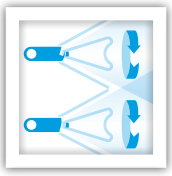
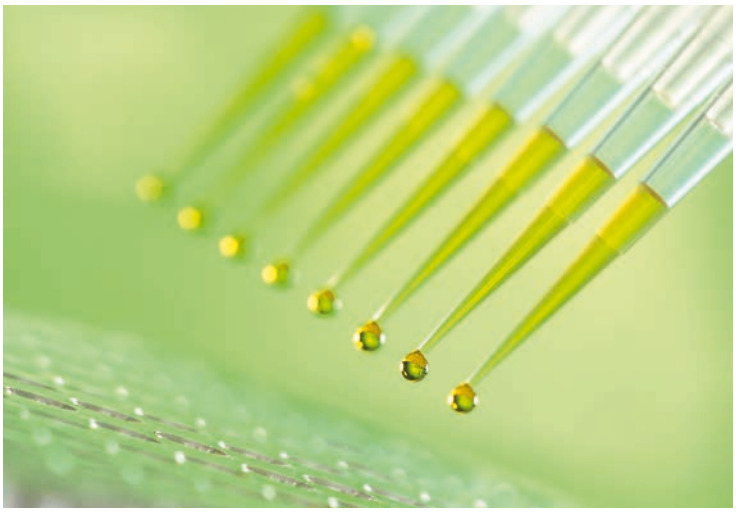
EN

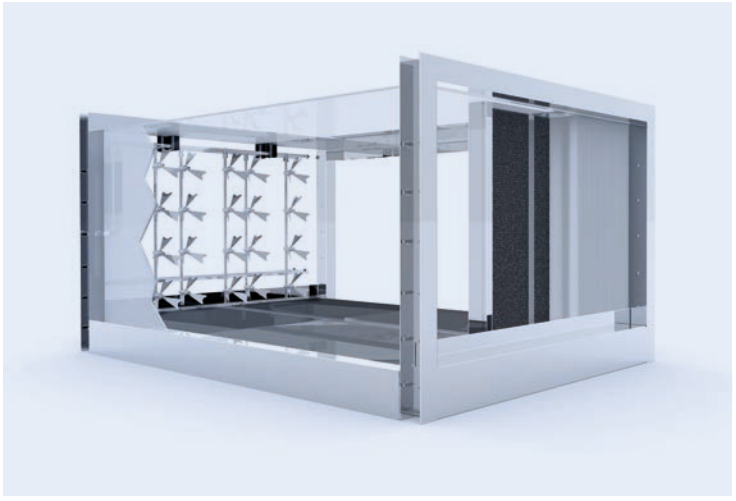
KLINGENBURG



Humidifier CERTO

How today's room humidifiers work

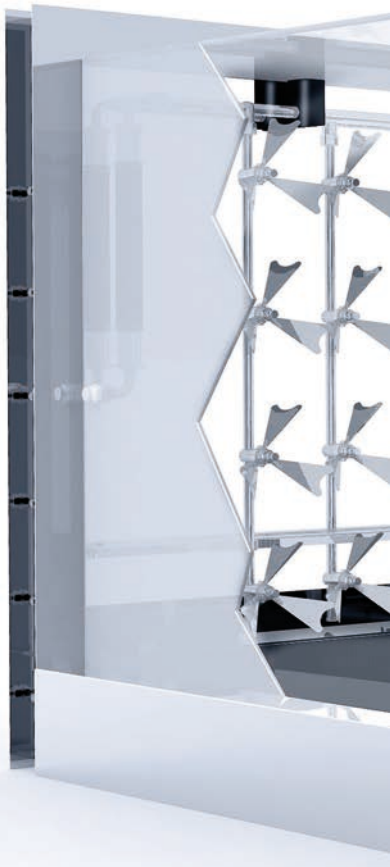




Advanced development has a new name: **CERTO**

CERTO stands for reliability and safety and therefore for two criteria, which the Klingenburg air humidifier fulfils.

Ambient air for humans should have a relative humidity between 40% and 60%. This is important for health and well-being and also for the prevention of undesired harmful substances, such as germs and bacteria.



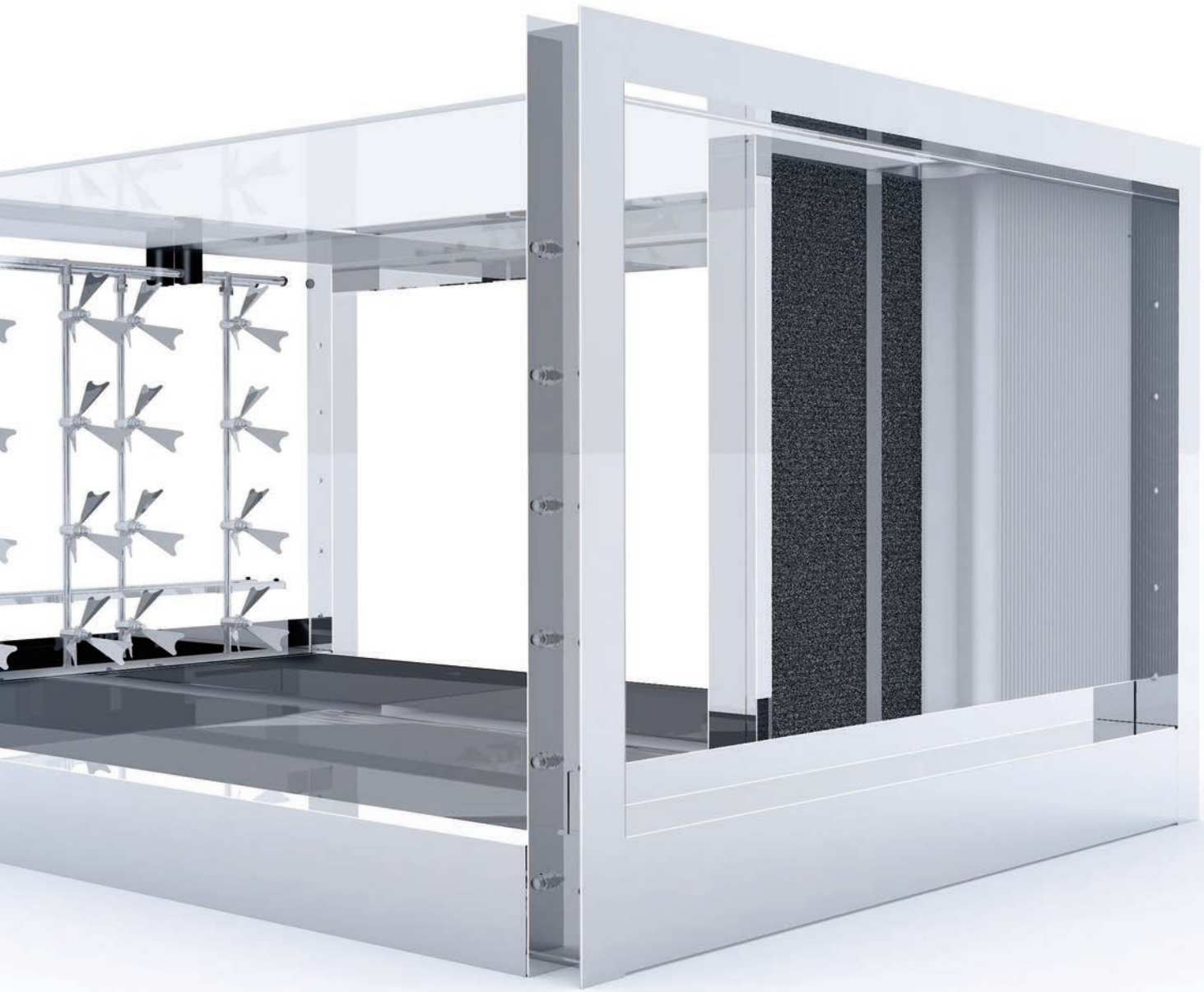
Air humidifiers installed in buildings must satisfy the purpose of supplying the humidity lacking in the air (intake air humidification) or cooling air by maximum moisture absorption (exhaust air humidification for indirect adiabatic cooling by means of a heat exchanger).

Besides different air humidification systems, „high-pressure humidification“ with the water atomisation principle is increasingly prevailing due to a number of advantages. However, while all high-pressure air humidifiers function according to the same basic principle, there are differences between the systems of different manufacturers.

Due to its advantages in terms of energy and hygiene (for example, exclusively fresh-water operation and outstanding controllability), for many years the Klingenburg high-pressure air humidifier has represented the highest technical standard.

Thanks to our research and development work, we are now again able to significantly improve this level of performance. The degree of evaporation could be increased and, at the same time, the pressure loss reduced, resulting in savings of water and energy.
The choice of material, the construction and the exclusive use of purified water from the reverse osmosis process guarantee the highest hygienic level. As a result, additional measures, such as silver ions, UV-irradiation, etc., are no longer required.

The further development of the Klingenburg air humidifier has a name: **CERTO** stands for reliability and safety.



In a nutshell:
The most important properties of the **CERTO**

The properties of the CERTO

- Highest evaporation capacities, up to 95% depending on operating mode
- Humidification up to super-saturation from all operating points
- Minimum pressure loss
- No circulating water, exclusively fresh water
- Implemented in stainless steel
- Continuously adjustable humidification
- Complete emptying and drying of the drain pan
- Integrated hygienic control for rinsing the pipelines during standstill and drying of the humidifier
- Application of the most recent frequency converter technology
- The CERTO safety package
- Reliable performance data
- Adaptation to customer‘s dimension specifications. Available as complete system or as modular installation variant
- Ideal for retrofitting of existing systems
- Simple installation of components
- Type-tested in respect of conformity with VDI 6022* and DIN 1946 Part 4* (*see Info, page 14, below)
- Completely fulfils the hygienic requirements of ambient air conditioning systems without the need for chemicals such as silver ions, etc
- Option: Complete drain of the piping using compressed air

Where hygiene and exact adherence to a defined air humidity are decisive:

Air humidification serves not only for human well-being, but also plays an essential role for many technical applications.

In industrial production processes, in printing facilities or painting facilities, and also in medicine, exact air conditioning is essential.

Pharmaceutical industry

Precision by the humidification in the microchip manufacturing

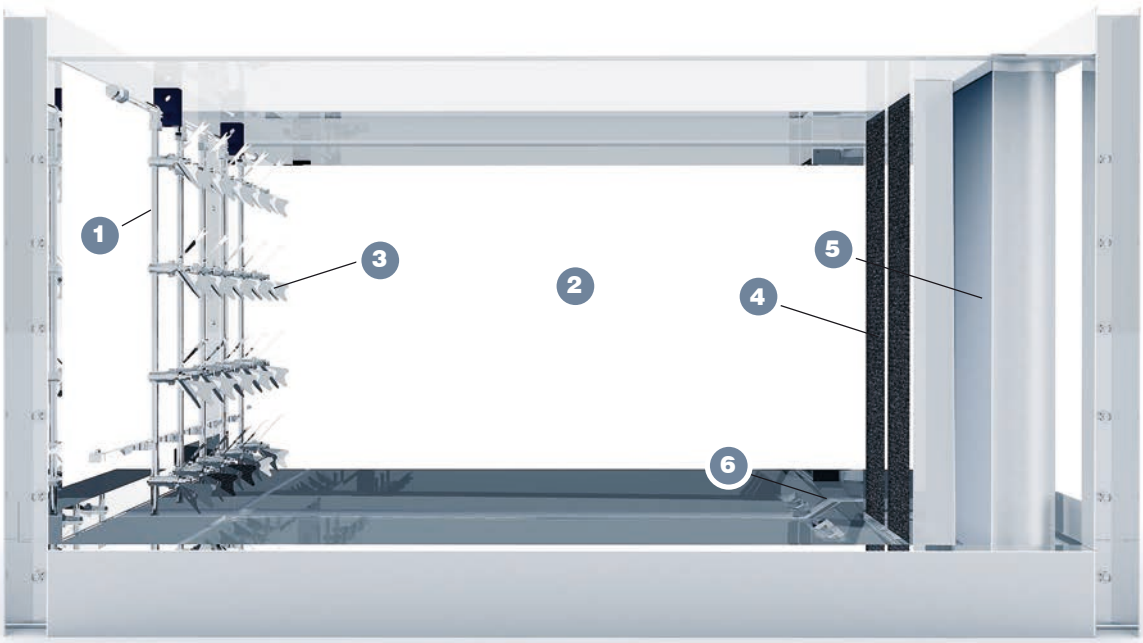
Valuable cultural treasures, libraries, museums, archives

There are many examples of how the Klingenburg air humidifier represents a reliable process component:

- Clean room requirements
  (e.g. chip production, pharmaceutical)
- Libraries, museums, archives
- Automotive supplier industry
- Printing facilities
- Painting facilities
- Systems implementing indirect evaporation

Automotive supplier industry

CERTO – The functional principle



Separate connectable nozzle system (optional)

Nozzle with winglet

Agglomerator

Post-evaporator

The CERTO air humidifier functions according to the principle of fine atomisation. The incoming air flow is led through a patented vortex generator and nozzle system **(1)**, generating stable longitudinal vortices. These vortices provide optimal mixing within the reaction chamber **(2)**. In the centre of each vortex, the water is atomised at high pressure over nozzles **(3)**. In this way, the air takes up the humidity and is also adiabatically cooled.

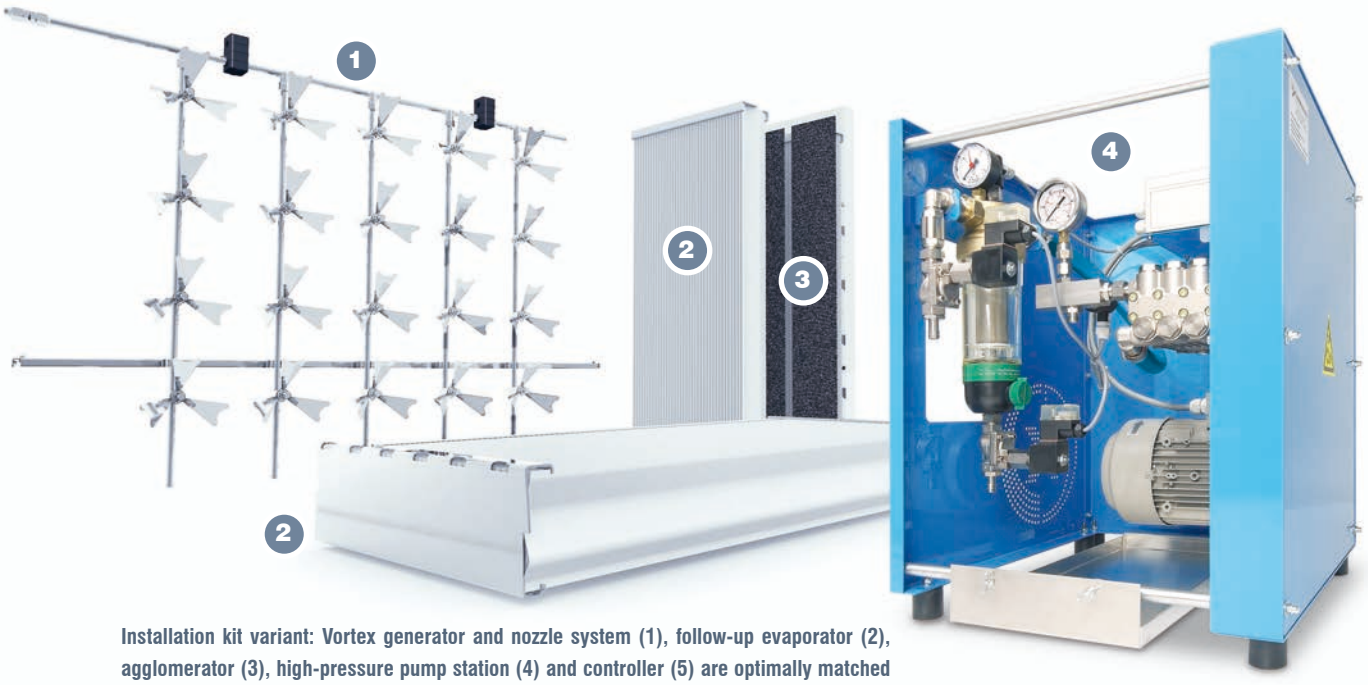
The multifunctional 2-step separatorsystem, consists of the agglomerator **(4)** and evaporator **(5)** which separates and evaporates the water not taken up by the ambient air. This is made of seawater resistant special profile aluminium, fulfilling hygienic requirements. The newly developed vortex generator and nozzle system, together with this specially developed secondary evaporator, guarantee the highest degrees of evaporation.

For the complete system version the stainless steel bottom pan includes a double-sided gradient **(6)**. This ensures the complete drainage of the residual water. The use of fully deionised water (permeate from the reverse osmosis) guarantees excellent hygiene and safe operation. The high evaporation capacities permit the use of fresh water without circulating water or water supply in the humidifier

The entire construction takes hygienic requirements for operation in ventilation and air-conditioning systems into consideration, without the use of chemicals.

The humidification capacity is continuously controlled by adjusting the injected quantity of water. The humidifier, pump station and controller are all carefully coordinated.

The available variants



Installation kit variant: Vortex generator and nozzle system (1), follow-up evaporator (2), agglomerator (3), high-pressure pump station (4) and controller (5) are optimally matched to your air conditioning unit, guaranteeing the best possible integration.

Variant: Complete system

The CERTO housing is isolated (20 or 40 mm) and made entirely of stainless steel (V4A) inside. The outer welded frame construction is made of seawater-resistant aluminium.
An inspection hatch enables easy access. All built-in elements can be easily dismounted. Both of these are decisive prerequisites for simple cleaning and maintenance.

Scope of delivery of CERTO: as a complete system for installation in an air conditioner system or as separate components of the air conditioning system:

- CERTO housing with vortex generator and nozzle system and secondary evaporator installed
- Recessed lighting
- Inspection glass with darkening capability
- Pump station
- Control unit
- Low-pressure hose
- High-pressure hose

Optional:

- Housing which can be dismounted, depending on transport and moving in to site of installation

Variant: Installation kit

Scope of delivery of CERTO as kit for installation in an existing housing:

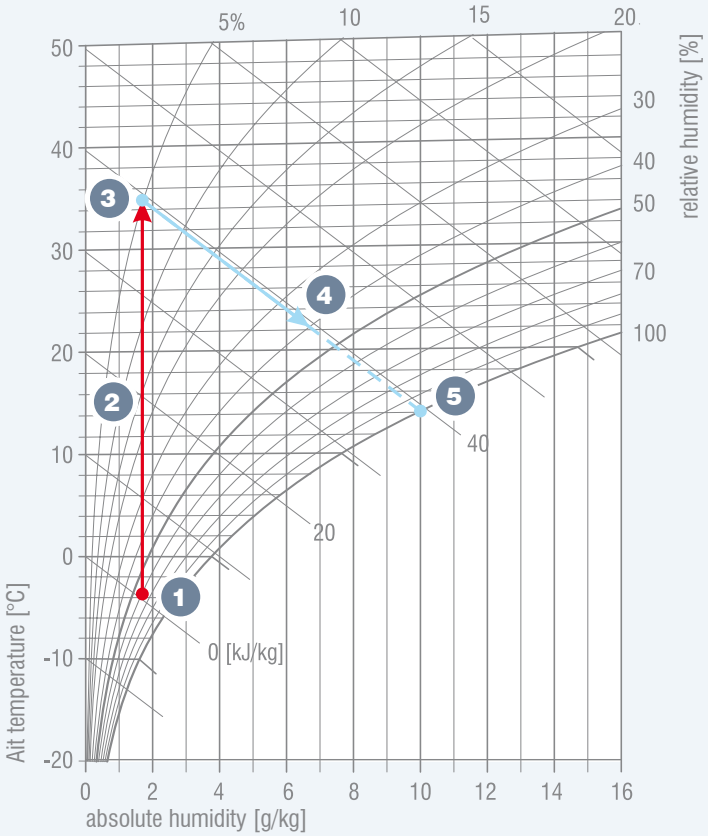
- Vortex generator and nozzle system
- Secondary evaporator
- Pump station
- Control unit
- Low-pressure hose
- High-pressure hose

When it's a question of energy efficiency, no one is better

The CERTO offers the highest degrees of evaporation and low pressure loss. This could only be achieved by intensive product research at Klingenburg.

For the calculation of the evaporation capacity the air intake conditions are of decisive importance. For a given absolute intake humidity, the degree of evaporation can be improved by increasing the intake temperature. The relationships between the intake condition, saturation deficit, moisture absorption and degree of humidification are shown in the following diagram:

1. Outside air
2. Pre-heater and thermal recycling if required
3. Intake condition – humidifier
4. Outlet condition – humidifier
5. Saturation humidity at wet bulb / cooling limit temperature



Humidification difference = 5,0 g/kg

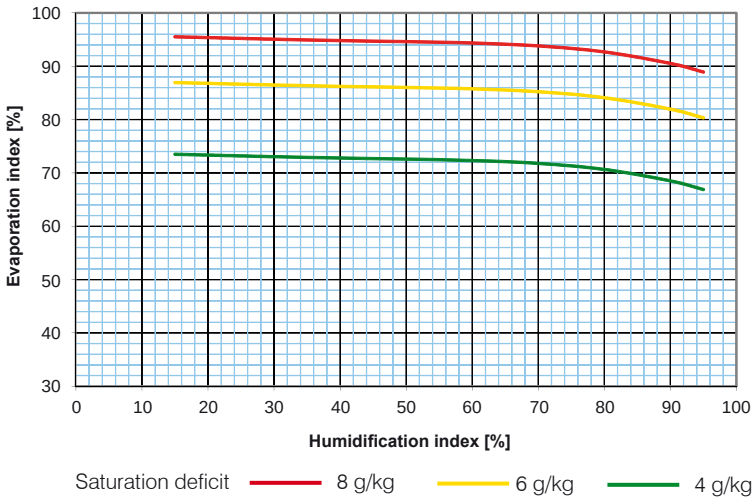
Saturation deficit = 8,3 g/kg

$$\text{Humidification index} = \frac{\text{Humidification difference}}{\text{Saturation deficit}} = 60\%$$

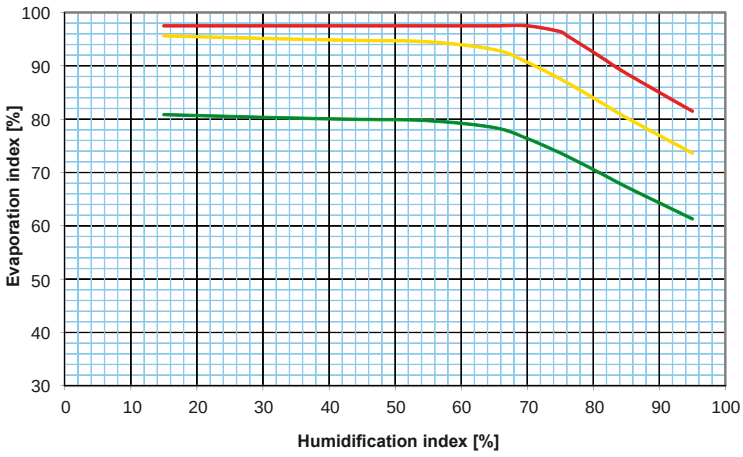
than **CERTO**

The operation of humififier with agglomerator offer significant advantages for the humidification index

Humidifier without agglomerator:

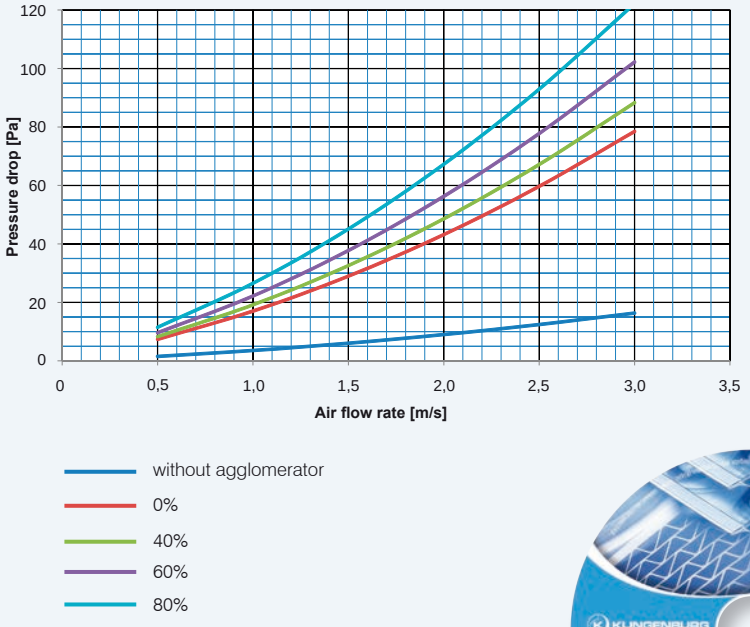


Humidifier without agglomerator:

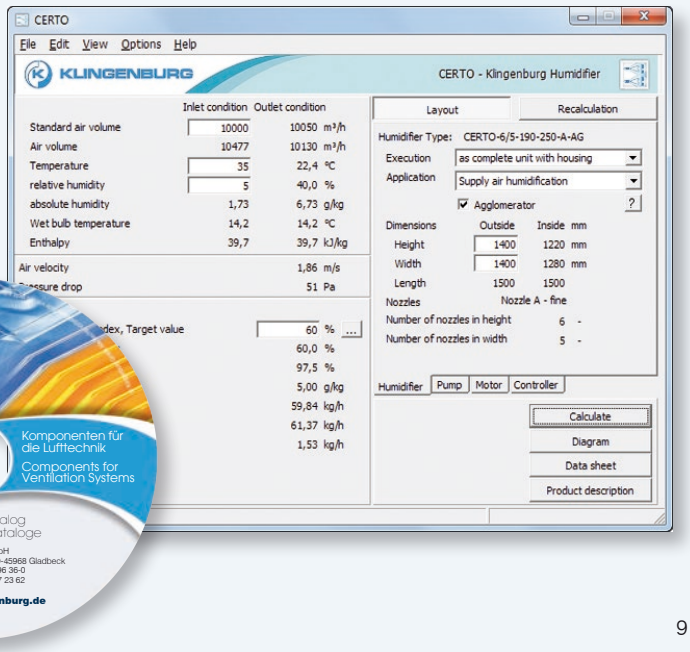


The low air-side pressure loss is another outstanding feature of the CERTO

Pressure drop in relation to humidification index



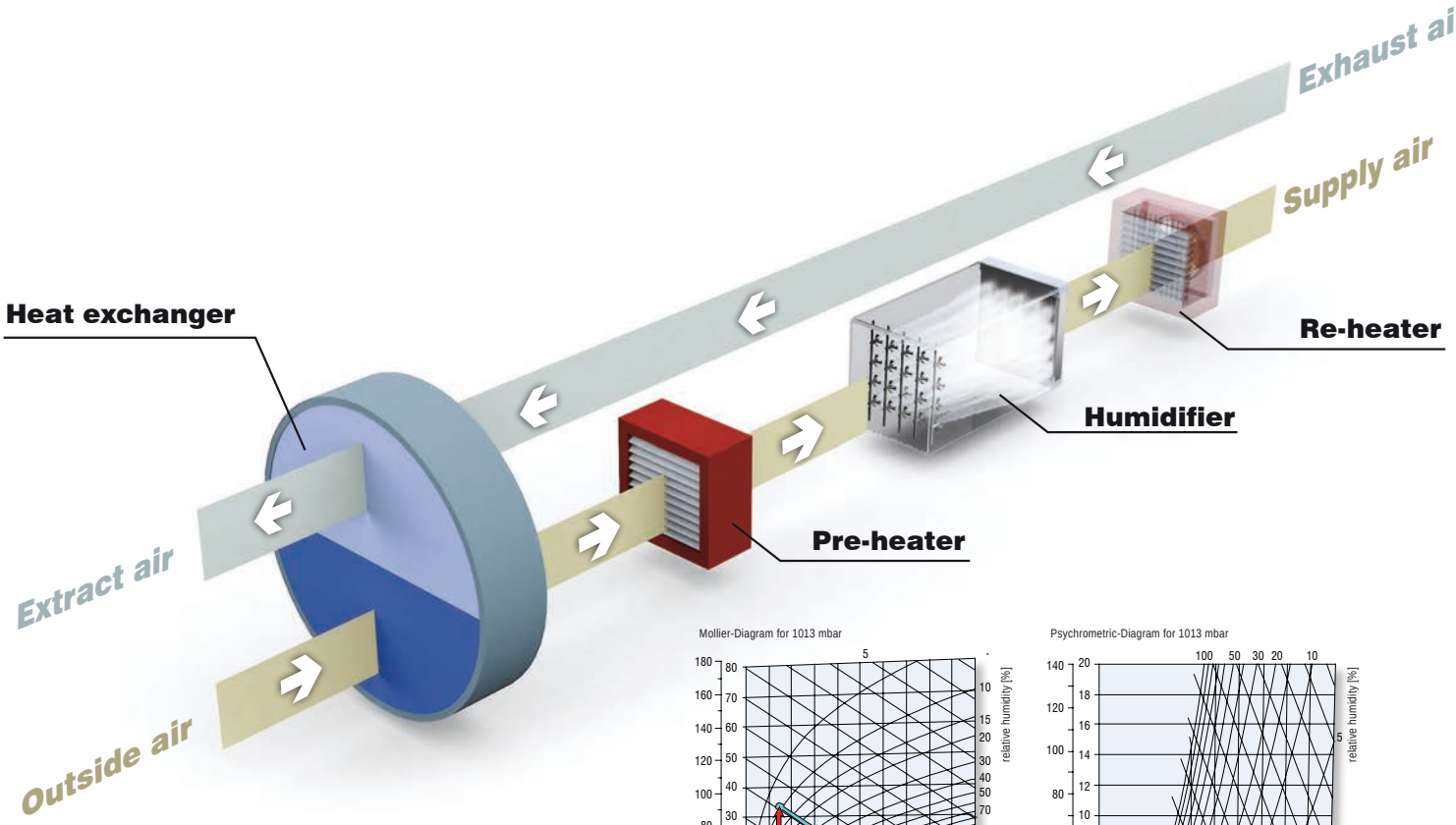
As for our other products, design software is also available for the CERTO. For each application, this allows the optimum humidifier design.

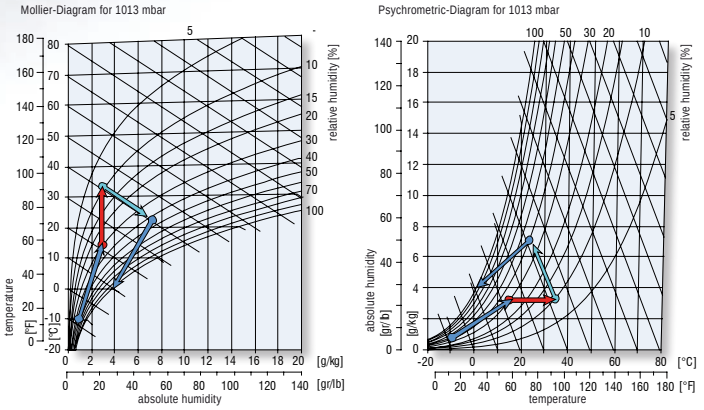


Applications of air humidification

One distinguishes fundamentally between intake air humidification and exhaust air humidification.

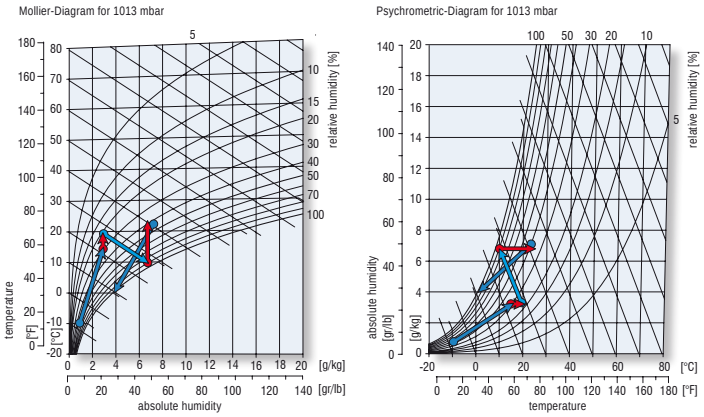
Intake air humidification





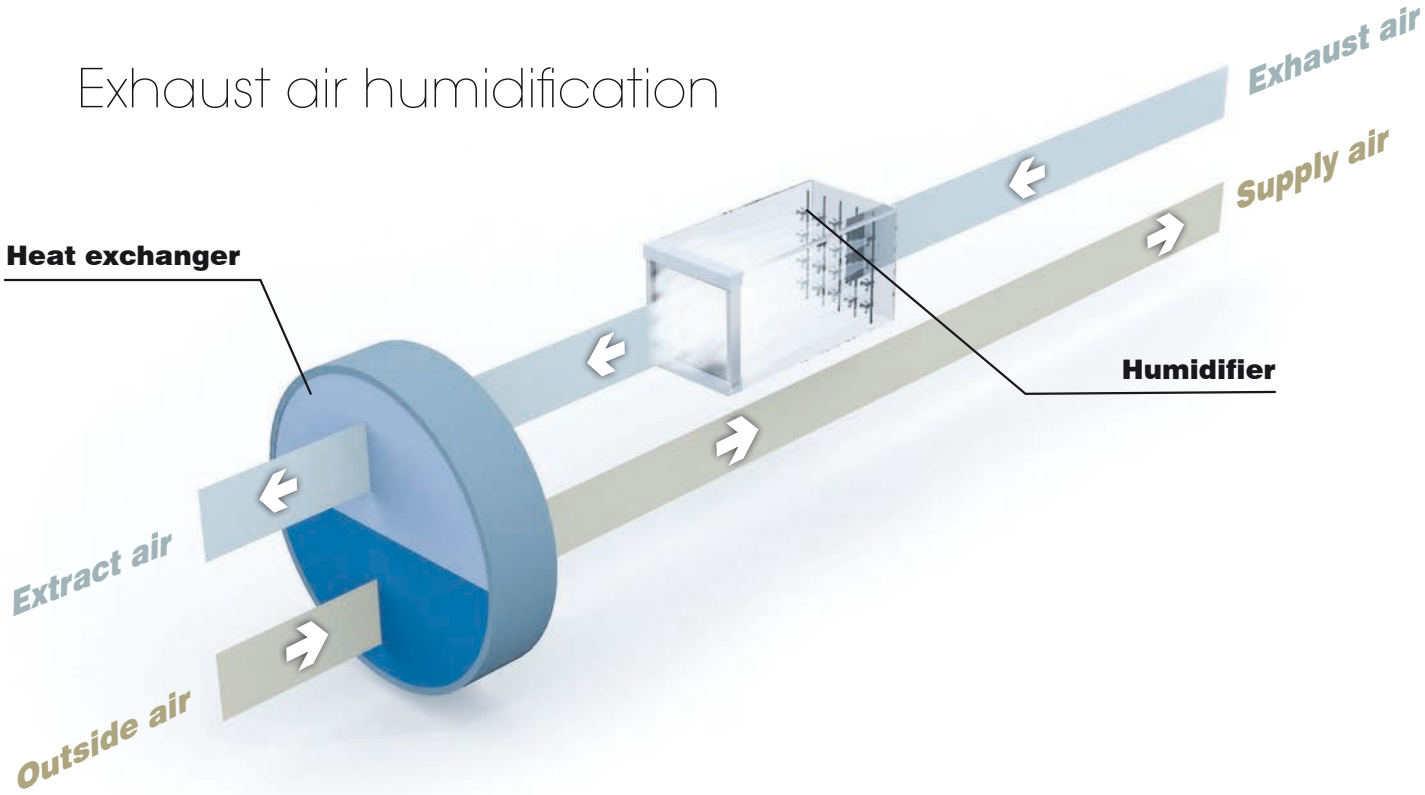
Process with pre-heater

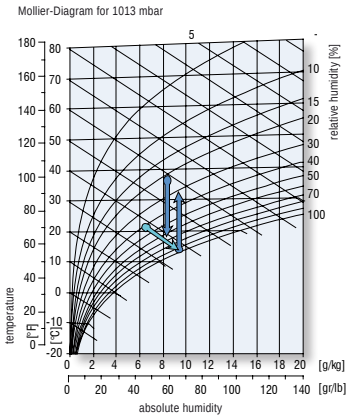
As a rule, the central task for air intake humidification is to achieve a certain relative humidity and maintain this, even with changing

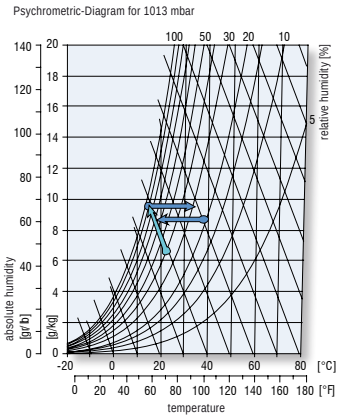


Process with pre- and reheater

Exhaust air humidification







Exhaust air humidification finds application in indirect adiabatic cooling. The exhaust air is moistened as far as possible and simultaneously adiabatically cooled. This cooling potential can be utilised for cooling the intake air. Via a heat exchanger, only the sensible energy is then transferred to the intake air, but not the humidity

Here work is performed under high pressure: The pump station

The water is introduced by a high-pressure pump via the nozzles to the humidifying chamber. The pump capacity is regulated by a frequency converter.

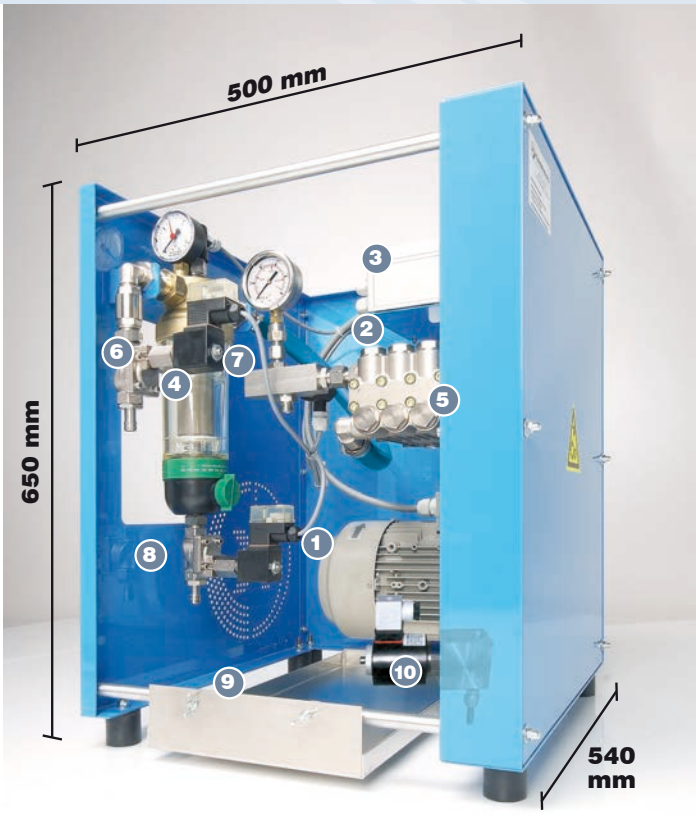
This is a sturdy high-pressure pump with ceramic piston, cast aluminium drive housing, crankshaft with ball bearing, and oil inspection glass. Optionally, water-lubricated pumps can also be employed. The pump head is chemically nickel-plated and therefore also suitable for operation with fully deionised water.

Other properties:

- Stable sheet steel system frame, with baked enamel, colour RAL 5015
- With attached shock absorbers for interior installation on load-bearing support surface
- The maintenance-friendly design permits easy access to all components
- The speed-controlled pump operation allows continuous adaptation of the water quantity to achieve the required air humidity
- Power transmission by sturdy toothed-belt technology, individually designed for optimal efficiency and broad control range

The CERTO safety package:

- Integrated water filter for the retention of possible impurities in the supply system and for the protection of the high-pressure pump against particulate matter
- Closed inspection cover on drive housing as protection against injuries due to contact with rotating parts
- Check valve and solenoid valve for switching off water intake during standstill
- Manometer on the low-pressure side and the high-pressure side for visual control of the pressures in the system
- Low-pressure switch as dry-running protection for pump, high pressure switch for limiting maximum allowed operational pressure
- The electrical connections are joined in a terminal box and pre-wired. Connection is by modular terminals connected to the same terminals of the control unit.



1. Drive motor
2. Speed-controlled high-pressure pump
3. Electrical distributor terminal box
4. Water filter with low-pressure switch
5. System frame with shock absorbers
6. Solenoid valve / water supply from reverse osmosis unit
7. High-pressure block with high-pressure safety switch and water supply to CERTO
8. Solenoid valve for integrated hygienic control
9. Drip-protection pan
10. High-pressure solenoid valve for load control

Excellent **controllability**

Control is by modern frequency converters, for which the operating parameters have been specially designed for the CERTO.

Properties of the frequency converters:

- Micro-processor driven frequency converter
- Degree of protection IP 54
- Built-in mains filter for suppression of interference and cooling body located outside housing
- Additional control board with all monitoring functions, alarm relays and inputs for the processing of standard control signals from the DSG
- Simple operation from five buttons, two-line colour LCD clear text display and menu-guided parameter assignment, optionally in different languages
- Display of set point and actual values and of fault messages
- Integrated operating hours counter and service messages for compliance with maintenance intervals
- Integrated hygienic control for rinsing the pipelines during standstill and drying of the humidifier
- Optional komplette Entleerung der Rohrleitungen mittels Druckluft möglich
- Later function extensions can be retrofitted via software

Inputs:

- Potential free contact enable
- Selectable control signal inputs 0-10 V or 0/4-20 mA
- Humidity signal for internal humidification control via sensor

Outputs: (max. 1A 250V~ AC1)

- Operation with floating potential
- Potential free contact disturbance
- Potential free contact maintenance
- Water purification with floating potential contact
- Drying run with potential free contact

Options:

- Menu language switch-over between German, English, French and Dutsch
- Control range extension for partial load operation below 20%

Hygiene

For the design of the CERTO great value was placed on the fulfilment of all hygienic requirements:

- No water supply
- No circulating water
- Consequently no germs
- Stainless steel nozzle arrays and inner walls
- No built-in components for storing water
- No recesses, smooth drainage surfaces
- All built-in components can be easily dismounted and replaced
- Type-tested in respect of conformity with hygienic requirements in accordance with VDI 6022* and DIN 1946 Part 4* (*see Info, page 14, below)
- The use of chemicals or silver

info: VDI 6022 (Hygienic Requirements for Room Air Conditioning Systems and Units)

DIN 1946 Part 4 (Room Air Conditioning Systems in Buildings and Rooms for Healthcare Purposes)

VDI 3803 (Central Room Air Conditioning Systems and Technical Requirements)

EN 13779 (Ventilation of Non-residential Buildings – General Principles and Requirements for Ventilation and Air Conditioning Systems and Room Cooling Systems)

Use without reservation is also possible in sensitive areas – the O2 Arena in Berlin has been equipped with Klingenburg air humidifiers

Thanks to Klingenburg humidifiers the Gewandhaus in Leipzig is able to offer optimal humidity conditions for the valuable musical instruments. Even the slightest changes in the air humidity could render the sensitive instruments useless.

Tender text

- CERTO high-pressure humidification system according to the principle of fine atomisation, as a complete system or for installation in an empty on-site humidification frame in accordance with VDI 6022 (see Info, page 14, above).
- An inspection hatch permits easy access to internal components.
- The incoming air flow is led through a patented vortex generator system, generating stable longitudinal vortices. These vortices provide optimal mixing within the reaction chamber.
- In the centre are the high-performance atomisation nozzles with integrated check valve for the fine atomisation of water (fully deionised water).
- The multifunctional 2-step separatorsystem, consists of the agglomerator and evaporator which separates and evaporates the water not taken up by the ambient air.
- The use of fresh water (no circulating water) makes a supply of water in the humidifier unnecessary.
- Continuously controllable humidification up to completely saturated air.
- Moisture absorption up to super-saturation of the air stream with a low waste water fraction.
- Integrated hygienic control for rinsing the pipelines during standstill and drying of the humidifier
- Option: Complete drain of the piping using compressed air
- Following switch-off no subsequent humidification due to media storing water occurs.
- Separate pump motor station with CERTO safety package.
- Pressure build-up by sturdy pump with ceramic piston, driven by a stand-alone frequency-controlled motor.
- Simple operation from five buttons. The LCD clear text display allows menu-guided parameter assignment in several different languages.
- Speed-controlled pump operation permits the continuous regulation of the air humidity.

Technical Data	
Volume flow rate	m^3/h
Intake temperature	°C
Intake humidity	% rel
	g/kg abs
Outlet temperature	°C
Outlet humidity	% rel
	g/kg abs
Humidification index	%
Humidification difference	g/kg
Humidifier capacity	kg/h
Pressure drop	Pa

Dimensions	
Length x Width x Height	mm
Weight	kg

Description	
Manufacturer	Klingenburg
Type	CERTO

- Power transmission is by sturdy toothed-belt technology.
- Guaranteed easy access to all components.
- The exclusive use of fully deionised water (permeate from the reverse osmosis) ensures high hygienic safety.
- The entire design takes the hygienic requirements for operation in air conditioning systems without the use of chemicals into consideration.
- Conformity with the standards VDI 6022 Sheet 1-3*, VDI 3803*, EN 13779*, DIN 1946/4* (*see Info, page 14, above)

KLINGENBURG
ENERGY RECOVERY

Rotary
Heat Exchanger

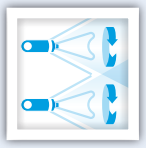
- Execution as aluminum, epoxy, enthalpy or sorption rotor
- High Temperature Rotor made of stainless steel

Counterflow-
Plate Heat Exchanger

- Aluminium, PET and epoxy versions available
- Highest efficiency

Crossflow-
Plate Heat Exchanger

- Aluminium, PET, epoxy and stainless steel versions available



Humidifier
CERTO

- Hygienic humidification
- Adiabatic cooling

Klingenburg GmbH • Boystrasse 115 • D-45968 Gladbeck / Germany
Phone: +49-(0) 20 43-96 36 0 • Fax: +49-(0) 20 43-7 23 62 • E-mail: klingenburg@klingenburg.de
www.klingenburg.de

CERTO EN 130715