Importance of Temperature and Humidity in Hospitals

Facts & figures:

RH (expressed in percentage) describes the amount of water vapor held in the air at a specific temperature at any time, relative to the maximum amount of water vapor that air at that temperature could possibly hold.

At higher temperatures, air can hold more water vapor, and the relationship is roughly exponential—air at high temperatures can hold much more water vapor than air at lower temperatures.

Control of Temperature and Humidity in Hospitals

Temperature and relative humidity affects the airborne survival of viruses, bacteria and fungi. Thus environmental control in hospitals is important because of infectious disease transmission from the aerosol or airborne infection.

Environmental exposure is a common hazard for all such organisms (whether viruses, bacteria or fungi) during this journey between hosts. Factors such as temperature, humidity (both relative and absolute), sunlight (ultraviolet light) exposure and even atmospheric pollutants can all act to inactivate free-floating, airborne infectious organisms.

Maintaining hospital premises at a certain temperature and a certain relative humidity (%rh), likely to reduce the airborne survival and therefore transmission of influenza virus.

Temperature and RH settings in different parts of a hospital differ slightly between summer and winter.

Why the need to measure relative humidity?

Temperature is one of the most important factors affecting virus survival, as it can affect the state of viral proteins and the virus genome. Virus survival decreases progressively at 20.5°C – 24°C then < 30°C temperatures. This relationship with temperature held throughout humidity range of 23%rh– 81%rh.

**Virus:** The survival of viruses and other infectious agents depends partially on levels of RH. At a temperature of 21°C, influenza survival is lowest at a mid-range 40%rh–60%rh. It is also important to note that temperature and RH will always interact to affect the survival of airborne viruses in aerosols.

Temperatures above about 24°C appear to universally decrease airborne bacterial survival.

Fungi: Ventilation systems controlling Temperature and Humidity have a significant effect on indoor levels of airborne fungi, with air-handling units reducing, but natural ventilation and fan-coil units increasing the indoor concentrations of airborne fungi. Dehumidification as well as HEPA filtration can be used to improve indoor air quality.

At High temperatures < 30°C and at high RH < 50%rh may reduce the survival of airborne influenza virus.

Different airborne infectious agents (i.e. viruses, bacteria and fungi) will have differing conditions under which they may be optimally suppressed; it will need to be decided which airborne pathogen poses the most risk to patients and staff alike in hospitals.

Thus, in reducing infectious disease transmission specific environmental control of temperature and humidity is required for Hospitals and healthcare premises.
What solutions can Rotronic offer?

Rotronic has the possibility of offering a complete system to all tyre manufacturers: a proven system that enables the tyre manufacturers to both, control and monitor their process and remain conform to their internal guidelines.

With the combination of both analogue outputs, controlling the air-conditioning, and digital outputs, linked up to the Rotronic HW4 monitoring software, the manufacturer has a clear overview of their manufacturing plant.

Rotronic products:

Humidity and temperature probes:

- **HC2-S**
  Standard humidity sensor, -50...100°C, 0...100%rh, ±0.8%rh and ±0.1K...

- **HC2-SM**
  Steel humidity sensor, -50...100°C, 0...100%rh, ±0.8%rh and ±0.1K...

- **HC2-IM**
  Chrome nickel steel Industrial probe, -100...200°C, 0...100%rh, ±0.8%rh and ±0.1K...

Transmitters:

- **HF3 series**
  With a fixed probe

  2 or 3/4 wire configuration, Various analogue and digital outputs, Display, Low cost...

- **HF5 series**
  For interchangeable probes, 2 or 3/4 wire configuration, Various analogue and digital outputs, Display, All psychrometric calculations available...

Dataloggers:

- **HL-NX range**
  For interchangeable probes
  (up to 7 probes with docking station)
  32MB flash card, Display, Conform to FDA21 CFR Part 11 and GAMP4

Customer benefits:

Accuracy:

Choosing Rotronic gives you the best accuracy on the market. Precise humidity measurements can be obtained: meaning that as the quality of the tyres will remain outstanding with regards to the relative humidity and temperature requirements.

Additionally the accuracy will lead to lower electricity costs based upon the fact that the air-conditioning system will only be used when necessary.

Communication:

With all of the different communication methods, from RS-485, Wireless to Ethernet RJ45, Rotronic can provide the solution for each installation.

Long term stability:

A long term stability with a drift under 1%rh per year (depending on the environment).

Calibration and adjustment:

All of the Rotronic products are digital so the whole calibration procedure can be done via a PC, or directly from the device with the help of the Rotronic humidity standards. Rotronic can also offer an ISO-17025 calibration.
Contact us:

Rotronic is represented in more than 40 countries around the world. An up to date list of all our partners is available at www.rotronic-humidity.com/international