

It's not the heat, it's the humidity

John Barker, sales director of Humidity Solutions Ltd, explains why humidity control is vital to stable digital printing and what to do about it.

Control of the environment is understood to be important in ensuring the smooth running of digital printing equipment. To control the temperature is easy and we confidently know the solution. Temperature is obvious and can be judged as soon as you walk in to a room – too hot, too cold. Easy.

Installing an air condition unit solves the temperature problem. However if we look at the definition of air conditioning, we get a clue as to why this cooling unit does not solve all the production issues to do with controlling the climate in the press room. The *Concise Oxford Dictionary* definition is: 'Having the air in a room cleaned and brought to required humidity and temperature.'

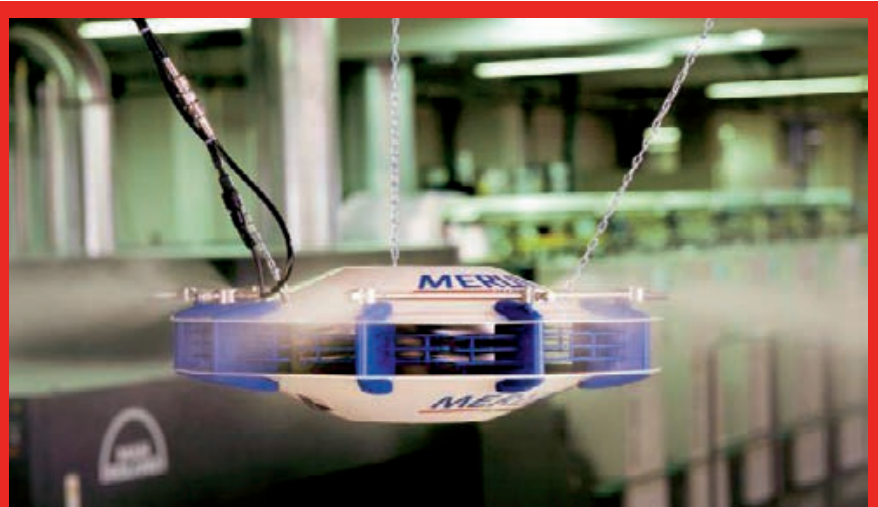
All hygroscopic materials such as paper react to variations in moisture levels in the air, so when printing the humidity level is a vital factor in maintaining a productive environment.

Humidity control is an essential component in printing, but why do we need it in the cold wet climate of the UK? It's because the air temperature and the humidity are permanently linked. If you change one the other shall follow, but frequently not in the right direction for a digital printer who's trying to produce a quality product.

If you heat the cold outside air entering your factory, its relative humidity plummets as the moisture-carrying capacity of the air increases – like a sponge being released from your grasp can hold more water, as the air heats and expands it likewise can hold more water. The water contained within it becomes proportionally less for a given volume, so its relative humidity falls. A humidifier restores it to the desired proportion.

In a hot summer the moisture has to be replaced if you are using air conditioning to keep the interior cool. As the air is cooled, its temperature drops below its dew point. Condensate forms and the humidity is reduced. This moisture needs to be replaced.

All digital printer manuals detail the temperature and humidity levels required. They all advise a stable and constant humidity of around 50% rh to ensure the machines achieve maximum performance and reliability.



A Merlin MD9XL direct air low energy humidifier in action.

Not maintaining a constant humidity level while printing has other consequences too. These range from erratic dimensional stability, low paper strength, static charges, paper curl and poor paper conditioning. It's also less comfortable for staff in the factory.

Humidifiers come in various shapes and sizes. However, moisture can only be added to air in one of three ways: evaporation, spray and steam. It will depend on the application as to what method you choose and which is the most cost effective.

In most digital print applications, dedicated wall mounted steam humidifiers are normally the ideal solution to maintaining a stable condition. They offer low capital cost, ease of installation, close control and user friendly operation. They're ideal where one or two digital presses are housed in a single room.

In larger establishments or where multiple zones require humidity control, then a low energy solution is the high pressure water humidifier. A central high pressure pump serves several individually controlled humidifier heads to deliver a very fine water spray. This provides excellent humidity control and some free cooling from the cold water mist.

These systems are silent in operation and have the advantage of being able to serve large print rooms containing multiple presses and finishing systems.

Localised humidity control can be achieved

in large factories where individual presses require a controlled environment but where the majority of the space would not benefit from the addition of moisture. This allows systems to be reduced in size, so saving capital and running costs.

Adiabatic cooling, the cooling achieved when water evaporates taking heat energy from the surrounding air to enable the water to change state from water to a gas, is a favourable side benefit of spray humidifiers. This often increases energy savings and other capital expense by reducing the cooling load within the press hall.

Payback periods for such systems are short, allowing the use of thinner paper, faster machine running times, less downtime, greater paper stability, increased registration accuracy and reduced or eliminated static. A controlled environment also helps predictability and repeatability of the print quality. Adiabatic cooling is also a cost benefit. ■

About Humidity Solutions

Humidity Solutions Ltd is based in Leatherhead and supplies, installs and maintains all the types of solution detailed in Mr Barker's article. Apart from the systems it supplies, it can source parts for practically any make of humidifier. Contact: www.humiditysolutions.co.uk