



# Humidification for Cleanroom Applications



# Maintain Cleanroom Integrity with Advanced Humidification Solutions

The specialized cleanroom environment is designed to maintain extremely low levels of particulates, such as dust, airborne organisms, or vaporized particles. This is crucial in industries where the control of environmental contaminants is necessary for the production and testing of sensitive items. To ensure the highest standards of cleanliness and operational efficiency, it is imperative to maintain precise control over environmental parameters, particularly humidity and temperature.





# Impact of Humidification in Cleanroom Environments

## Ideal Temperature and Humidity

Maintaining the correct temperature and humidity levels is essential for cleanroom operations. The optimal temperature for a standard cleanroom is around 70°F (21°C) with a humidity level of 30%-40% RH. Aerospace cleanrooms typically range from 67°F to 77°F (19°C to 25°C) with an ideal humidity range of 40%-60% RH. Incorrect humidity levels can lead to discomfort for workers, increased particle release, product spoilage, and various other issues. Maintaining stable and precise humidity levels ensures a controlled environment conducive to high-quality production and research.

## Effects of Humidification

Humidity directly influences both operational efficiency and product quality. Cleanrooms require precise relative humidity levels, typically between 40% to 60% RH, to maintain optimal conditions. This range protects personnel and materials against various issues such as electrostatic discharge (ESD) and microbial growth. Furthermore, it aids in weighing down airborne contaminants, causing them to settle more quickly out of the air. This reduces the time that particles, dust, and microbes remain suspended, contributing to a cleaner, more controlled indoor environment.

# A Dedicated Humidification System is Essential

Relying on air conditioning to manage humidity can lead to suboptimal conditions that jeopardize product quality and safety. Air conditioning systems are primarily designed for temperature regulation and are not equipped to maintain the precise humidity levels required for cleanrooms.

## Benefits of a Dedicated Humidification System

- Maintains precise, optimal humidity ranges essential for cleanrooms
- Modular systems allow for customizable levels across different facility zones
- Mitigates discomfort due to overcooling by not relying solely on air conditioning
- Creates a consistent testing environment
- Minimizes product and material waste
- Reduces risk of ESD
- Integrated water treatment options ensure the most hygienic humidifying water
- Proper humidity levels prevent environments conducive to microbial growth.



# Water Treatment for Cleanroom Applications

It is vital to consider the water quality that will be feeding your humidifier as this water will ultimately end up in the air. In many cases, water treatment using Reverse Osmosis (RO) and additional Deionization (DI) may also be required. With the proper water treatment, humidifiers can run for longer periods, yielding more productivity from your humidified cleanroom.

## Water Treatment for Adiabatic Humidifiers (cold-water)

In adiabatic humidification systems, water is not boiled and therefore hygiene must be considered. Water treatment not only helps to reduce scaling and clogging of nozzles by reducing mineral content in the water, but also removes the food sources for bacteria, viruses and other organisms to grow. Systems that spray or atomize water (HP, ML, DL, US) always require water treatment

Reasons to treat feed-water in adiabatic humidification systems:

- Humidifiers with RO and DI water, prevent dust from accumulating on surfaces by removing particles from the feed water before it is sprayed
- Treated water reduces mineral content and scale build-up which could lead to clogged nozzles, transducers and fouled media. This allows you to reduce extend regular service and maintenance cycles

## Water Treatment for Isothermal Humidifiers (steam generators)

In isothermal humidification, the feed water is boiled and is therefore considered very hygienic. Reverse osmosis water treatment would be used to reduce scale build-up within equipment and extend maintenance cycles.

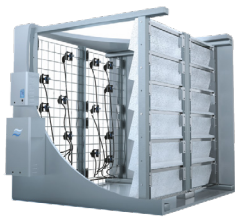
Reasons to treat feed-water in isothermal humidification systems:

- Using filtered water can allow you to turn down the amount of water that is periodically flushed out of the system as well as the frequency, improving the efficiency of the system and allowing for more consistent steam production and accurate steam control
- Filtered water reduces mineral content and scale build-up in the boiling tank, extending maintenance cycles

# Choosing the Right Humidification System

Maintaining precise humidity levels in cleanroom environments is crucial for ensuring product quality, preventing contamination, and optimizing operational efficiency. Condair's advanced humidification solutions offer high precision, energy efficiency, and hygienic humidification tailored to your needs. Whether you require in-duct or in-space solutions, Condair provides customizable humidity control for any cleanroom environment. With our innovative technology and customizable features, including various water treatment options, scalable loads, and durable components, you can trust us to create the optimal humidity environment for your cleanroom.

## In-Duct Humidifiers



### DL Series

Combining atomization and evaporation technologies, the DL Series ensures high evaporation efficiency and uniform humidity distribution. It delivers aerosol-free, hygienically humidified air, making it energy-efficient and cost-effective for cleanroom environments.



### RS Series with SAM-e

The RS Series resistive element humidifier provides clean atmospheric steam from potable or DI/RO water with high precision, achieving  $\pm 1\%$  RH. It features the SAM-e short absorption manifold for uniform steam distribution, ideal for maintaining strict humidity levels in cleanrooms.



### HP Series

The HP Series high-pressure humidification system uses advanced atomization nozzles for efficient evaporation, providing significant operating cost savings. It includes an 8000-hour life water-lubricated pump, stainless steel components, and very low energy consumption, ideal for large air handlers in cleanrooms.



### US Series

The US Series ultrasonic humidifier offers cost-effective and efficient performance with extra fine atomization (1-3 micron) of water. It uses minimal energy to create humidification, reducing operating costs by up to 90%, making it perfect for cleanroom applications requiring high precision and low energy usage.



# In-Space Humidifiers



## RS Series with Blower Pack

The RS Series resistive element humidifier, paired with blower packs, provides clean atmospheric steam directly into localized areas or spaces without built-in air distribution systems. It ensures high precision humidity control, achieving  $\pm 1\%$  RH, ideal for cleanroom environments.



## MLRO System with DI Water

The ML Series direct room humidification system offers low operating costs, reduced cooling expenses, and minimal maintenance. Combined with an integrated RO water treatment and DI water options, it delivers ultra-hygienic humidification with microfine particle atomization, perfect for sensitive cleanroom applications.



## Our Cleanroom Clients

Abbott Vascular, Eire  
Abbott  
Boston Scientific

Galen Pharmaceutical  
Medisense  
Millipore

National Semiconductor  
Oxford University  
Pfizer

## Why Choose Condair

Condair Group, founded in 1948 and based in Switzerland, is the global leader in humidification, dehumidification and evaporative cooling. Supported by science, we engineer tailored, holistic solutions that customers can trust. With optimal humidity, we increase productivity and create healthier built environments.

Our advanced technology ensures precise and reliable humidity control tailored for cleanrooms. We offer superior technical support and customer service, assisting clients in maintaining optimal cleanroom conditions. Proven across various industries, our solutions consistently deliver improved product quality, reduced wastage, and enhanced operational efficiency. By maintaining optimal humidity levels, Condair contributes to healthier work environments, reducing illness and boosting productivity.

Condair Group has production sites in Europe, North America and China and representatives in 50 locations worldwide. You can rely on our comprehensive portfolio of innovative technologies for air humidification, dehumidification and evaporative cooling to meet the needs of your application.

**Questions?** Contact us today at [na.info@condair.com](mailto:na.info@condair.com)  
to ensure optimal humidity control for your  
cleanroom facility.

**USA** 1021 6th Street, Racine, WI 53403  
**Canada** 2740 Fenton Road, Ottawa, Ontario K1T 3T7  
**Tel** 1.866.667.8321  
**Email** [na.info@condair.com](mailto:na.info@condair.com) **Website** [www.condair.com](http://www.condair.com)

