



# INTELLIGENT HUMIDIFICATION

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



Humidification and evaporative cooling

 **condair**



## Efficient low-pressure systems

The low-pressure mode of operation translates to significant energy savings due to the lesser compression work.



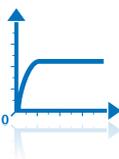
## Aerosol-free air

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



## Effective degermination

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



## Precise control

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

# Condair **DL**

Advanced version of the Condair DUAL2

#### Fine filter

The fine filter prevents suspended particles from entering downstream components.

#### Pipe disconnecter

A pipe disconnecter meets the requirements for drinking-water facilities.

#### Water softening

Optimal water treatment first of all requires the softening of the humidifying water.



# Condair **DL**

Advanced version of the Condair DUAL2

**Reverse osmosis**

A reverse osmosis system supplies mineral-free humidifying water.

**Condair DL central unit / controller**

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

**Condair DL HygienePlus®**

The HygienePlus® silver ionization is used as preventive hygiene measure and offer lasting hygiene safety.

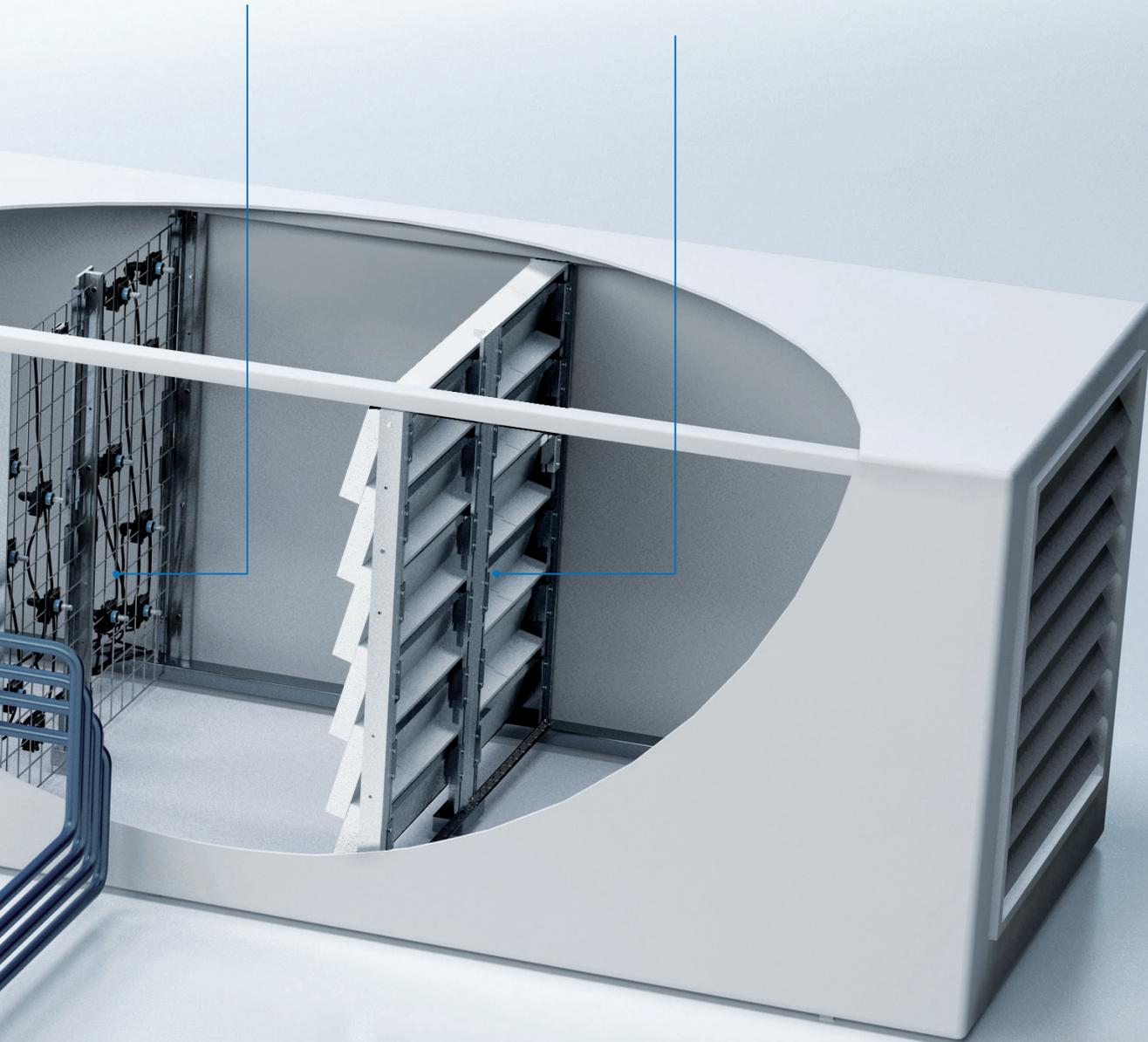


### Condair DL atomizer unit

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

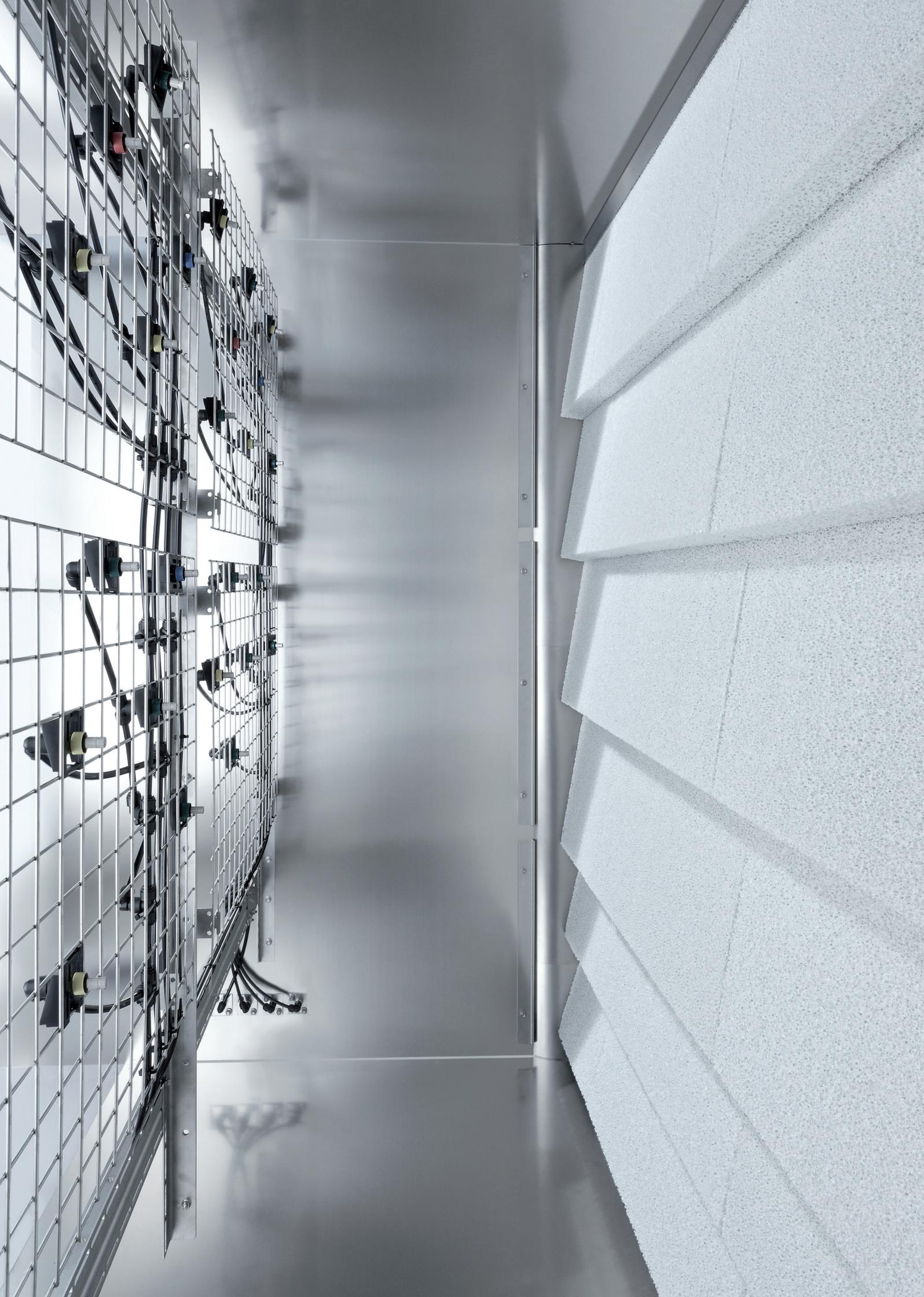
The patented ceramic evaporator unit increases water use and allows economical use of valuable humidifying water. The separating efficiency of the ceramic ensures hygienic operation.



The Condair DL is the advanced version of the Condair DUAL2, the most successful adiabatic humidification system. Its hygienic quality has proven itself in practice 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 patented HygienePlus® method provides for healthy air and a lasting hygienic

environment. The right relative humidity is of great importance. Optimal air condition values for comfort and health protection lie in the range of 21°C to 22°C, and with relative humidity between 40% and 60%. Suitable air humidity translates to the best production results and quality in the industrial sector.



# Two adiabatic methods intelligently combined!

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

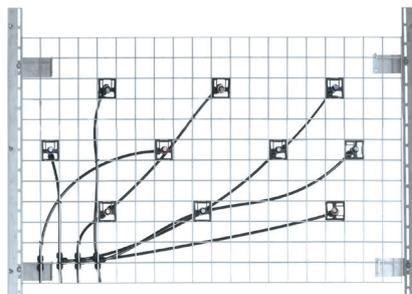
## Atomize

The humidifying water is atomized by molecular atomizing nozzles at low pressure. The atomizing nozzles have an adjustable spray and are optimally distributed over the entire cross-section of the device. High evaporation action and uniform humidity distribution are achieved because of this layout.

## Evaporate

The patented evaporator unit made of premium ceramic is placed at the end of the humidification distance. It captures the humidifying water and carries out the best possible re-evaporation. The ceramic thus allows the maximum utilization of the valuable humidifying water. At the same time, it prevents water accumulation in downstream components.

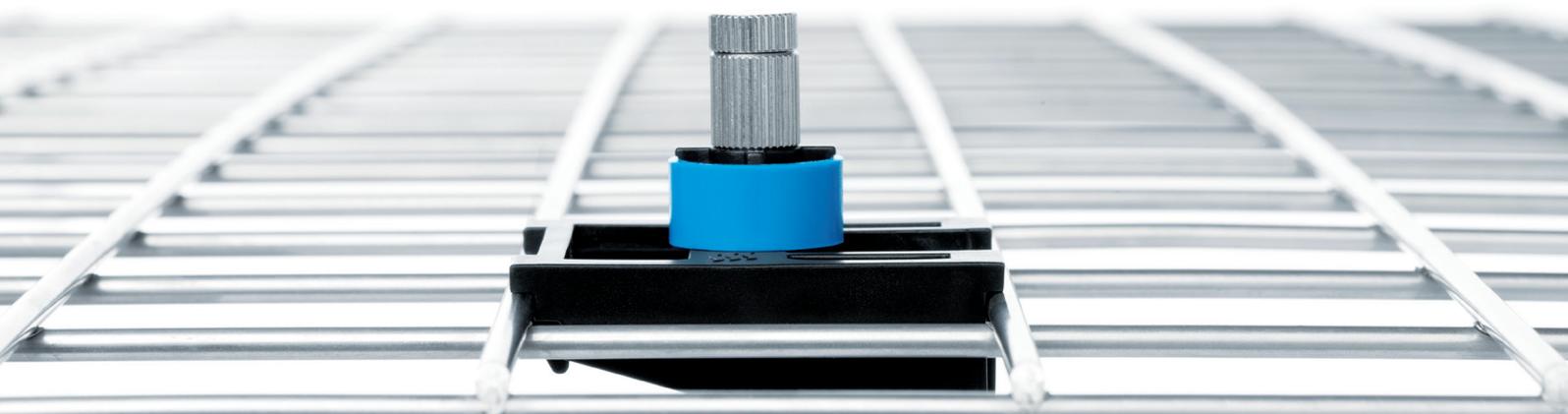
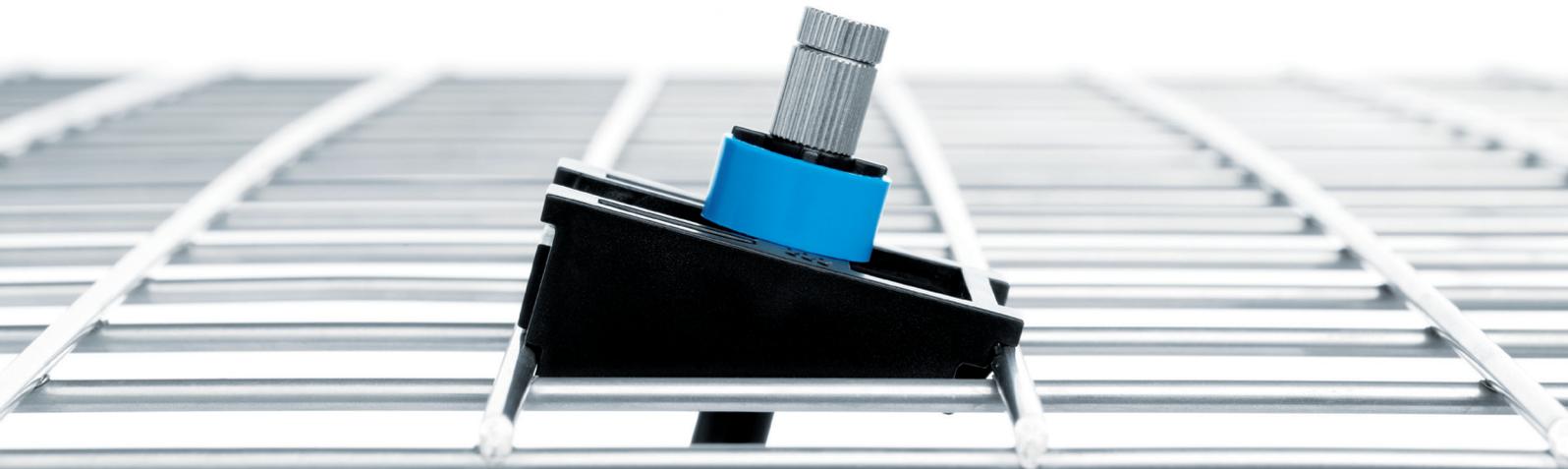
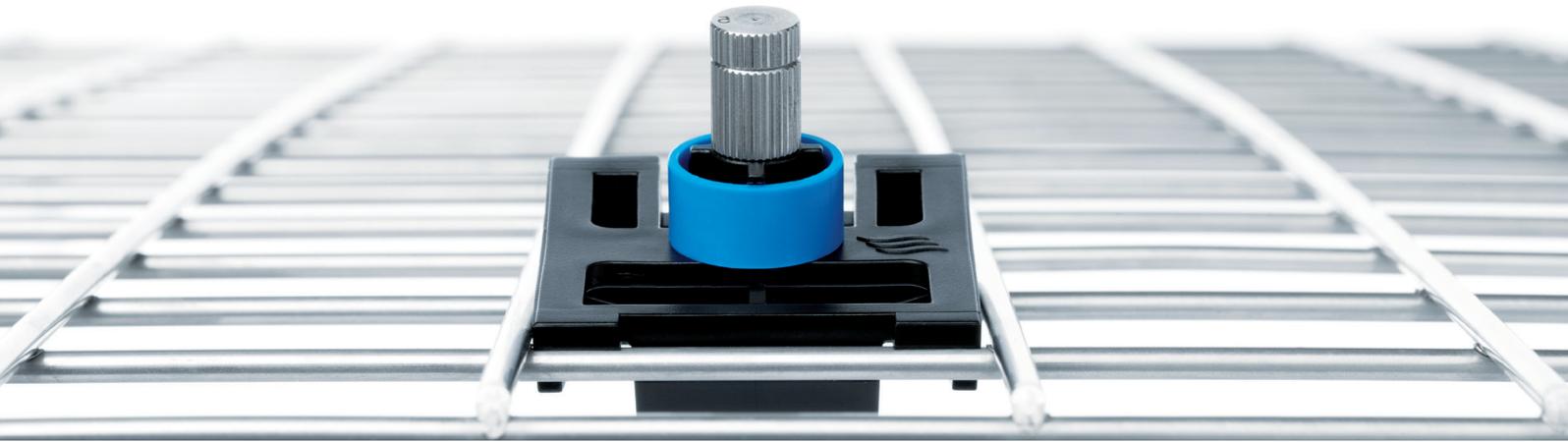
Behind the Condair DL humidifier, there is aerosol-free and hygienically humidified breathable air.



Atomize  
Low-pressure molecular atomizer nozzles



+ Evaporate  
Patented evaporation ceramics

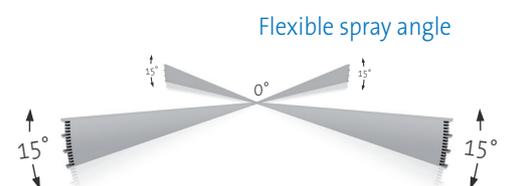


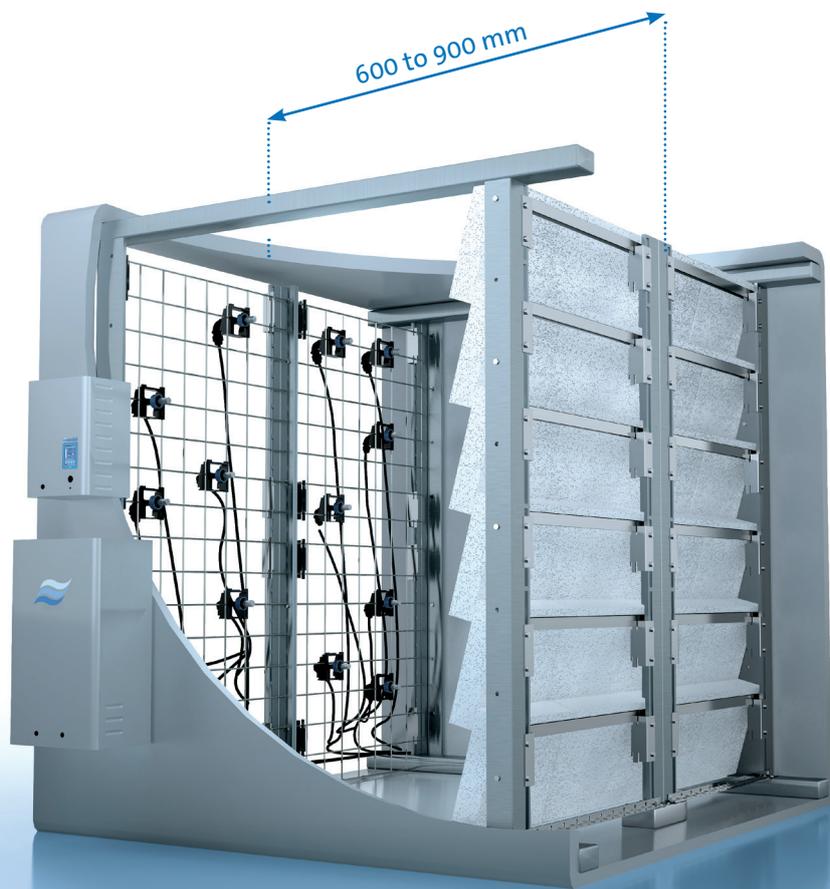
# Adjustable molecular atomizer nozzles

The low-pressure mode of operation translates to significant energy savings due to the lesser compression work. The low-pressure molecular nozzles work in the pressure range of 2 to 10 bar(g) and are totally wear-free.

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

The spray cone of the nozzles can be controlled so that the humidifying water meets the evaporation ceramics completely, even in the critical border areas.





# Full-surface evaporation of water

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

This makes the valuable ceramic surface available for complete water absorption on the upstream side.

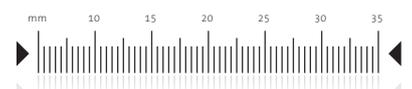
# Extremely short installation length

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

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

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

Overall length can be reduced up to 600 to 900mm!

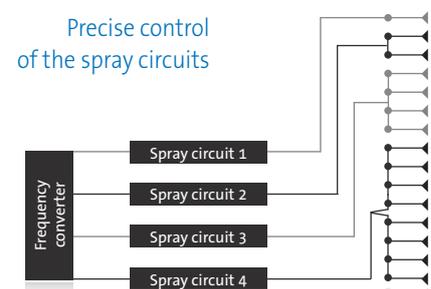


## Control with highest precision

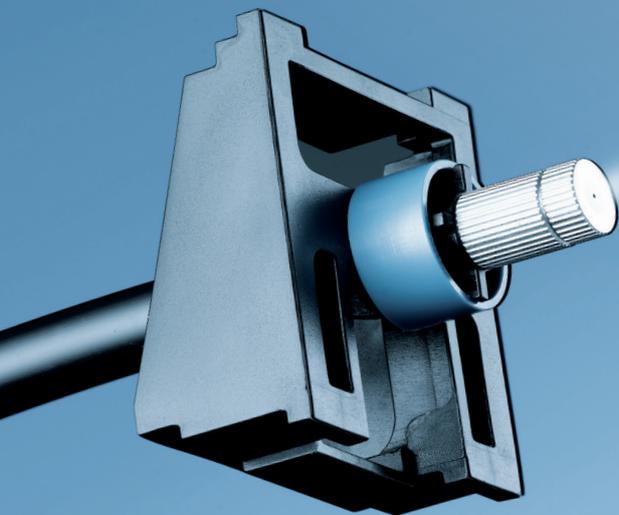
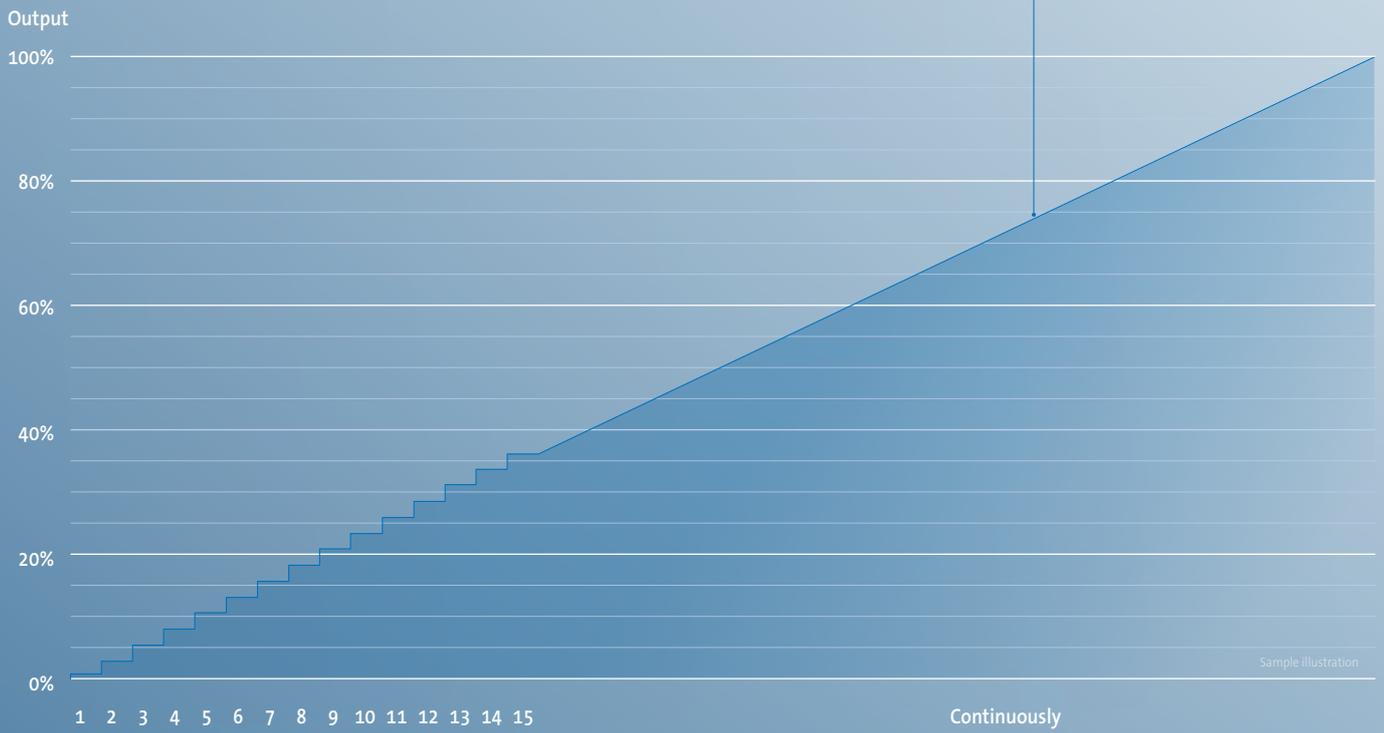
The unique combination of the spray circuit drive and continuous water quantity control allows precise control accuracy. The system first runs through the 15 output levels of the spray circuits of the row. Only afterwards is the speed-controlled humidification pump used and the humidification output continuously rises until the needed humidification demand is reached.

In conjunction with the evaporation action 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%.

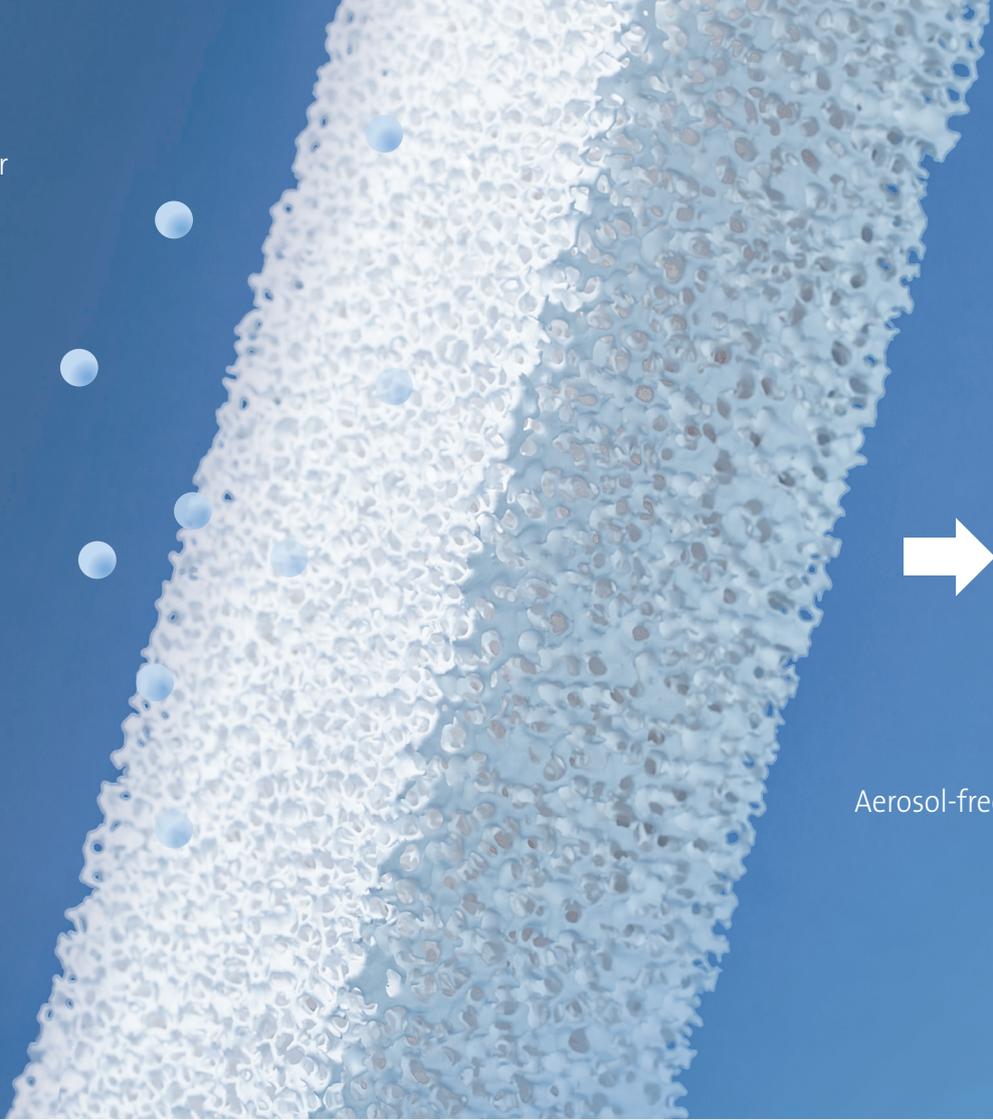
This operating mode is energy-efficient, saves humidifying water and also meets the high requirements for humidification accuracy.



Precise humidifier output using frequency converters

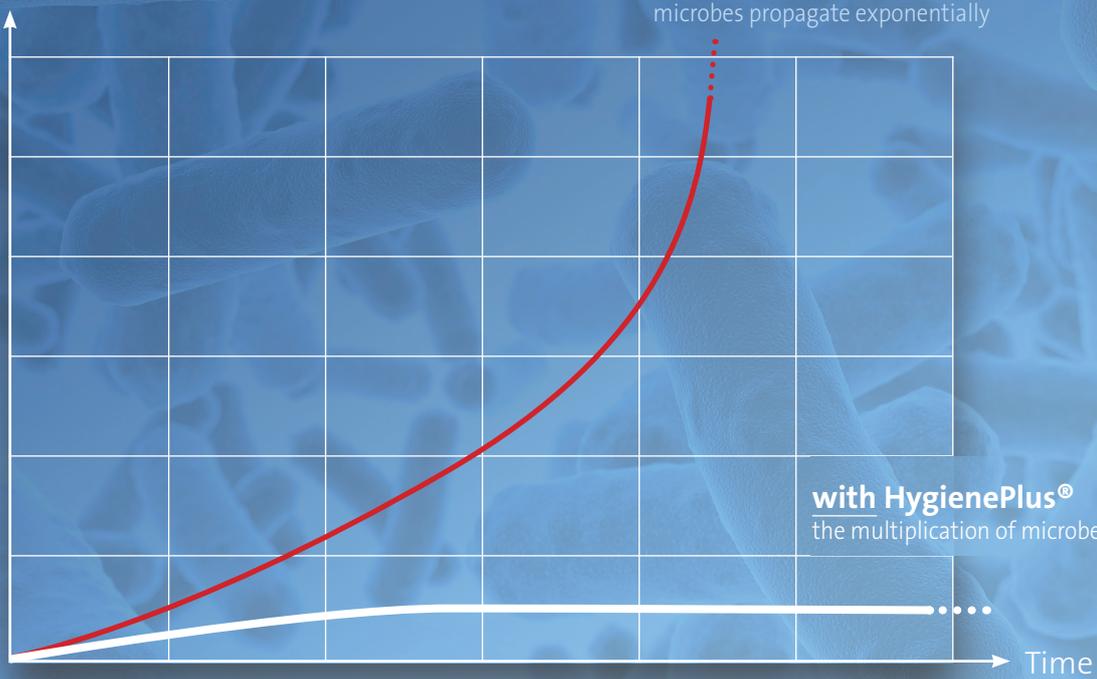


Air with humidifying water



Aerosol-free air

Bacterial count



## Absolutely aerosol-free

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

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 completely from the air current.

## Preventive hygiene measures

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

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

Suitable hygiene measures are therefore essential to hinder the growth and propagation of pathogens in adiabatic humidifiers.

The germ diagram points out the rapid propagation 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 patented germ neutralization system.

### **Independent flushing of the water supply pipe**

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 completely after a system stoppage of 12 h. In addition, every power-up cycle of the humidifier triggers an automatic flushing of the on-site water supply pipes.

### **Intrinsic safety through automatic conductance 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 conductance 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 patented silver ionization of the humidifying water. Silver ions are allotted into the application efficiently, precisely and easily. Microorganisms are prevented from propagating during the process.



### Effective germ neutralization

The germ diagram points out the rapid propagation of microorganisms when no appropriate steps are taken to contain them. The HygienePlus® concept relies on natural germ control using 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 relationships in all water-wetted components of the humidification system.

### Optional H<sub>2</sub>O<sub>2</sub> disinfection

Upon request it is possible to carry out preventive germ neutralization through the optionally available H<sub>2</sub>O<sub>2</sub> disinfection.

The quantity, time and duration of the disinfection cycles can easily be adjusted through the Condair DL controller.

### 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 lines during downtimes when no humidification is carried out.

The humidifying water in these lines is thus regularly replaced. The duration and intervals of this automatic flushing can be individually set by the operator according to what is required.

### Optional compressed air flushing 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.

Users are also free to choose the time and duration of the compressed air flushing.



Effective germ neutralization  
with silver ions

