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**Touch-Free Restrooms?**

**SmarterBuildings** Buildings June, 2002

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Published in **BUILDINGS**

## Why Humidify?

### *Improving Indoor Air Quality With Humidity*

Properly controlled humidification enhances occupant health and comfort, improves manufacturing processes, and helps preserve building materials and furnishings. In short, any building housing people or things will benefit from proper humidification, and the cost to add humidification is easily offset by gains in processes, productivity, life of materials, and occupant satisfaction.

Bacteria and viruses thrive in dry air. This is why that scratchy sore throat you wake with when staying in a too-dry room lasts for days. Studies have shown that when room relative humidity (RH) drops below 40 percent, absenteeism increases due to respiratory illness. Proper humidification can reduce adult absenteeism as much as 18 percent.



### **Keys to Comfort**

In any humidified environment, levels will fluctuate. Most humidifier controllers can maintain humidity within  $\pm 5$  percent of set point (the desired optimal RH level). Some processes require humidity to fluctuate only within 1 percent of set

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Of course, too much humidity can be unhealthy. Keeping RH levels within a range of 40 to 60 percent not only decreases bacteria and viruses in the air, but hinders the development of fungi, mites, chemical interactions, and ozone production. The result is reduced occurrences of allergic rhinitis, respiratory infections, and asthma among building occupants. To ensure that RH levels do not rise above 60 percent, responsive humidification system control is essential.

Many building materials, finishes, and furnishings are hygroscopic – they absorb, retain, and release moisture. Low RH levels can cause expensive damage to building interiors because as hygroscopic materials dry, they shrink. This can cause carpet and upholstery fibers to become brittle, and can create gaps in wallpaper seams, floor boards, and furniture joints. Low RH levels wreak havoc on historic and artistic artifacts, etc. Maintaining a consistent and adequate RH level will eliminate this deterioration.

Also hygroscopic in nature, the human body will give up its moisture to dry air. As our body's moisture migrates (evaporates) to areas of lower RH, we become cooled, just as when we perspire. Raising the RH level in a room 20 percent slows the evaporation rate and will make the room feel 1-degree warmer. By increasing humidity in a room, you can drop the dry-bulb temperature without a loss in comfort, while typically offsetting the humidification energy costs.

Relative humidity levels affect manufacturing production rates, and product weights,

point. In general, the tighter the control that is required, the more variables that must be carefully managed.

What are some of the variables that affect humidity control?

- Environmental conditions: Duct and room temperature; building envelope.
- Humidifier design: Its ability to provide uninterrupted, continuous service.
- Sensor types, locations, and calibration.
- RH control type: How fast the humidification system can respond to RH

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strength, appearance, and quality. If you've ever known your laser printer to jam on a humid summer day, then you can understand how changes in texture, strength, or weight could affect the high-speed processing of hygroscopic materials. Static electricity also affects processes.

Static electricity can cause high concentrations of oxygen and other gases to explode. These gases are prevalent in hospitals and laboratories. Dust particles, when charged by static electricity, adhere to objects. This can be a critical problem with semiconductor, pharmaceutical, and other electronic processing, where one misplaced dust particle can ruin a chip, a batch, or an assembled component. Maintaining RH levels within a range of 30 to 60 percent will significantly reduce problems associated with static electricity.

Adding humidity to a building preserves materials, improves processes, and enhances health and comfort, and it easily pays for itself with increased productivity and lower heating costs.

Lynne Wasner is a writer for Eden Prairie, MN-based DRI-STEEM Humidifier Co.

fluctuations.

- Controller integration with a building management system.
- Dispersion type used and its absorption capabilities.
- Available absorption distance in the duct or AHU.

In general, a humidification system should be designed for a specific application to ensure good humidity control.

Key to system design will be equipment capabilities and placement of dispersion devices and sensors.

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