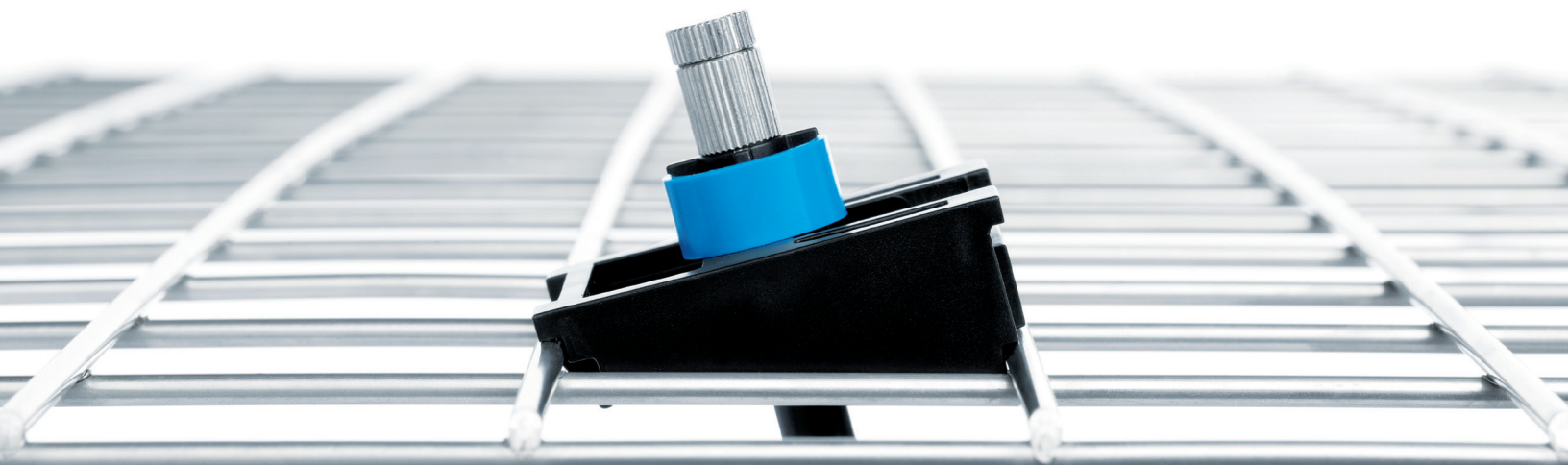
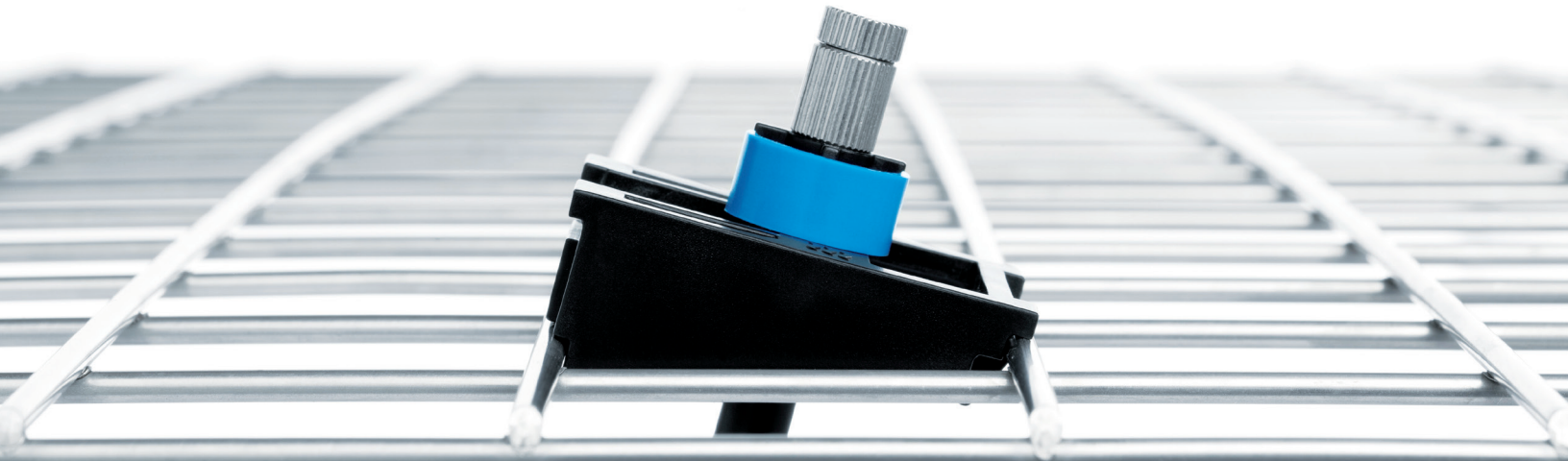
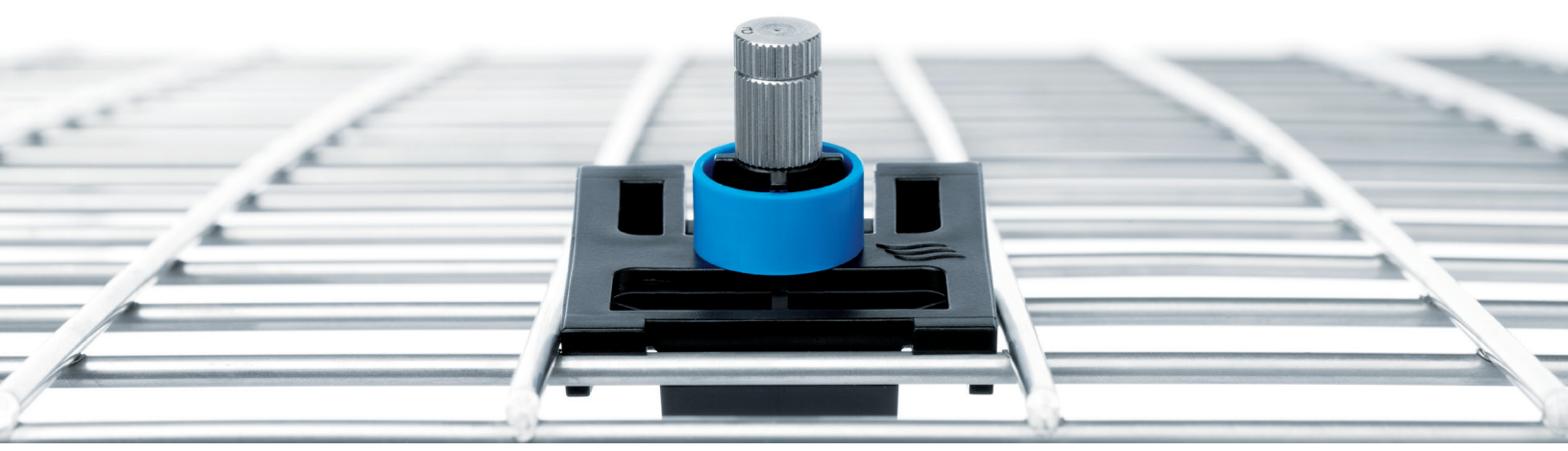
Low-pressure stainless steel atomizer nozzles



Evaporate

Evaporation ceramics





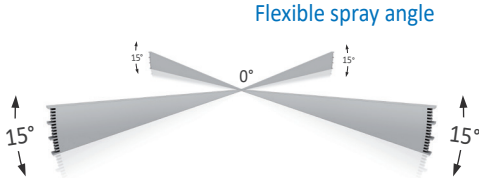
# Adjustable stainless steel atomizer nozzles

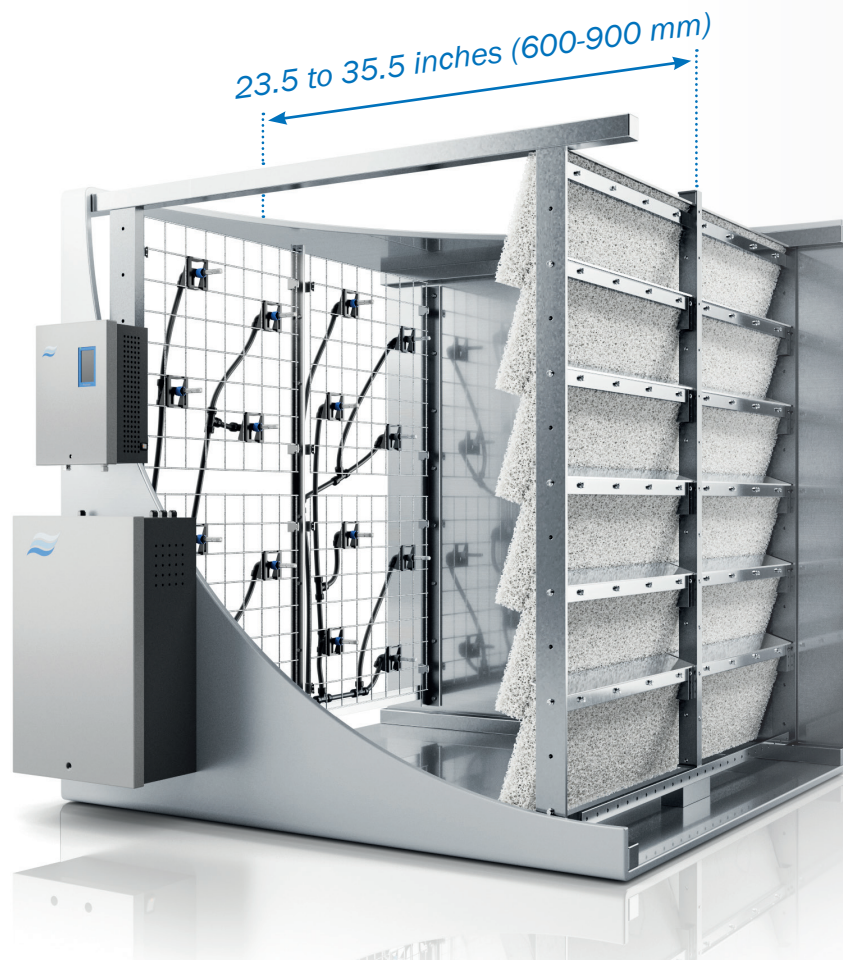
The low-pressure mode of operation translates to significant energy savings due to the lower compression work. The low-pressure stainless steel nozzles work in a pressure range of 43.5 to 101.5 psi (3 to 7 bar(g)) and are totally wear-free.

The nozzle itself is located on a flexible mounting clip which can be adjusted into a straight line or at an inclination angle of 15°.

By that, the spray cone of the nozzles can

be directed so that the humidifying water meets the evaporation ceramics completely, even in the critical edge areas.







## Full-surface evaporation of water

The bigger the wet ceramic surface, the higher the efficiency in water utilization. The humidifying water therefore evaporates over the entire cross-section of the air flow.

This makes the high-grade ceramic surface available for complete water absorption on the upstream side.

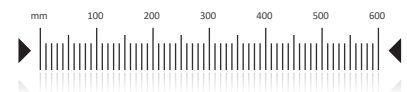
## Extremely short installation length

Low-pressure systems generally get by with a significantly shallower design depth than what is necessary in high-pressure humidifiers.

Thanks to the compact design, the humidification chamber can also be shortened and remarkable material savings can be obtained.

Because of the full-surface layout of the evaporation ceramics and the spray cone of the stainless steel atomizer nozzles, the overall design depth of the Condair DL can be reduced to up to 23.5 inches (600 mm).

Overall length can be reduced up to 23.5 inches (600 mm)!



# Intuitive Touch Controller

## Optimal process transparency

With the Condair touch controller you have all devices and process data at a glance. Functional data can be called up in real time and by using a detailed data history. Via the IoT (Internet of Things) connection, data can be transferred to the Condair Cloud, viewed and analyzed online.

## Perfect connection to the building management system

The DL hybrid humidifier supports a variety of standard common network protocols of building technology.

The connection to Modbus RTU or Modbus TCP as well as BACnet IP or BACnet MS/TP is easily made directly via the interfaces attached to the controller.

The DL has [BTL \(BACnet Testing Laboratories\)](#) certified BACnet technology. This certification is carried out by an accredited BTL test laboratory and is considered a worldwide test standard in BACnet communication. The optional gateway board can also be used to connect to a Lonworks network.

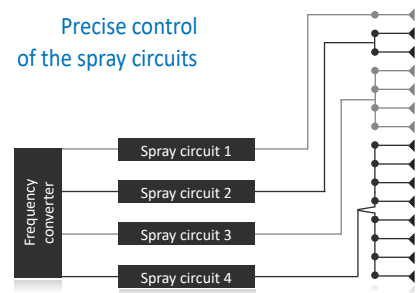


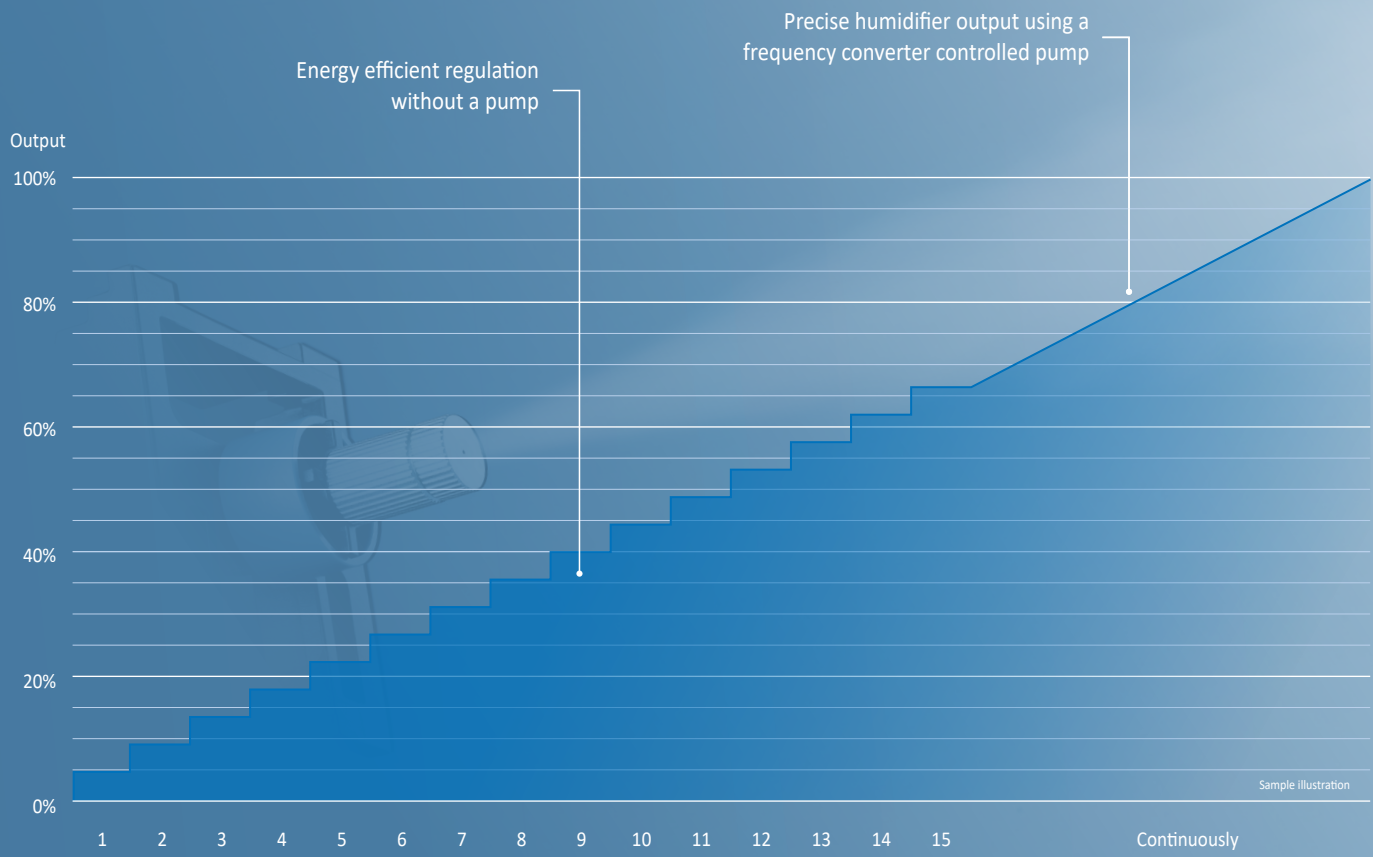
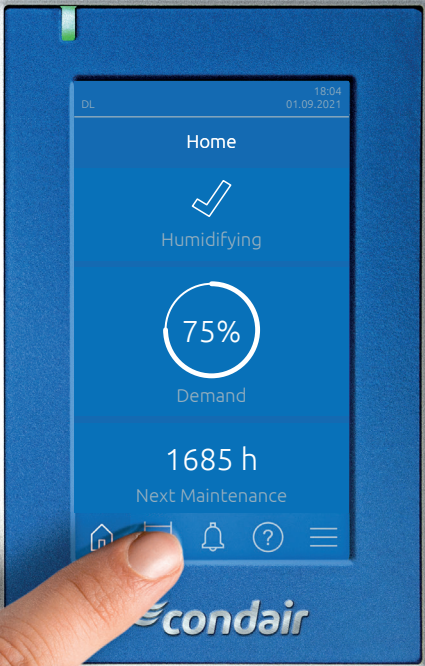
# Control at highest precision

The unique combination of the spray circuit and continuous water quantity control allows precise control accuracy. The system first runs through the output levels of the spray circuits in line. Only afterwards, the frequency controlled humidification pump is activated and the humidification output continuously rises until the required humidity setpoint is reached.

In conjunction with the evaporation effect of the ceramic elements the highest possible control accuracy is reached at each operating point and this takes place over the entire output range of 0% - 100%.

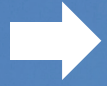
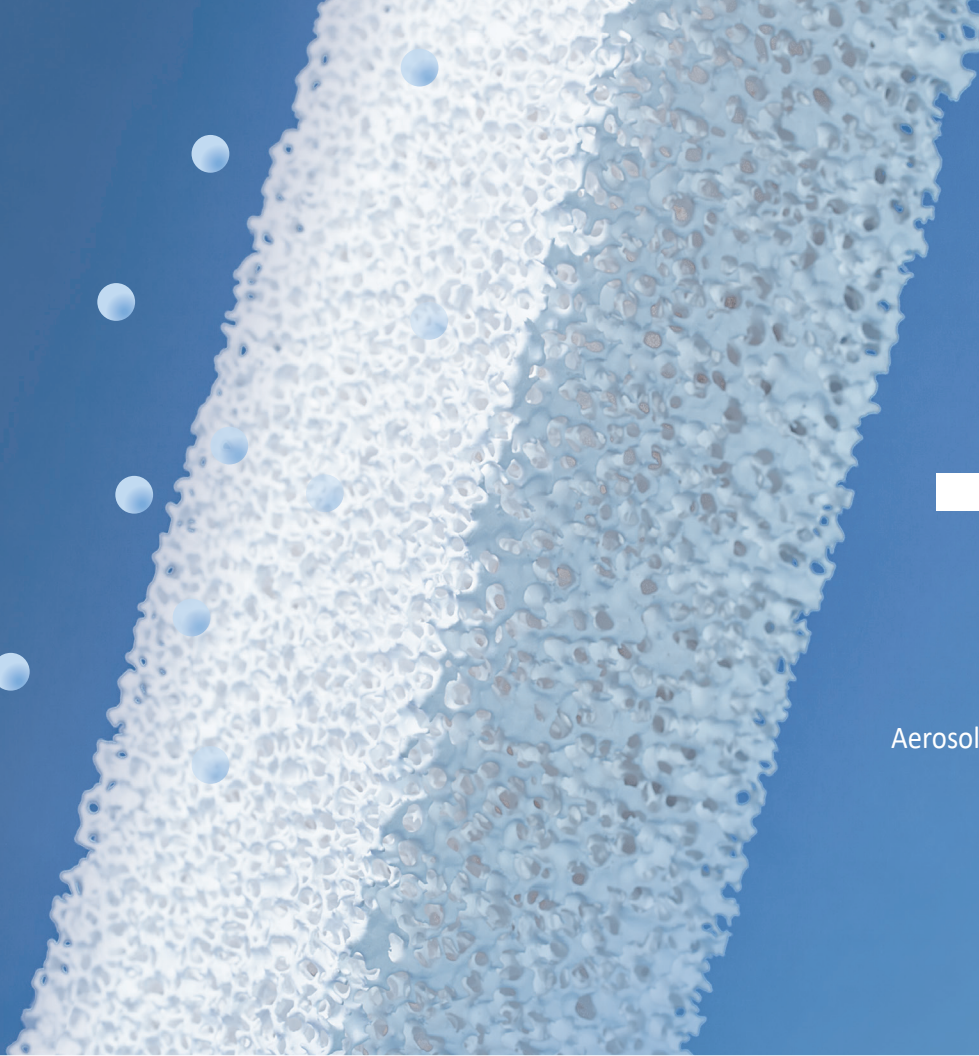
This operating mode is energy-efficient, saves humidifying water and meets the high requirements for humidification accuracy.





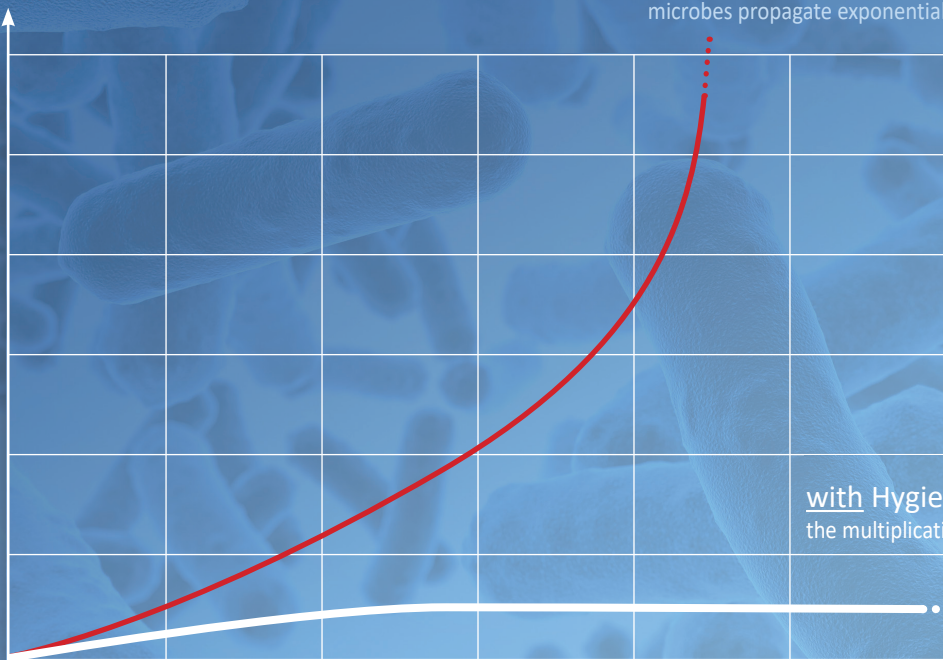
Sample illustration

Air with water drops



Aerosol-free air

N° of germs



without HygienePlus®  
microbes propagate exponentially

with HygienePlus®  
the multiplication of microbes is prevented

Time

# Aerosol-free air

No water aerosols should enter the air duct system during hygienic humidification. The aerosols could get deposited there and form hazardous wet areas.

Water aerosols in microbially contaminated humidifying water or existing biofilms can become germ carriers and contaminate breathable air. Here too, the Condair DL Series offers

a sustainable solution with the ceramic evaporator unit which separates and effectively evaporates the humidifying water from the air flow.

# Hygiene precautions

Basically, air conditioners and humidification devices are not sterile areas. Even when humidifying water of drinking-water quality is used, it will never be completely free of germs.

Therefore, microbes can always settle and form hazardous biofilms in humidifiers and in wet areas of air conditioners.

Suitable hygiene precautions are therefore essential to prevent the growth and multiplication of pathogens in adiabatic humidifiers.

The germ diagram points out the rapid multiplication of microorganisms when no appropriate steps are taken to contain them.

The DL Series Adiabatic Evaporative Humidifier offers hygienic humidification that you can trust. This system holds an [SGS Institut Fresenius Hygiene Certificate](#) confirming its hygienic operation.

The Condair DL Series system was installed and commissioned in an air handling unit at the technical center of the SGS Institute Fresenius GmbH, Taunusstein. There it was operated under real-life conditions for six months (June to November 2013) and observed throughout. As part of the investigation, microbiological contamination was applied in a targeted way in order to test the function of the DL unit under worst case conditions.

The logo for SGS, consisting of the letters 'SGS' in a bold, sans-serif font. A vertical orange line is positioned to the right of the 'S', and a horizontal orange line is positioned below the 'S'.



## The HygienePlus® concept



### **The purest humidifying water**

Clean treated humidifying water is the basis for hygienic humidification. Only mineral-free fresh water with drinking water quality is used in the Condair DL. The humidifying water has the highest hygiene quality thanks to the germ neutralization system.

### **Independent draining of the DL hydraulic system**

Stagnant water in water pipes generally represents a hygiene risk. For this reason, the water-bearing pipe systems of the Condair DL humidifier are emptied after a system stoppage of 1 h.

### **Intrinsic safety through automatic conductivity monitoring**

Limescale in adiabatic humidifiers offers ideal refuge areas for undesirable microorganisms. They are protected there and cannot be eliminated through conventional hygiene measures. Mineral-free humidifying water must therefore always be used for adiabatic humidification. Automatic conductivity monitoring is part of the Condair DL hybrid humidifier and protects the system from undesirable entry of minerals even when on-site operating conditions are not ideal.

### **Preventive germ neutralization**

The HygienePlus® concept is based on the silver ionization of the humidifying water. Silver ions are dosed into the application efficiently, precisely and easily. Microorganisms are prevented from propagating.



#### **Effective germ neutralization**

The germ diagram points out the rapid multiplication of microorganisms when no appropriate steps are taken to contain them. The HygienePlus® concept is based on the natural effect of silver ions for germ neutralization and prevention.

The electronic controller with automatic capacity monitoring ensures the exact dosage with constant disinfection action. The silver ions ensure hygienic conditions for all water-wetted components of the humidification system.

#### **Interval flushing of supply water**

Stagnant water in water pipes always poses the risk of microbial contamination. The Condair DL controller therefore allows the automatic flushing of the on-site water supply pipes during downtimes when no humidification is carried out.

The humidifying water in these pipes is thus regularly replaced.

#### **Optional compressed air cleaning of the humidification system**

The water-conducting lines of the humidification system can be flushed with compressed air and dried upon request. This is done either automatically after specific downtimes or individually initiated by the user.

Effective germ neutralization  
with silver ions



# Condair DL Series

## Hybrid Humidifier



### Energy-efficient low-pressure system

The low-pressure operation leads to significant energy savings due to the lower compression work.



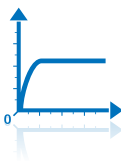
### Aerosol-free air

Using the ceramic evaporator unit, the humidifying water is separated from the air flow and effectively evaporated.



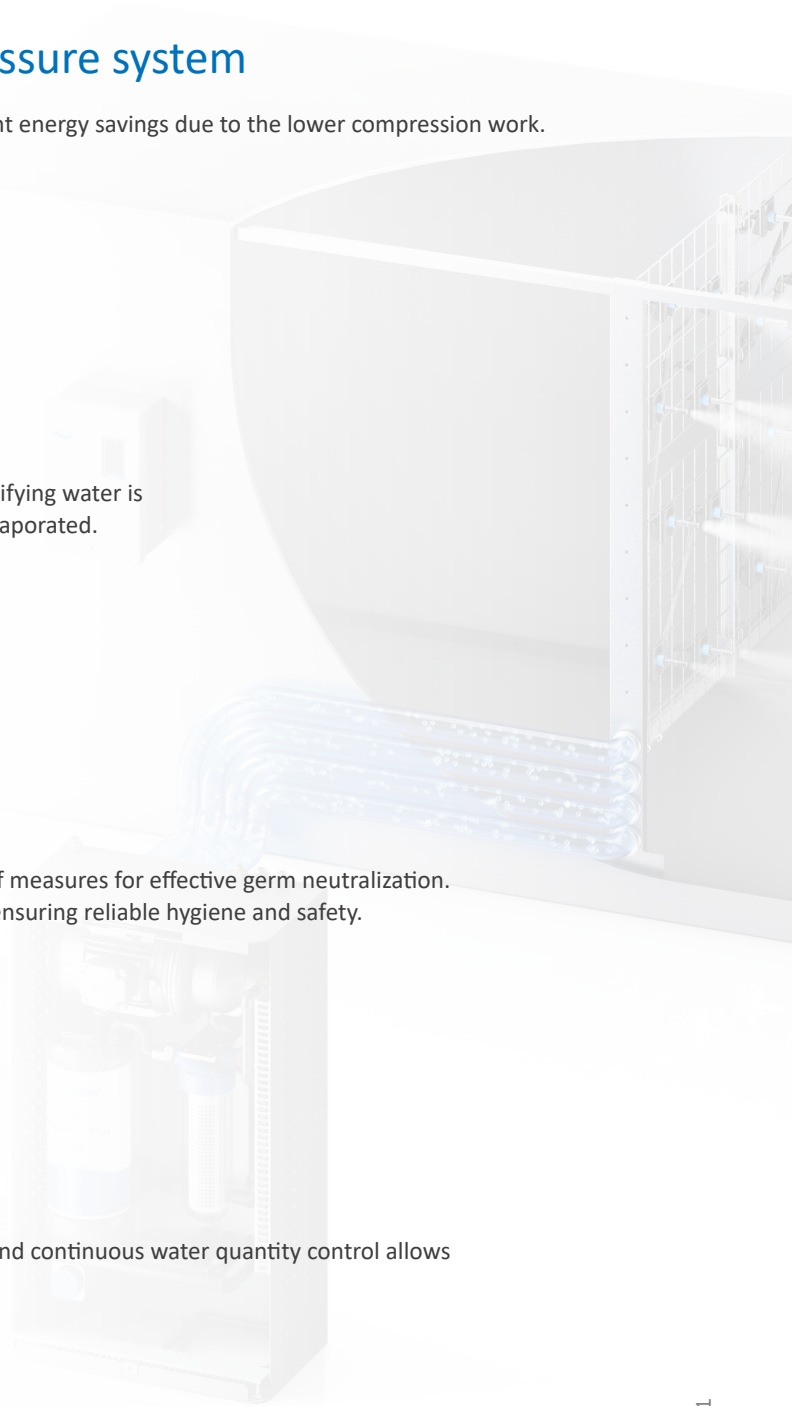
### Effective degermination

The HygienePlus® concept includes a series of measures for effective germ neutralization. The key element here is the silver ionization ensuring reliable hygiene and safety.



### Precise control

The unique combination of the spray circuit and continuous water quantity control allows precise control accuracy.



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