

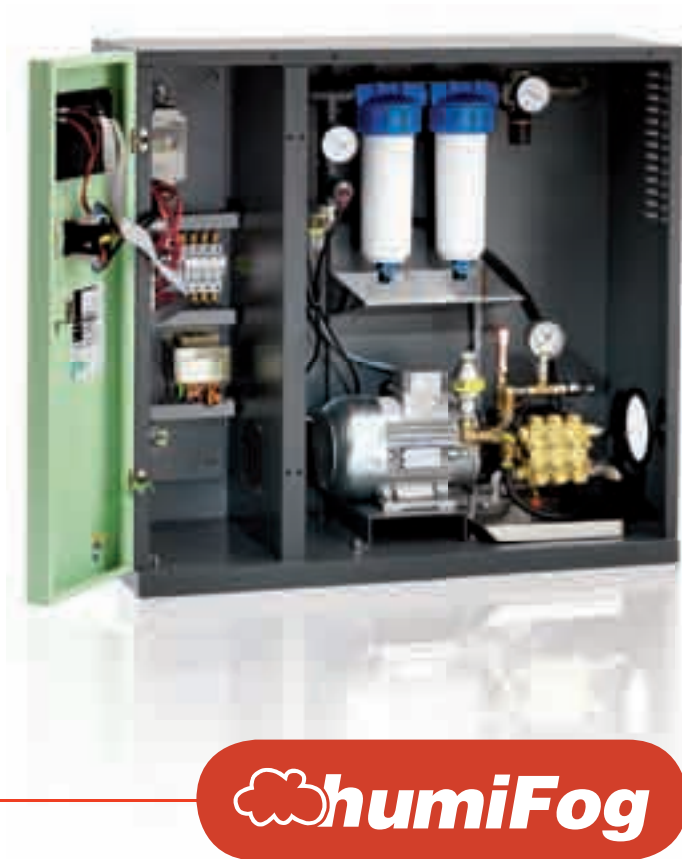
humiFog  
Pressurized water humidifiers

CAREL

 **humiFog**



T e c h n o l o g y & E v o l u t i o n



 **humiFog**



## humiFog for ducts and AHUs

humiFog represents the latest generation of atomising humidifiers with a power consumption of just 4 Watts per litre/hour of nebulised water (less than 1% of any steam humidifier).

humiFog is suitable for all applications where a high humidification capacity is required, up to 500 kg/h. Custom models are also available for capacities up to 5000 kg/h.

A special pump generates high pressure water, which is then atomised through stainless steel nozzles, producing a very fine and uniform mist. The droplets created evaporate spontaneously, consequently humidifying and cooling the air. The sophisticated control system combines the action of an inverter, which controls the pump flow-rate, and a series of solenoid valves that activate only the nozzles required, ensuring the system always operates at the optimum pressure to atomise the water, over a wide range of flow-rates.

### Typical applications for ducts and AHUs:

- office buildings;
- hotels and call centres;
- printing and paper processing;
- clean rooms;
- textiles industry;
- food conservation;
- adiabatic cooling;
- timber industry;
- other industrial applications.



## Rack and droplet separator

Supplied to measure for the AHU/duct, this is made up of various manifolds that contain the atomising nozzles, each one with activation and drain valves. The stainless steel nozzles are supplied with pressurised demineralised water to generate very fine droplets that are easily absorbed by the air. The droplet separator has the purpose of trapping the droplets of water that are not completely evaporated, so as to prevent them from leaving the humidification chamber.

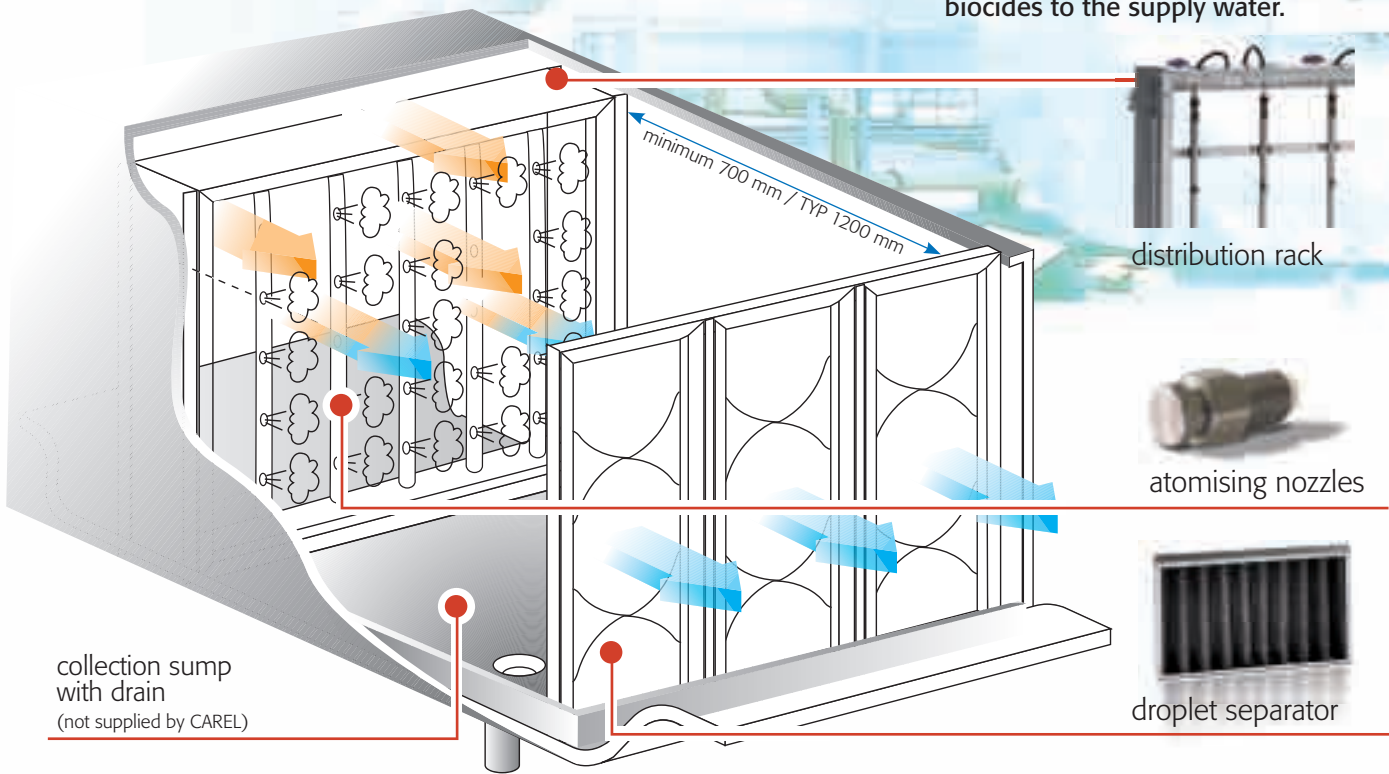
Also available in the version for VDI6022 certified installations.

## Certified hygiene

The implementation of the:

- special stainless steel atomising rack that allows the pipes to be drained
- fully stainless steel droplet separator made by CAREL.

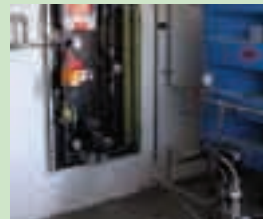
**obtain VDI6022 certification: "Hygienic standards for ventilation and air conditioning systems, Offices and assembly rooms", issued by ILH Berlin.** In addition, the appliance has also been certified in accordance with DIN1946, VDI3803, SWKI2003-5 (CH), ÖNORM H 6021 (A), **without the need to add costly chemical biocides to the supply water.**



## Main characteristics:

- very low power consumption (around 4 watts per litre/hour of humidification capacity);
- maximum capacity 500 kg/h (custom versions are available with capacities up to 5000 kg/h);
- continuous modulation from 14% to 100% of maximum capacity;
- complete distribution rack, supplied already assembled and tested;
- water pressure from 25 to 75 bar;
- rack custom made for the cross-section of the AHU;
- uses demineralised water.

## Why is demineralised water required?



By using demineralised water, the quantity of mineral salts released during the evaporation process will be minimal, therefore avoiding fouling the humidification section of the AHU and clogging up the filters; this also ensures maximum hygiene of the system. Demineralised water is also required to reduce maintenance on the nozzles. To ensure the supply water has the correct characteristics, reverse osmosis systems are recommended (not supplied with the product); these eliminate almost all the minerals, require minimum maintenance and feature low power consumption.



 **humiFog**

## humiFog for direct humidification into rooms

Low energy consumption, high capacity and low maintenance make humiFog the ideal solution for direct humidification into rooms.

humiFog atomises the water directly inside the environment, humidifying the air. A constant speed volumetric pump brings the water to high pressure, 70 bar, which is then atomised by special nozzles into very fine droplets, between 10 and 15  $\mu\text{m}$  in diameter, which are readily absorbed by the air.

Another important application is adiabatic cooling: a 100 kg/h humiFog cools the air with an equivalent cooling capacity of 70 kW, with a power consumption of just 0.95 kW.

### Applications

#### Humidification:

- printing industry;
- textiles industry;
- timber industry;
- fruit/vegetable cold stores;
- paper, timber stores, etc.

#### Cooling:

- industrial, especially in the textiles industry;
- outdoor cooling.





## Components



### Pumping unit for AHU/ducts

This controls the speed of the pump using an inverter, thus ensuring precise modulation of the capacity of the humidifier, while maintaining the water pressure between 25 and 75 bar, guaranteeing

optimum atomisation of the water.

In addition, humiFog manages the capacity control valves on the rack so as to extend the range of continuous modulation from 14 to 100% of maximum capacity.

### Pumping unit for direct humidification

The constant speed volumetric pump pressurises the water to 70 bar, thus ensuring that the nozzles always create very fine droplets, with an average diameter of 10 to 15  $\mu\text{m}$  and as a result rapidly absorbed by the air. The built-in controller completely manages the operation of the unit, and can independently control the humidity of the air in the room by simply connecting an external probe.

### Pumping unit capacity and multipoint/multizone installations

The pumping units are available with various maximum capacities, 60, 120, 180, 250, 350, 500 kg/h (custom versions up to 5000 kg/h), as well as models suitable for supplying water at a constant pressure to multiple ducts/AHUs, controlled by an external system.



### Rack for ducts and AHUs

Made to measure for the AHU/duct, the rack consists of manifolds, nozzles and ON/OFF and drain valves.

The nozzles are supplied by demineralised water at 25 to 75 bar. The ON/OFF solenoid valves control the

number of active nozzles, while the drain valves are used to automatically empty the rack. All the metal parts are made from stainless steel (upon request). The rack can be supplied completely assembled and tested at high pressure.



### Droplet separator for ducts and AHUs (compulsory for VDI6022 certified installations)

The droplet separator has the purpose of trapping the droplets of water that are not completely evaporated, so as to prevent them from leaving the humidification chamber. This is available in two versions: with fibreglass or AISI304 steel filters, the latter required for VDI6022 certified installations.

### Room distribution system

This consists of stainless steel manifolds (pipes) with nozzles. Fans can also be fitted to create a flow of air that optimises the absorption of the droplets and prevents them from falling in the room. The nozzles are made from stainless steel and feature anti-drip valves. Each distribution line, with or without ventilated distributors, can be isolated using a solenoid valve so as to achieve modulation of the capacity in steps (up to 4 steps).

The drain valve is used to quickly discharge the water pressure when the line stops atomising, preventing the nozzles from dripping. In addition, the drain valves are used for the periodical automatic washing cycles managed by humiFog. Upon request, CAREL can also provide hoses or stainless steel pipes and compression fittings suitable for a pressure of up to 100 bar.

### Observations on the installation in the room

Each nozzle creates a spray of droplets that requires a certain time and distance to be completely evaporated. The time and distance depend on the air conditions: for example, at 20 °C and 50% rH and without air flow, the droplets will have a parabolic trajectory reaching up to 2.5 m horizontally, and up to 4 m in height. This consequently requires limits in installation aimed at preventing the droplets from wetting objects, machinery and people present in the room. Where these limits cannot be satisfied, ventilated distributors are required.

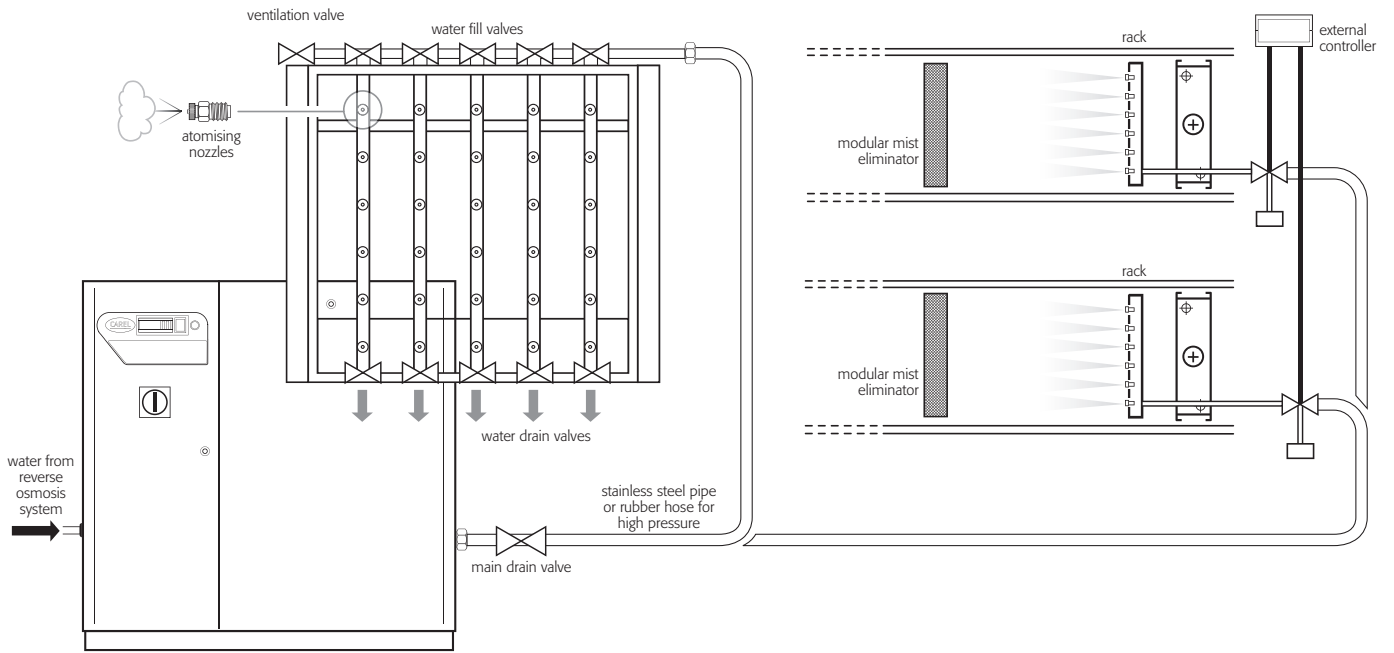


### Probes

Extensive experience combined with a vast range of solutions make CAREL probes the ideal choice for all humidification systems.

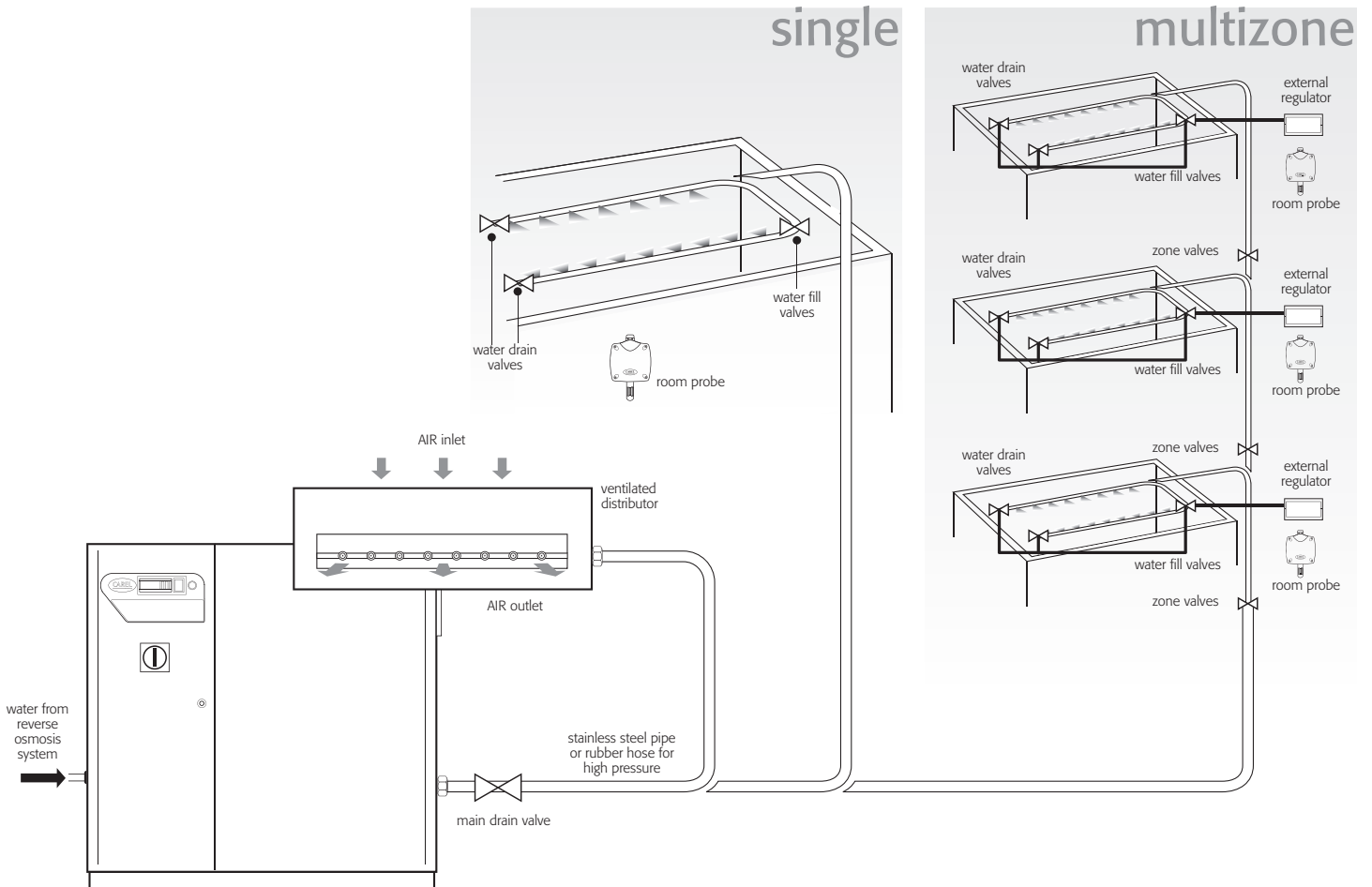
# OVERVIEW DRAWING

## DUCT humiFog



# OVERVIEW DRAWING

## AMBIENT humiFog



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