Humidity and air quality in hospitals

Technical bulletin

For over 75 years, Alfa Laval Kathabar has engineered and manufactured liquid and dry desiccant systems for dehumidification and energy recovery applications. Our systems help to improve the reliability, economy and efficiency of any procedural area that is humidity, temperature or microorganism-sensitive. We meet the ever-changing needs of our customers with quality products – providing precise and economical temperature and humidity control.

Alfa Laval Kathabar systems provide sanitized air while efficiently maintaining precise temperature and humidity levels for general and critical care hospital zones. Our energy-efficient systems work in existing or new build health care centers.

Health care:
The statistics are daunting – each year more than 98,000 patients die in US hospitals due to Hospital Acquired Infections (HAI).[1] Concerned health care professionals are realizing that Indoor Air Quality (IAQ) can help heal or potentially harm patients.

The need for IAQ is more acute within surgery suites – where invasive procedures present the greatest infection risk for patients. These suites are typically supplied with significantly cooler air than other areas of the hospital. Lowering air temperature can raise the Relative Humidity (RH) to 75%.

Higher RH can lead to higher infection risk, as noted in *Hospital Infections*: “Humidity, for example, can influence a multiplicity of factors; it can affect the persistence of an agent at its source, its transmission through the air, and the effectiveness of a host’s mucous membranes in resisting infection.[2]”

The solution:
Alfa Laval Kathabar liquid desiccant systems deliver air directly at the required temperature and humidity, regardless of air inlet conditions. The system cools and dehumidifies air in the summer, and automatically humidifies air in the winter – all from simple temperature controls located in the surgery suite.

Airborne bacteria, viruses and molds are removed and killed as air is “scrubbed” by the liquid desiccant solution. Third party research demonstrates the efficacy of the technology on pathogens associated with Healthcare Acquired Infections (HAIs).

System advantages:

- Complete eradication of all microorganisms entrained within the desiccant solution.
- Reduces operating cost through lower utility consumption.
- Eliminates wet cooling coils that promote reproduction of microorganisms.
- Relative humidity control to 45% and lower – even at temperatures below 60°F.
- Highest energy efficiency of any desiccant unit.
- Low-maintenance fiberglass construction.
- Features automatic air humidification in winter, eliminating the need for steam humidification.
- If the hospital has a distributed power or cogeneration system, waste heat may be used to dramatically reduce energy costs.
- Microbiological decontamination – the Kathene solution is bactericidal and virucidal to airborne organisms. Bacteria, mold and viruses are inactivated and removed from both the conditioner and regenerator air streams.

How it works:

Incoming air passes through a flow of Kathene® solution (lithium chloride brine) that dehumidifies or humidifies the air as needed. The temperature of the Kathene, cooled automatically according to load conditions, controls the rate of moisture addition or removal. With moisture control, air scrubbing action is acheived.

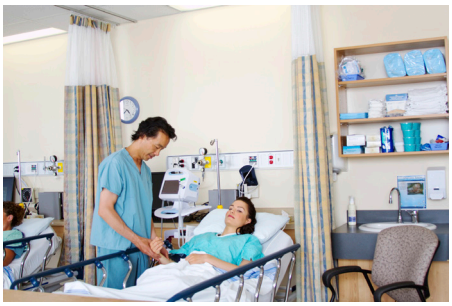
Air sanitizing:

1. The process scrubs the air as it passes through the spray, removing airborne particulates, germs, viruses, etc.
2. All airborne organisms washed from the airstream are neutralized by the liquid desiccant solution.

Surgeries cancelled due to rain:

This situation is more common than not. Most hospital HVAC systems were designed to maintain surgery suites at 68°F with 50% relative humidity. Due to advances in operation procedures (e.g. double gowning, personal protection equipment, etc.), surgeons are requesting suite temperatures of 60°F or lower to alleviate uncomfortable conditions. To deliver temperatures lower than the designed criteria, conventional HVAC systems provide air that is cooler, but also higher in relative humidty.

This super saturated air condenses on surfaces and ceiling coverings in the surgery suite – causing indoor rain. Unlike typical HVAC equipment, Alfa Laval Kathabar dehumidification systems are able to meet the needs of surgery suites requiring lowered temperature and relative humidity levels. Air temperatures of 60°F with relative humidity as low as 30% may be attained.



1. Klevens, R.M. “Estimating health care-associated infections and deaths in U.S. hospitals, 2002.” *Public Health Reports* March-April 2007:22; 160-66.

2. Bennet & Brachman’s Hospital Infections. editor, William R. Jarvis. 5th ed. Philadelphia: Wolters Kluwer Lippincott Williams & Wilkins, 2007.

Liquid desiccant packaged conditioner

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