

Keeping RH in its place

Effective humidity control is a necessity for all work environments and is particularly important in many industrial environments, says John Barker of Humidity Solutions

In any indoor environment, controlling humidity is essential for protecting the health of occupants and the building fabric. In an industrial environment, poor humidity control may also impact on productivity and profitability, so there are strong commercial reasons for taking control.

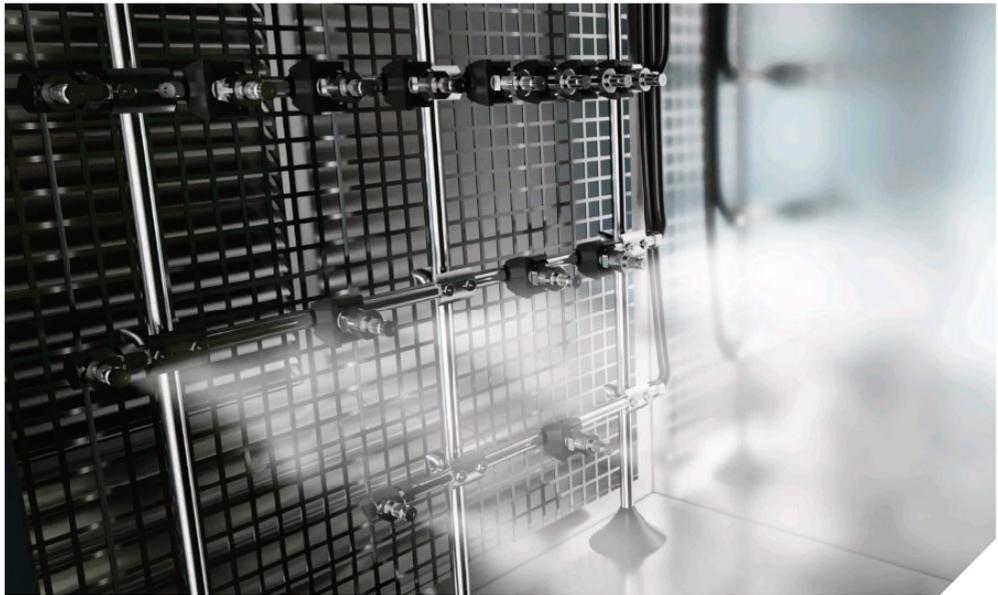
In terms of measuring humidity, we use the term 'relative humidity' - or RH - to describe the relationship between the temperature of air and the amount of moisture it can hold. In most industrial environments the RH should be maintained between 40 and 60%. Where the RH is below this, humidification will be required; if above this range, dehumidification should be considered. Some environments may require both at different times of the year.

High RH and dehumidification

High humidity causes discomfort for occupants and will increase the likelihood of condensation forming on cold surfaces, potentially causing damp damage and mould growth. It may also lead to pools of water on the floor, creating a slip hazard.

In such cases, dehumidification is the obvious answer and the most appropriate dehumidification technology will depend on the application. The most familiar of these may be refrigerant dehumidifiers, where the air passes over a cold surface so that water condenses in the machine. These are ideal for spaces where the air is heated.

In environments that are unheated or where the air is maintained at relatively low temperatures, desiccant dehumidifiers will often be a better option. These work by drawing air through a desiccant rotor (a rotating wheel containing desiccant - typically silica gel) where it gives up most of its water vapour, so that as the air passes out of the other side of the rotor it is drier than when it entered the rotor. The moistened section of the rotating desiccant wheel then passes through another air stream that dries (reactivates) the silica gel and this



moistened air is exhausted to the atmosphere.

Low RH and humidification

Low RH will also cause various materials (eg. timber) to dry out very quickly. Additionally, it may cause dehydration and drying out of eyes and respiratory surfaces. It also makes occupants feel colder, so they turn the heating up, which increases energy consumption - whilst raising the temperature reduces the RH even further, exacerbating the problem.

Traditionally, the solution has been to heat water to produce steam and this is still an appropriate option for some projects. However, high pressure, low energy systems using cold water are becoming increasingly popular in industrial applications.

There are several ways of generating steam for humidification and the optimum solution will depend on the project. For example, electrode boilers will not supply more than 90kg/h of steam, while resistive generators can provide up to 120kg/h for a single unit and modular gas-fired humidifiers will deliver up to 400kg/h.

A lower energy alternative to steam generation is to spray water through nozzles, at low or high pressure, directly into the space or into ductwork. Such systems also need to incorporate anti-bacterial measures such as ultra violet disinfection and can be combined with demineralised or reverse osmosis water.

In all cases there is a range of factors to be considered in arriving at the best solution. In addition to the level and type of humidity control other factors such as energy consumption, maintenance requirements and where the humidity control plant is located must also be taken into account. It therefore makes sense to team up with companies that have a comprehensive range of different humidity solutions and the expertise to apply them to optimum effect. ■

For more information:
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