

## DOUBLE INTELLIGENCE

Two adiabatic humidification  
principles intelligently combined  
Condair **DL**



Humidification and evaporative cooling

 **condair**



## Energy-efficient low-pressure system

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



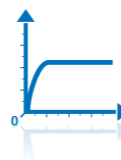
## Aerosol-free air

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.

Condair **DL**  
Hybrid Humidifier

#### 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 HygienePlus®

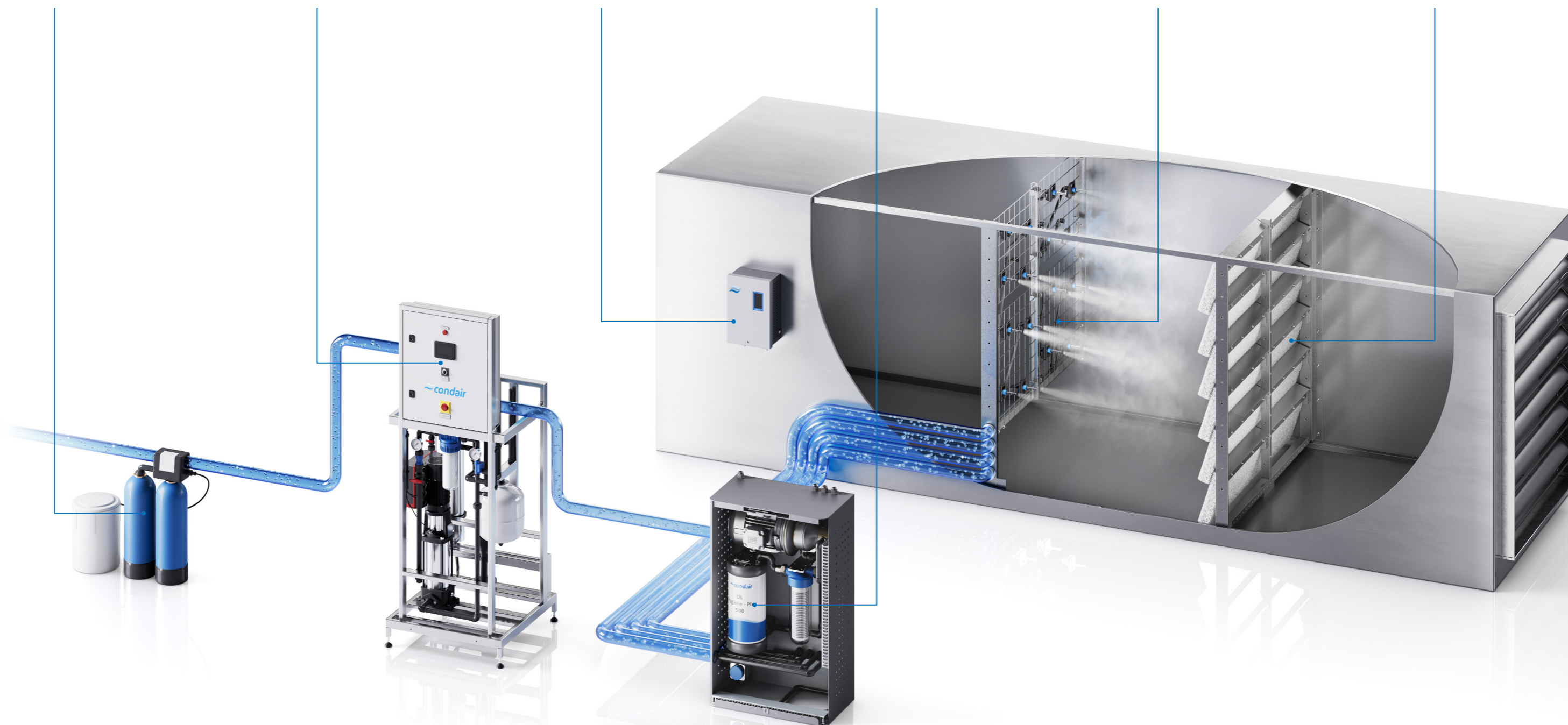
The HygienePlus® silver ionization and the optional sterile filter are used as hygiene precautions and ensure permanent hygiene safety.

#### 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 ceramic evaporator unit increases the efficiency in water consumption and allows the economic use of the high-grade humidifying water. The separating efficiency of the ceramic ensures hygienic operation.



## Condair DL Hybrid Humidifier

The Condair DL is the most successful adiabatic humidification system. Its hygienic quality has proven itself in operation and has been demonstrated and given awards by independent organizations with public responsibility.

The Condair DL was developed with regard to the highest possible hygiene safety. Detailed structural solutions have a preventive effect, guarding against uncontrolled germ growth inside the humidifier.

The HygienePlus® system ensures sustainably healthy air and a hygienic environ-

ment. An adequate relative humidity is of great importance. Optimal air parameters for well-being and health protection are between 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.

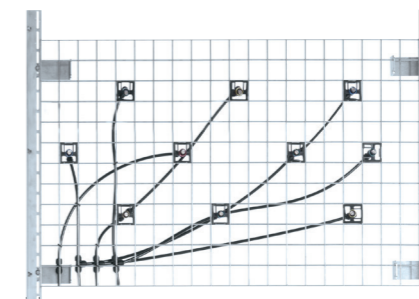
### Atomize

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.

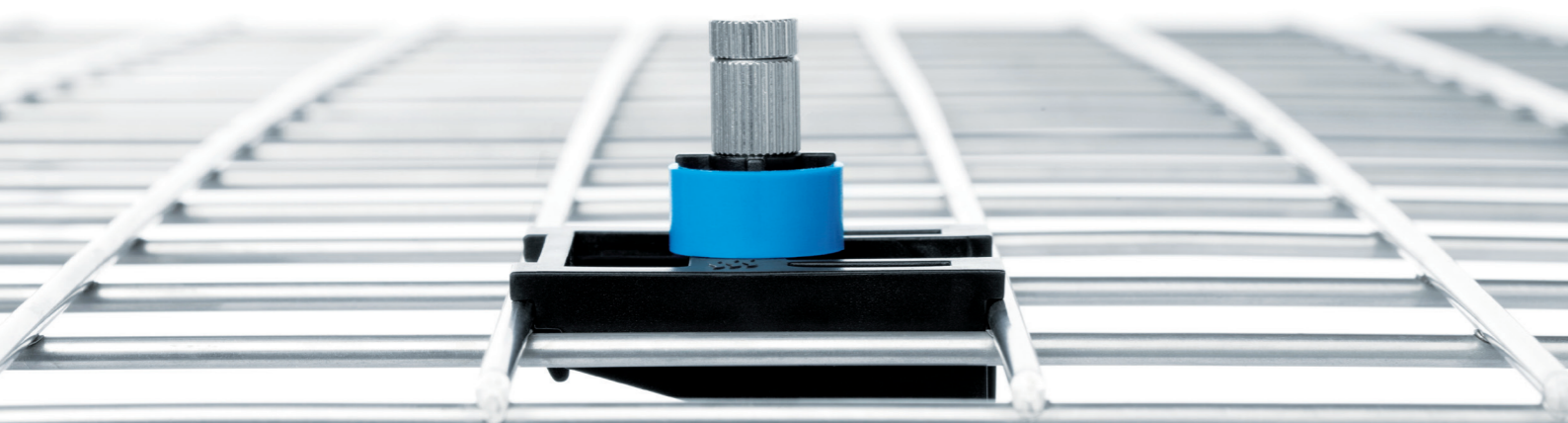
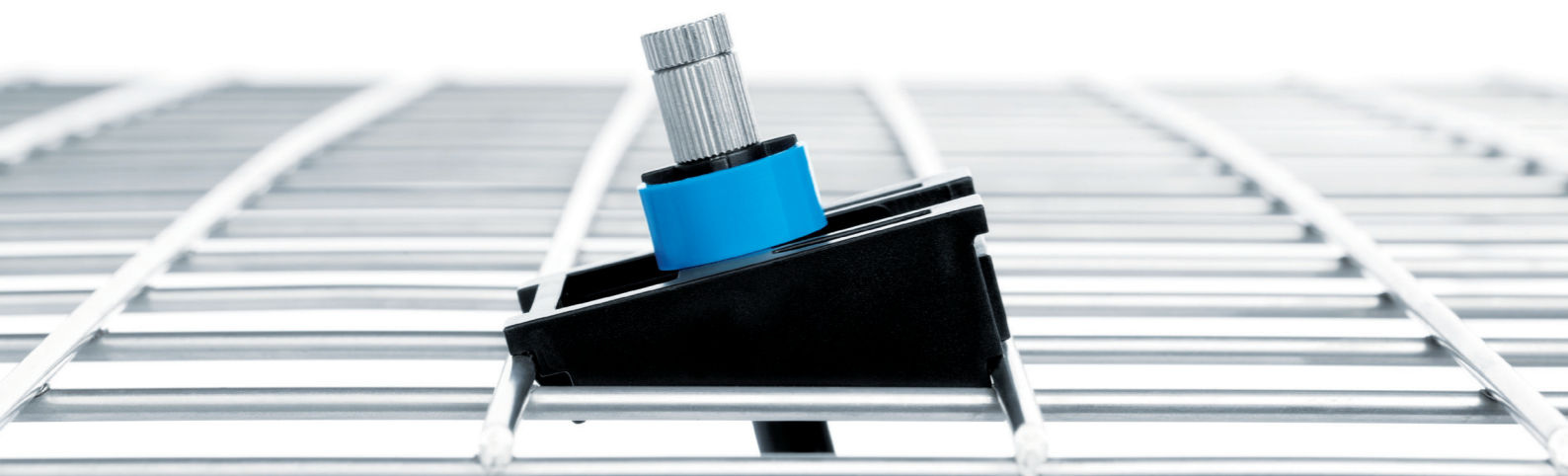
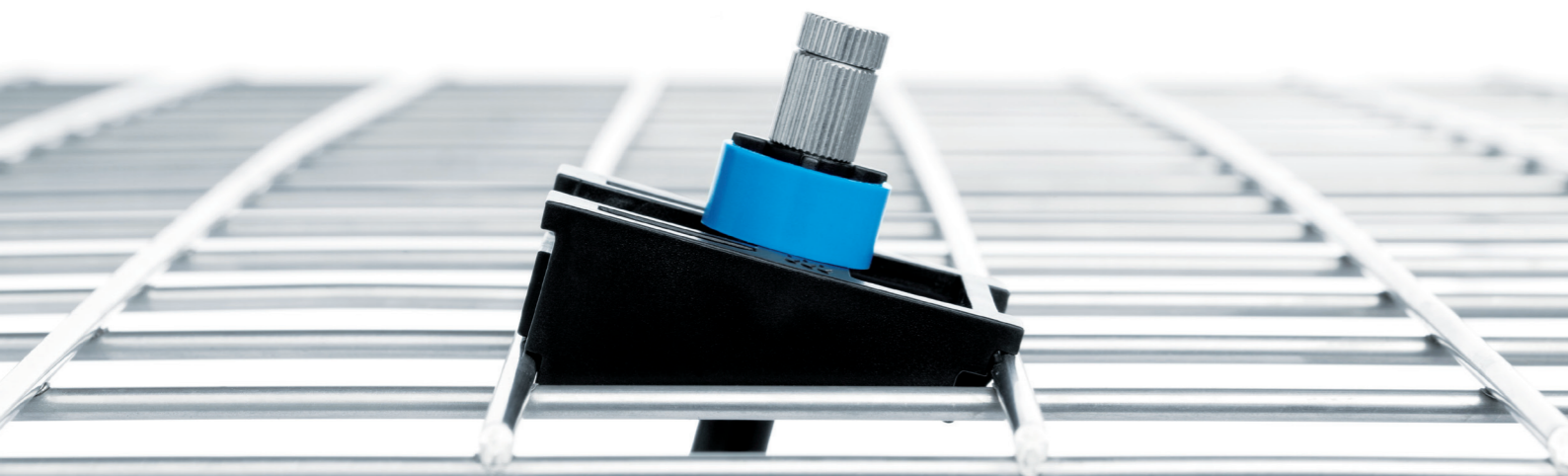
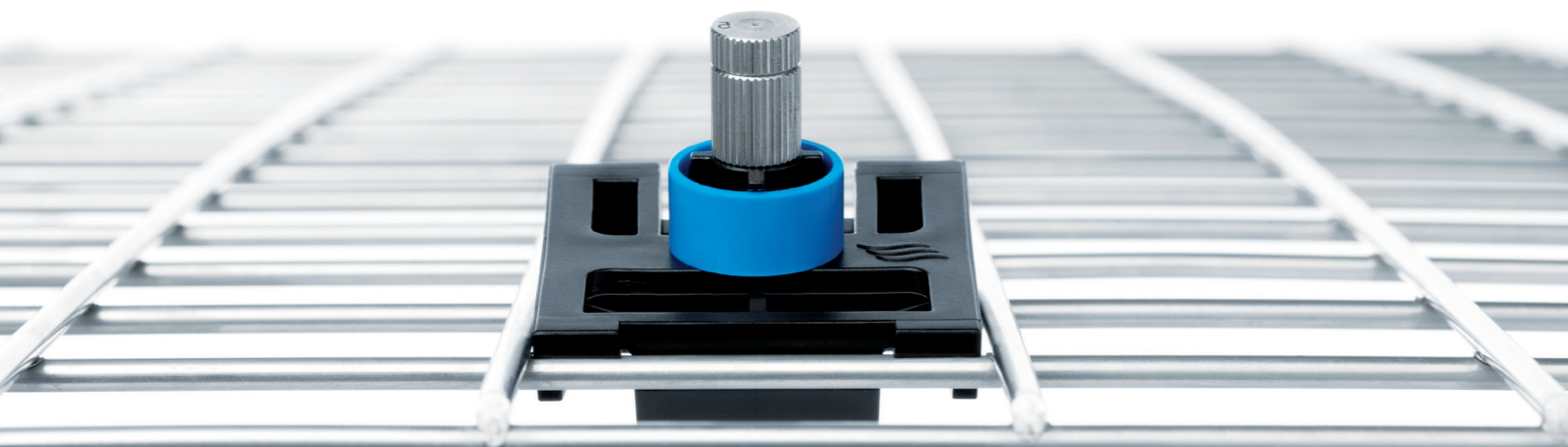


Low-pressure stainless steel atomizer nozzles



Evaporation ceramics

Atomize + Evaporate

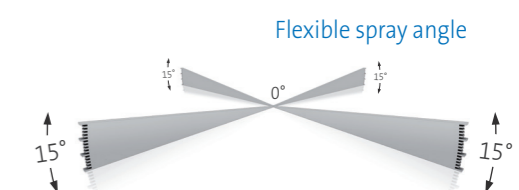


## Adjustable stainless steel atomizer nozzles

The low-pressure mode of operation leads to significant energy savings due to the lower compression work. The low-pressure stainless steel nozzles work in a pressure range of 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.

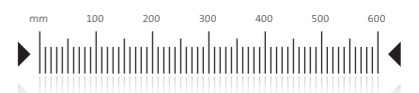


## Extremely short installation length

Low-pressure systems generally get by with a significantly lower construction depth than what is necessary in high-pressure humidifiers. Because of the full-surface layout of the evaporation ceramics and the spray cone of the stainless steel atomizer nozzles, the overall construction depth of the Condair DL can be reduced to up to 600 mm.

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

Overall length can be reduced up to 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 as 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 a **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 the BACnet communication. The optional gateway board can also be used to connect to a Lonworks network.

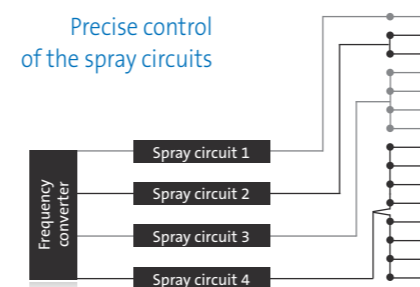


## Control at highest precision

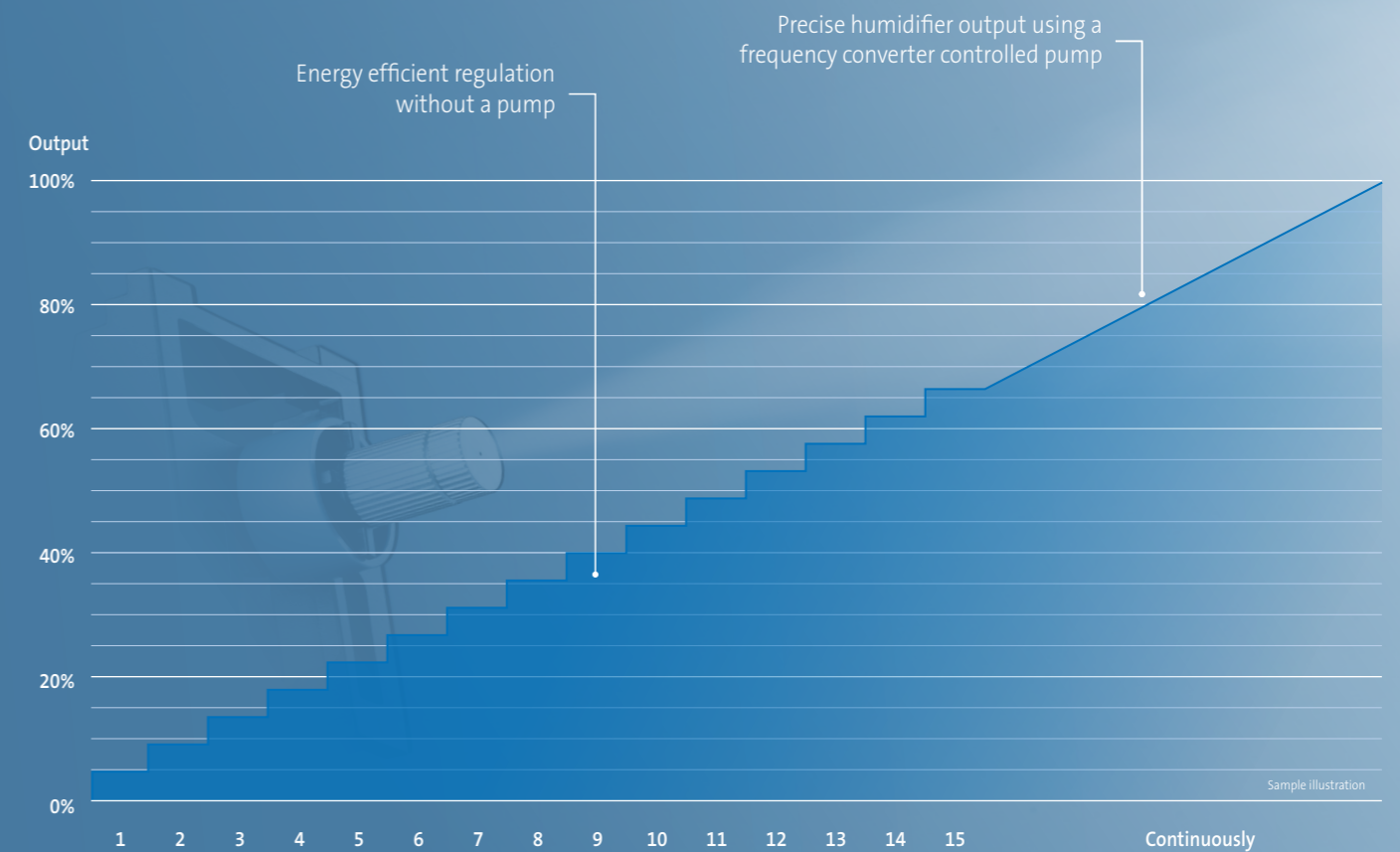
The unique combination of the spray circuit and continuous water quantity control allows precise control accuracy. The system first runs through the output levels of the spray circuits in line. Only afterwards, the frequency controlled humidification pump is activated and the humidification output continuously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

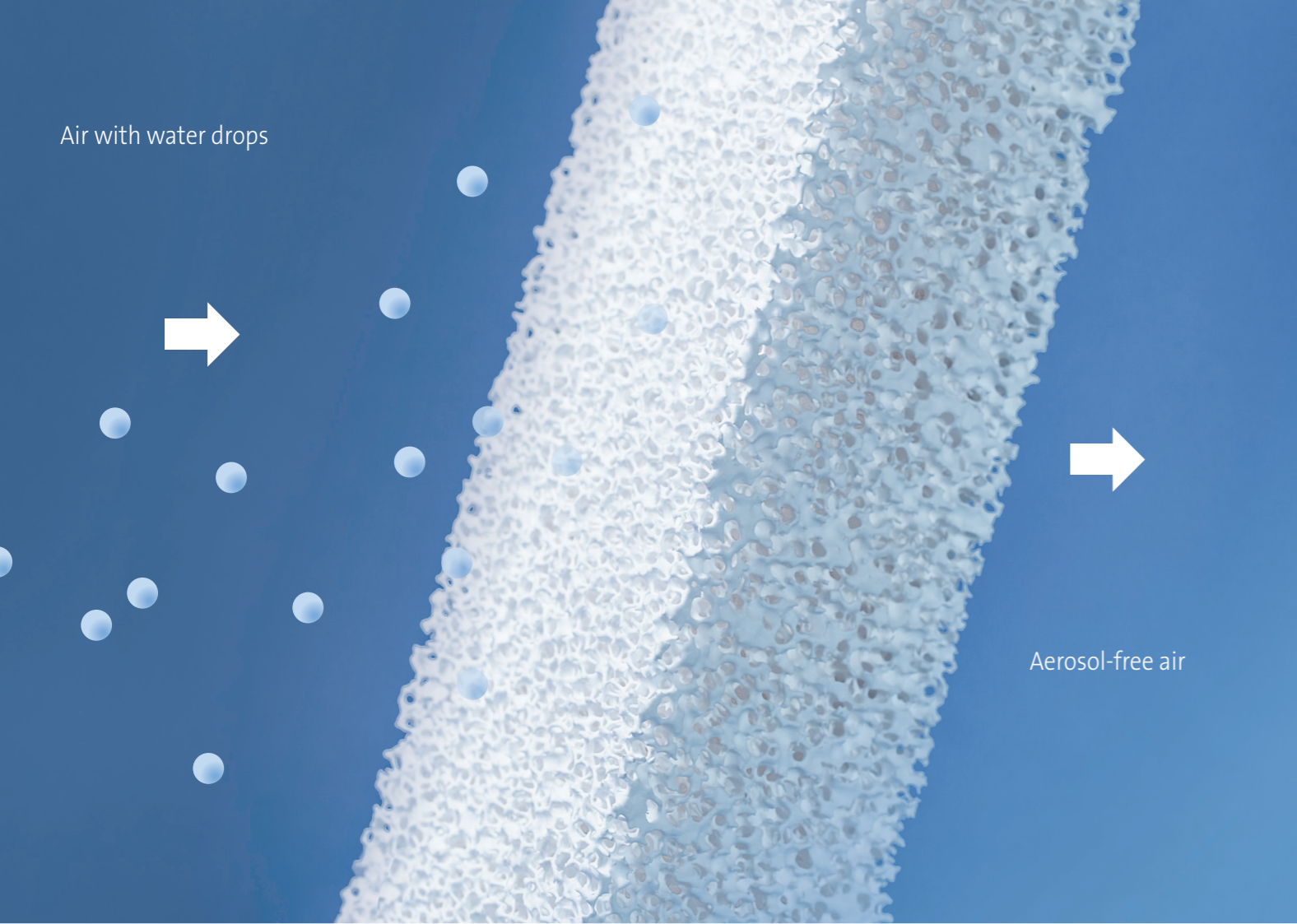


Precise control of the spray circuits



Sample illustration

Air with water drops



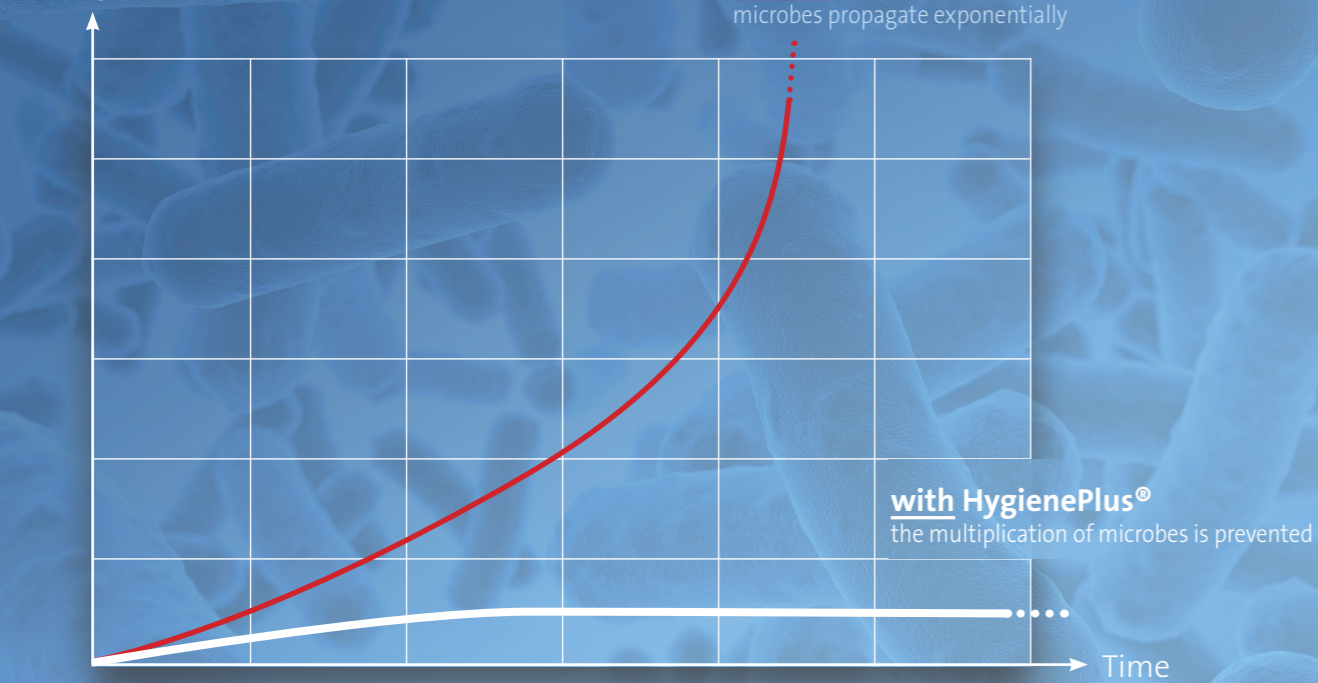
## Aerosol-free air

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

N° of germs



## 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 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 bases 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 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 pipes 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



