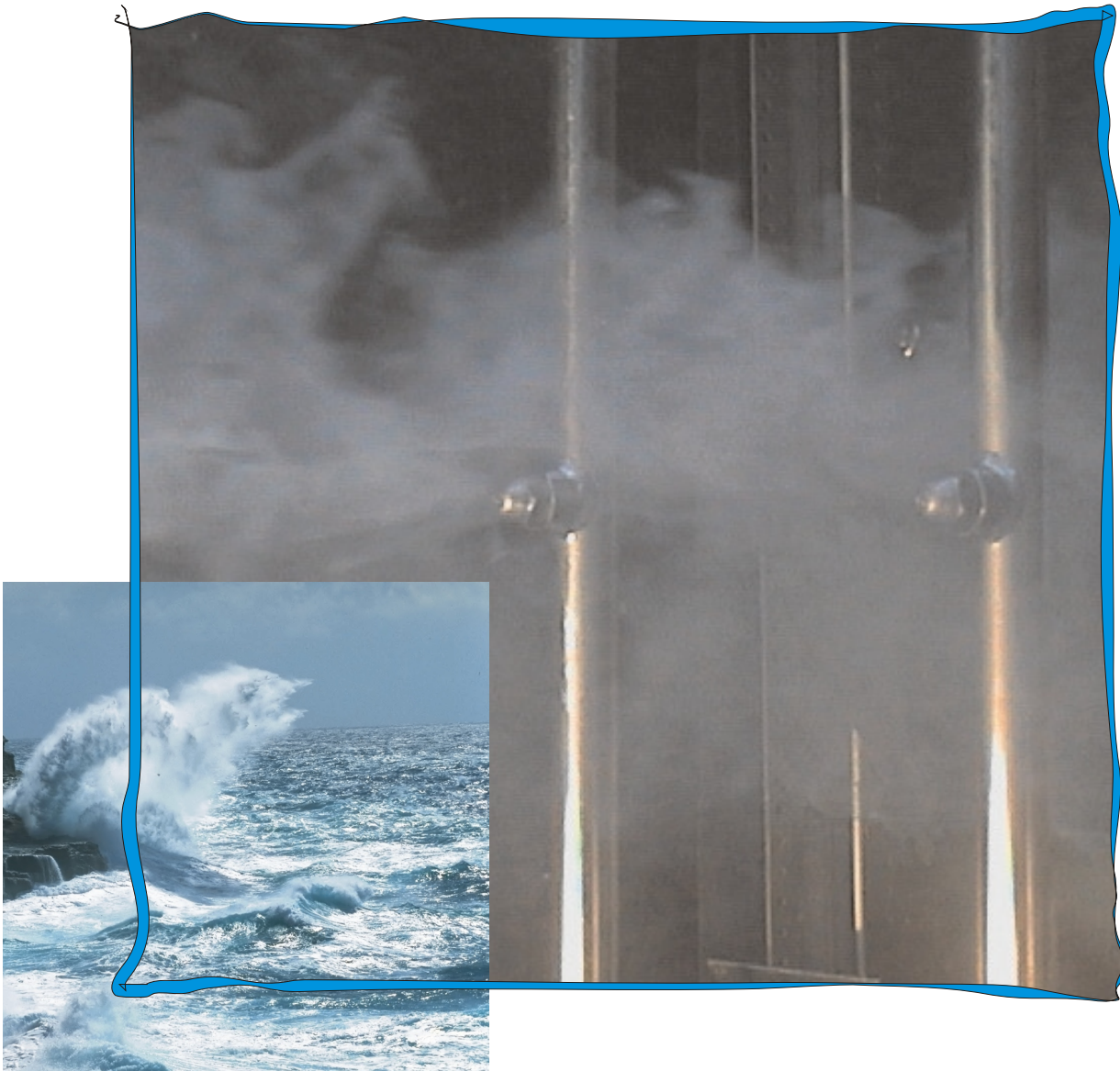


Air Humidification Systems

Requirements and Solutions



KLINGENBURG
ENERGY RECOVERY

Introduction

Introduction

A constant humidity is essential in many production processes. In addition, air humidification improves the quality of indoor air and leads to better comfort. Deficiently designed or poorly serviced air humidification installations are often a reason of illness. Bacteria or their poison can enter the indoor air during spraying. This can cause numerous illnesses (e.g. legionnaires' disease). This problem arises above all with systems which have a water reservoir as the recirculated water creates ideal growth conditions for bacteria and germs.

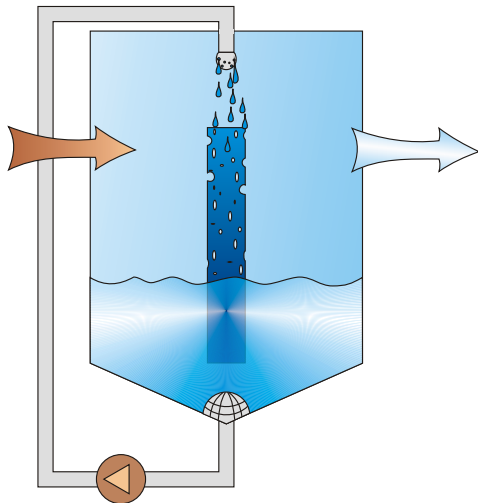
Numerous problems are prevented in advance through the selection of the most suitable humidification process.

Air Humidification Systems

Air Humidification Systems

The dispersion of micro-organisms in indoor air varies depending on the air humidification system.

Humidifiers with Circulating Water

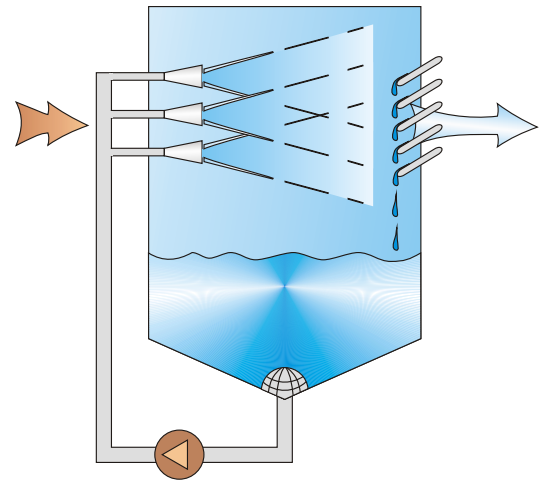


Contact Humidifiers, Trickling Humidifiers

Water is sprayed on a porous surface passed by the air flow which is to be humidified. Evaporation takes place on the large and humid surface. The water which has not evaporated is conveyed back to the contact surface in circulation process.

Advantages: no water treatment necessary
favourable in price

Disadvantages: calcification of the contact surface
high risk of germination
no control possibility

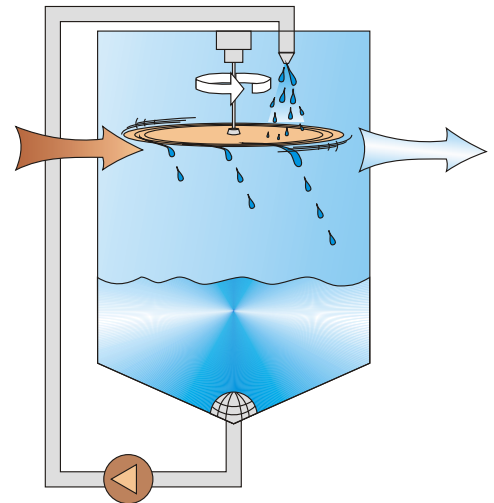


Spray Humidifier (air washers)

Spraying of water in a humidification chamber. Due to the relatively large drops, only a small part of the injected water evaporates. The non-evaporated water is collected in a trough and conveyed to the nozzles again.

Advantages: no water treatment necessary

Disadvantages: germination of the circulation water possible
high pump action necessary
poor control possibility



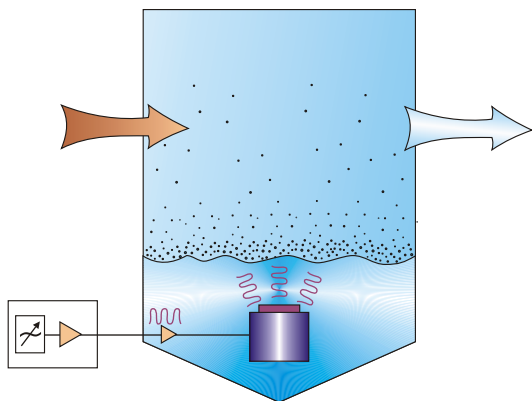
Disc Atomiser

Water is injected on to a fast rotating disc and, due to the centrifugal power, spun off this as a fine mist.

Advantages: also possible for mobile devices

Disadvantages: calcification of the discs
risk of germination

Humidifiers without Circulating Water

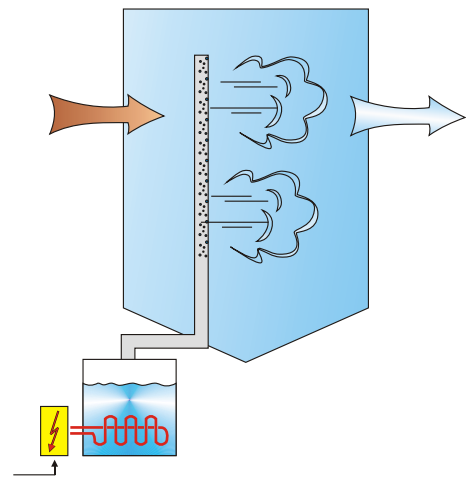


Ultrasonic atomiser

A membrane is initiated to vibrate through a high frequency signal. It transmits the vibrations to the water to be evaporated so that the water is atomised as fine mist.

Advantages: fine atomisation
also possible for mobile devices

Disadvantages: expensive
only small construction sizes feasible

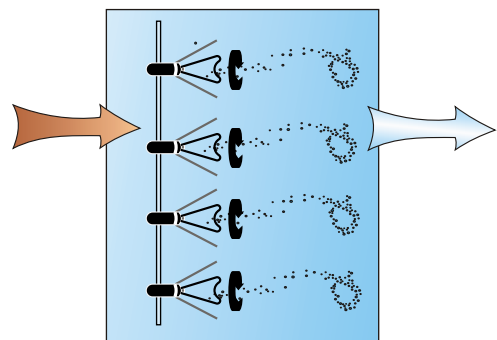


Steam Humidifier

Water is brought to boil in a cylindrical vessel. Popular are electrode systems which use the conductivity of the water for heating. The vapour generated in this manner is transported in pipes to the ventilation duct and distributed in a steam lance into the air flow.

Advantages: hygienic, if condensation is avoided

Disadvantages: boiler scale formation
no adiabatic cooling possible
expensive



Klingenburg CERTO Humidifier

Stable longitudinal vortices are generated in a vortex grille. Water is injected into the centre of each vortex at high pressure. Evaporisation takes place in the subsequent reaction room.

Advantages: hygienic as there is no circulation water and no water-storing components

Disadvantages: treated water necessary

**Klingenburg GmbH**

Boystraße 115
45968 Gladbeck
GERMANY

Tel. +49 (0) 20 43 / 96 36 - 0

Fax +49 (0) 20 43 / 7 23 62

e-mail: klingenburg@klingenburg.de

web: www.klingenburg.de

Klingenburg International sp. z o.o.

ul. Metalowców 5
58-100 Swidnica
POLAND

Tel.: +48 (0) 74 / 851 54 00

Fax: +48 (0) 74 / 851 54 01

e-mail: klingenburg@klingenburg.pl

web: www.klingenburg.pl

Klingenburg USA, LLC

503 Old Thomasville Road
High Point, NC 27260
USA

Tel.: +1 336-884-5050

Fax: +1 336-884-8058

e-mail: info@klingenburg-usa.com

web: www.klingenburg-usa.com

Klingenburg Shanghai Representative Office

Room 24/P Jinsui Mansion
No. 379 Pudong South Road
Shanghai
P.R. CHINA

Tel.: +86 (0) 21 / 68 86 92 51

Fax: +86 (0) 21 / 68 86 99 31