

# Humidity control in printing applications

**CAREL**

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

# Better quality prints with the right humidity

Paper is made of vegetal fibres (cellulose) and is intrinsically hygroscopic, which means that it is very susceptible to changes in relative humidity.

In cold seasons, as the heat generated by printing equipments and heating systems dries the air, the water content in the paper drops producing changes in the dimensions and the mechanical properties of the paper. For optimum printing and paper storage conditions the relative humidity should be kept between 50 and 60%

A correct and stable level of humidity can assure better quality prints, can boost productivity and increase efficiency minimizing costs for machinery downtime and wasted materials. A humidity control system:

- Reduces printing misalignments due to dimensional variations of the paper;
- Avoids paper cracking during automatic feeding;
- Avoids paper curling and waving;
- Eliminates electrostatic damage, adhesion and dust attraction;
- Optimizes ink absorption.



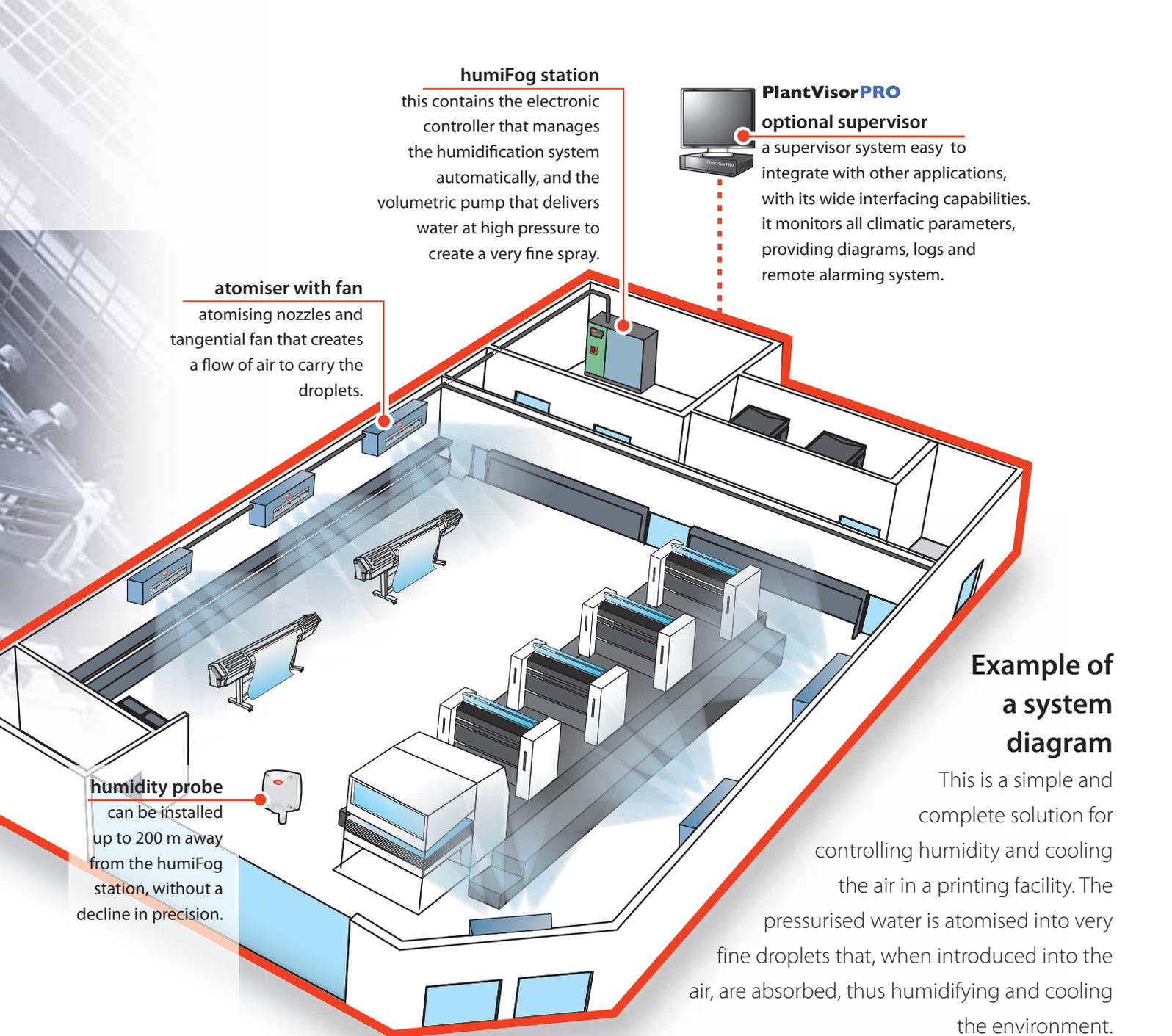
## Product Quality

Changes in the level of humidity cause variations in the length of the fibres of the paper which affect the correctness of all cutting and printing operations. For example, in multi-pass colour printing processes, dimensional variations between runs of different colour processes create blurred and poor quality images



## Productivity

In low humidity environments, curling or corrugation of the sheets of paper is due to uneven shrinkage between the external and exposed surfaces of stacks or rolls of paper (where moisture is drawn quickly) and the centre of the paper. Cracking of the paper fibres also occurs as they dry.



**humiFog station**

this contains the electronic controller that manages the humidification system automatically, and the volumetric pump that delivers water at high pressure to create a very fine spray.

**atomiser with fan**

atomising nozzles and tangential fan that creates a flow of air to carry the droplets.

**PlantVisorPRO optional supervisor**

a supervisor system easy to integrate with other applications, with its wide interfacing capabilities. it monitors all climatic parameters, providing diagrams, logs and remote alarming system.

**humidity probe**

can be installed up to 200 m away from the humiFog station, without a decline in precision.

**Example of a system diagram**

This is a simple and complete solution for controlling humidity and cooling the air in a printing facility. The pressurised water is atomised into very fine droplets that, when introduced into the air, are absorbed, thus humidifying and cooling the environment.

**CAREL, specialists in humidification**

From more than thirty years CAREL has been designing and manufacturing electronic control systems for air-conditioning and humidification solutions.

CAREL provides professional solutions for humidification, with the maximum attention to hygiene and control aspects, as well as expert support to choose and design the best solutions for paper processing industries



**Electrostatic charges**

Relative humidity levels lower than 30% make it easier for electrostatic discharges to be generated. It's then difficult for the machines to ensure correct paper feed, imprecise stacking of the sheets occurs and the presence of static electricity tends to attract the dust present in the environment worsening the quality of the print.



**Adiabatic cooling**

The atomisation of water directly into the room both ensures the required relative humidity and provides adiabatic cooling, due to the heat absorbed by the water when evaporating. A typical application with the atomisation of 100l/h of water removes around 75kW of heat from the air.

## Recommended temperature and humidity values for different types of paper processing

Application	air temperature (°C)	relative humidity (%)
paper conservation	18-20	60-65
photographic printing	22	50-60
rotary press printing	20	50-60
silk screening	22	50-60
photographic development	22	50-60
binding	20-22	55-60

## Our Solutions

### isothermal

 **gaSteam**



Gas-fired steam humidifier at atmospheric pressure (45 to 180 kg/h).

**humiSteam**



Immersed electrode steam humidifier at atmospheric pressure (1.5 to 130 kg/h).

**heaterSteam**



Immersed heater steam humidifier at atmospheric pressure (2 to 60 kg/h); precision  $\pm 1\%$  rH.

### adiabatic

 **humiFog**



High pressure water spray humidifier (60 to 500 kg/h standard; up to 5000 kg/h custom).

 **mc**



Water spray humidifiers using compressed air (60 and 230 kg/h).

**humiDisk**



Spinning disk humidifier (1 and 6.5 kg/h).

## Headquarters ITALY

CAREL S.p.A.

Via dell'Industria, 11

- 35020 Brugine - Padova (Italy)

Tel. (+39) 0499 716611

Fax (+39) 0499 716600

carel@carel.com - www.carel.com

## Sales organization

CAREL Asia

www.carel.com

CAREL Australia

www.carel.com.au

CAREL China

www.carel-china.com

CAREL Deutschland

www.carel.de

CAREL France

www.carelfrence.fr

CAREL Ibérica

Automatización y Control ATROL S. L.

www.carel.es

CAREL Sud America

www.carel.com.br

CAREL U.K.

www.careluk.co.uk

CAREL U.S.A.

www.carelusa.com

## Affiliates

CAREL Korea

www.carel.co.kr

CAREL Ireland

FarrahVale Controls & Electronics Ltd

www.carel.com

CAREL Spol (Cekia e Slovakia)

www.carel-cz.cz

CAREL Thailand

www.carel.co.th

CAREL Turkey

CFM Sogutma ve Otomasyon San. Tic. LTD

www.carel.com.tr

[www.carel.com](http://www.carel.com)

All trademarks hereby referenced are the property of their respective owners. CAREL is a registered trademark of CAREL S.p.A. in Italy and/or other countries.