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Run out of steam?

In this world of energy efficiency, have self-generating steam humidifiers had their day asks *Lindsey Henderson*, sales director at Humidity Solutions.

Humidity control is essential in almost every building, for health and wellbeing, manufacturing, printing, hospitals, museums and process industry to name a few. Humidifiers should not be removed due to cost savings and energy efficiency, or indeed overlooked or ignored in the first place. This short sightedness is missing the importance of it, and the whole-life costs and benefits must be considered if we are striving for the most efficient and healthy buildings now and into in the future.

When discussing the design of a building only recently, I was not surprised to hear the value of correctly humidifying a building can still be completely underestimated. In the past, unfortunately, humidification has so often been seen as unimportant, or suffered as a 'cost reduction' when the call to find savings or reduce energy goes out.

In an office, maintaining a relative humidity of between 40 - 60% contributes to a healthy and comfortable working environment, reduces the spread of infections, respiratory problems, dry eyes and static shocks. In addition to these very important factors, a key benefit is overlooked in so many cases: that when humidifying an office environment to a stable relative humidity of 50% this often allows the temperature of the building to be reduced by a couple of degrees, from say 23°C to 21°C over the winter period. This can save a considerable amount on heating costs that equates to far more than the cost of installing and running a humidifier in the first place.

So why is this temperature reduction achievable? Most people are not used to relating to low humidity, whereas we are very aware of the temperature surrounding us - whether it is too hot or too cold. At low relative humidity, moisture will be drawn from all surroundings and that includes the building occupants. This evaporation process of moisture from the skin causes us to feel cold, leading to many complaints from the occupants of feeling uncomfortable and cold, hence putting pressure on the building operators to turn the temperature up to compensate. This is seen in many offices where the installation of a simple, low cost humidification system has been excluded. The increase in running cost at this higher temperature over a winter period equates to valuable energy that need not be consumed. If we humidify a building to an adequate level of humidity a more constant control within the building is achieved, thus making it a more efficient and healthy environment to be in - the reduction in the energy cost for increased temperature far outweighs the energy consumption of the humidifier.

We often see within specifications that 'a space should be left for humidification to be added at a later date if needed', and humidifiers excluded. Once the building has run for a short period of time it is found there is indeed a need for humidification as the humidities are often as low as 20%rH. With space restrictions always an issue this is where Steam Humidifiers can be the ideal solution for retrofitting humidification into existing systems.

There are two types of self generating steam humidifiers:

Electrode steam humidifiers bring potable water to a boiling point by passing current between electrodes within a disposable plastic cylinder. The cylinders are easily and quickly replaced as and when required, depending on hours run and water quality. The capacity of the unit will depend on the size of the cylinder and the rated voltage and kW of the humidifier, with outputs from 2 to 110 kg/hr. Electrode boilers are easy to install, only requiring power, water and a suitable drain. The units can be controlled directly using a sensor or be controlled from the BMS. Electrode boilers are still the most widely used humidifier in the market today, they are low cost, easy to maintain and reliable. With reliable and reputable British brands like Vapac having been manufactured for over 40 years, the longevity of this type of steam humidifier speaks volumes.

The second type of self-generating steam humidifier is the Resistive element humidifiers these use electric, self-cleaning, immersion heating elements to raise the temperature of the water to the boiling point within a permanent stainless steel evaporation chamber. Each of these immersion heaters has a specific power rating (KW) at a specific voltage. This heating will raise the temperature of the water within the evaporation chamber independent of the ion content of the water, this permits equal performance in purified (reverse osmosis) water or potable water. The capacity of these units is similar to the electrode boiler type with outputs from 3 – 120kg/hr. The units can also be connected directly to a sensor or connected to BMS and if required BACnet interface.

In potable water installations, the scale within the tank is mitigated with flush cycles. Although the output of the humidifier will not be affected by the build-up of scale, the evaporation chamber will have to be removed and cleaned periodically and then replaced.

In pure water applications however, these drain cycles may be greatly reduced or eliminated depending on the purity of the water, effectively increasing the efficiency of the humidifier, and reducing the service required. Neptronic's range of resistive steam humidifiers are often used in process and manufacturing applications where demand is high and where very tight control of the humidity is required, +/- 2%

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is achievable with a resistive humidifier when using Reverse Osmosis water, another common application would be research laboratories.

In both types of units, steam is introduced into the AHU or duct by stainless steel steam lances sized to ensure good evaporation of steam into the airflow. For those retrofit applications where space is tight, or where the AHU section needs to be kept to a minimum, a multisteam steam distribution manifold can be used to ensure the shortest evaporation distance is achieved - with these systems it is possible to evaporate 100kg/hr of steam in less than 500mm. Neptronic's Multisteam HD system is a high efficiency steam distributor that ensures wasted energy is reduced by up to 85%. This includes steam supply consumption and wasted condensate generated by heat transfer from hot channel to air stream, the system eliminates condensation and prevents any wetting.

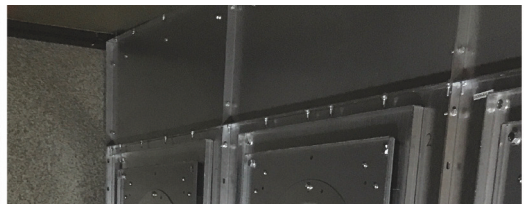
For those in-room applications such as digital print rooms or small test labs, a simple fan head can be installed on top of the humidifier, or remotely, to disperse the steam directly into the space.

Where humidification is concerned, it is important to look at the bigger picture and not just the fact that a humidifier uses energy. Humidifying a building correctly could save a considerable amount of energy as stated above, far outweighing the energy consumption of a self generating steam humidifier.

Selection should be based on the application requirements... Is it a comfort application? do you need the humidity control for a manufacturing process? Is tight control, less than +/- 5% required? Is it a sterile application and / or a 24 hour operation? Is treated water available? All these factors and more are taken into account when selecting the correct technology to use in each specific application, and in many cases steam humidifiers are indeed the right choice and the best engineered solution for a project. As always, it is best to consult humidity control specialists to determine the best solution for each unique application.

So steam does not equate to inefficiency and energy guzzling, it is an excellent solution for many applications being versatile, easy and straightforward to install and very reliable.

Steam humidifiers have certainly not had their day: humidification has all too often been ignored and misunderstood, and with the spotlight on the importance of healthy buildings, cost effective production creating good return on investment, reliability and maintaining accurate humidity control in laboratories and the like, whether it be Electrode Boiler or Resistive, steam humidifiers are definitely front runners when selecting the solution for many humidification applications.



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