

success story



Precise humidification for quality printing

where

Stampa Grafica S.r.l.

- humidification in winter;
- Illasi (VR) - Italy;
- www.stampagrafica.it

what

humiFog Installation

- room humidification using five blower units with nozzles

why

- energy saving;
- water saving;
- low running and maintenance costs;
- hygienically safe;
- high efficiency by very fine atomisation of water;
- winter/summer operation;
- easy to install;
- multilanguage display interface;
- blower units for atomisation directly into the room;
- stable humidity as outside conditions vary.



Stampa Grafica S.r.l.: perfect results on any media

Founded in 1988, Stampa Grafica has since grown continually to become an established and recognised business in the graphics industry. Partnerships with leading national and international companies have helped lay the foundations for the development of its corporate philosophy, that is, quality, flexibility and proactiveness, while experience has brought perfection in its results: on 18 February 2009 the company's quality system was certified in accordance with EN ISO 9001: 2008.

The company is set-up to offer pre-printing, printing and post-printing services in house. Its products are mainly designed for stores and sales outlets in various different sectors: automobiles, cosmetics, wellness centers and grocery stores, and include cases, displays, brochures and catalogues/booklets. The products designed for stores are typically made from cardboard in different weights, coated, matte, glossy, laminated and pearl effect, first offset printed with up to 5 colours and then finished with matte or glossy varnishes, or relief screen printing. The prints stand out for their vivid colours, precise lines and total absence of imperfections.

As we know, however, paper is a hygroscopic material and its dimensions vary significantly depending on the humidity. The length of a sheet of paper may vary by 0.1-0.2% with 10% changes in relative humidity: on a typical 70x100 cm² sheet this difference may thus exceed 2 mm. The air-conditioning system in the printing facilities therefore needs to compensate for wide fluctuations in air relative humidity throughout the year. Design specifications require a stable temperature of 20 °C and relative humidity between 50 and 60%.

The owner of the company, Guido Santi, realised over time that the wetted media humidification system incorporated into the air handling unit was not able to ensure the design requirements. Despite increasing the size of the wetted media, the need to filter the air led to blockages of the filters and increased maintenance costs. Moreover, humidifier water consumption was quite high as the water could not be recycled, being contaminated by dust: water purification would have been way too costly.

The solution to the problem involved using a humidification system made up of a CAREL humiFog adiabatic humidifier with 5 blower units that atomise water directly into the environment. This met the design requirements with minimum power and water consumption, with considerable savings in running and maintenance costs and without wasting resources, all benefiting the environment.

The importance of humidity in printing

During the cold season, the heat generated by the machinery and the heating system dry the air (decreasing the relative humidity) and thus the moisture content of the paper decreases, causing changes in its dimensions and physical properties. In ideal conditions for storing and printing on paper, relative humidity must be kept between 50% and 60%. Correct and stable humidity ensures better printing quality and increases productivity and efficiency, minimising costs due to machinery downtime and wasted material. A humidity control system:

- reduces print misalignments due to variations in paper dimensions;
- avoids breakages and tearing during automatic paper feed;
- avoids puckering and wrinkling;
- eliminates electrostatic discharges, adhesion between sheets and electrostatic dust attraction;
- optimises ink absorption.



rotary



fast paper flow

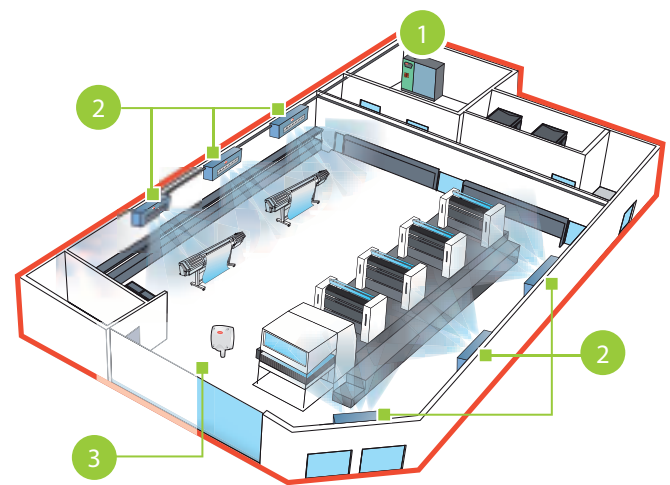
Adiabatic room humidification

The ventilation system consists of an air handling unit that takes in fresh air from the outside and provides enthalpy-controlled freecooling to reach the desired humidity set point.

The underfloor heating system is divided into nine sectors, so as to compensate for the heat produced by printing presses. The design set point temperature is 20 °C.

If the humidity set point is not reached, the humidification system in the production department activates the humiFog pumping unit with 5 blower units.

These are installed on brackets at a height of around 1.5 m from the ceiling. This guarantees perfect atomisation of the water without the problem of wetting the ceiling or the floor, as the height and distribution are sufficient to ensure complete evaporation of the atomised water.



1 pumping unit

3 humidity probe

2 blower unit



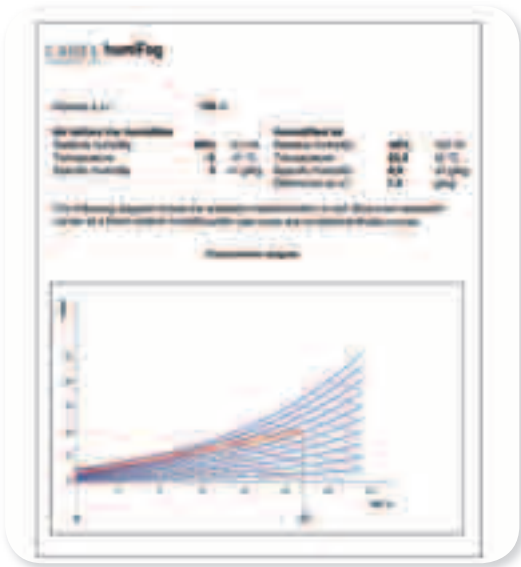
production department with blower units at the top right

Simple design tool

The humiFog calculation tool, available to heating technology designers, automatically provides, based on the design specifications, a list of details for selecting the size of the humiFog humidifier and the reverse osmosis water treatment system:

- initial and required temperature and relative humidity;
- dimensions of the room, outlet air flow-rate;
- number of air changes per hour;
- water conductivity in $\mu\text{S}/\text{cm}$;
- space available for water evaporation: free height starting from the height of the unit to the ceiling and free distance in front of the blowers.

The psychrometric chart below shows the overall transformation, from the point at $-5\text{ }^{\circ}\text{C}/80\%\text{ RH}$ to the point at $22\text{ }^{\circ}\text{C}/60\%\text{ RH}$



transformation on the psychrometric chart



humiFog multizone



reverse-osmosis demineraliser
- WTS



blower unit with 4 nozzles and
built-in fan



humidity probe

A powerful and complete solution

CAREL provides the pumping unit and blower units ready for the system and tested with pressurised water before delivery to the customer. The drain valves ensure maximum hygiene by automatically washing the system. The humidification system consists of:

- humiFog atomiser;
- 5 blower units with 8 nozzles each and speed control;
- reverse-osmosis demineraliser for water treatment (WTS).

Material supplied for room humidification

Code	Description	Qty.
UA120SL000	400 V pumping unit, step operation, 120 kg/h	1
DL22SDI010	8-nozzle blower unit, 22 kg/h slave without valve, with speed control	2
DL22SDF010	8-nozzle blower unit, 22 kg/h slave fill, with speed control	1
DL22SDD010	8-nozzle blower unit, 22 kg/h slave drain, with speed control	2
UAKCD00000	NW central drain valve kit	1
UAKT100000	2 m hose kit	1
DPPC210000	Humidity probe 0-100 %RH	1
CMROUV0250	Reverse osmosis system, 250 kg/h with UV lamp	1
CMROL00000	Descaler liquid, 25 kg	1



humiFog in the installation and WTS



flow of atomised water blown by the fans



Conclusions

humiFog uses a piston pump to pressurise water to 70 bars, which is then atomised by the special nozzles in the blower units into millions of droplets that evaporate spontaneously, humidifying and cooling the air. The system has been simplified, and the blowers fitted with a potentiometer to adjust fan speed and consequently the throw of atomised water. The tangential fan in fact generates a flow of air that carries the droplets, ensuring an essentially horizontal trajectory.

The design requirements were thus met with low operating and maintenance overheads, to the extent where the owner, Guido Santi, has recommended this solution for the printing industry.

The project was developed through the partnership between CAREL, Andrea Donola from the CAREL Agency for Triveneto and Trentino Alto Adige - Südtirol, Climaset s.r.l. and the company that completed the installation. This ensured a high level of customer satisfaction that, as well as excellent products in terms of quality and reliability, identified an excellent partner for its printing humidification applications.



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