DESICAiR® Desiccant Dehumidification

Surgical Suites and Healthcare Facilities

The Problem
Surgeries are the source for much of healthcare facilities' profit. Unacceptable environmental conditions can mean cancelled procedures and lost revenues. Worse yet is uncomfortable environments creating greater stress and potential for errors. Surgeons, wearing layers of clothing and protective gear, are requiring cool, dry conditions in order to perform their critical task.

The general hospital environment may be 75°F and 50% RH. These conditions are obtained using standard cooling equipment. However, surgery suites, procedure rooms and lab areas may need 60°F and 50% RH in the space. This would mean a dewpoint of approximately 41°F. These conditions fall outside the range of where typical air handling equipment can perform well. Considering a normal chilled water temperature of 45°F, lower temperature equipment would be required to reach an air temperature of 41°F, and this is just to reach space neutral dewpoint. Re-heat is then required to bring this nearly saturated air to an acceptable supply temperature. If the system is serving multiple areas, the re-heat is likely to be located at each individual area. Another problem with over cooling is the air is nearly saturated until it reaches the re-heat. This high relative humidity can promote fungal growth in the air handling system.

The Solution
DESICAiR® desiccant dehumidifiers can provide a solution to meet these humidity requirements. Desiccant dehumidification provides dry air, which reduces the potential for mold growth in ductwork, creates a more comfortable environment for the physician and increases the chance of success in the procedure.

Using typical cooling methods, air can be

brought to 55°F. This nearly saturated air can be dehumidified using rotary desiccant technology. The desiccant dehumidification process does not rely on condensation as cooling systems do. Water is removed from the air as vapor, resulting in dryer, warmer air. Dewpoints well below 41°F are obtainable. Since desiccants do not rely on condensation for moisture removal, dewpoints below 32°F can be achieved without concern of freezing or the need to defrost. This dry air can be cooled or heated as needed to reach the desired space temperature. Since the dewpoint is well below the air temperature, the relative humidity is low enough to reduce mold growth and prevent condensation.

SATS offers a range of products from a stand- alone desiccant dehumidifier to a package system with cooling, heating and humidification. We also provide a dehumidification module to be incorporated in another manufacturer's air handler. Our H-Trac® and Dew-Trac® control strategies are proven to provide consistent, close humidity control. Since existing steam or hot water can be used for regeneration at most healthcare facilities, installation and operating cost can be kept to a minimum.

DESIGN CONSIDERATIONS FOR DEHUMIDIFICATION

The desiccant system can be utilized in various configurations depending upon the required air conditions and the amount of make-up air used. As a make-up air system, make-up air is pre-cooled to 55°F using existing cooling media. This nearly saturated air passes through the desiccant rotor, resulting in dry, warmer air. This conditioned air can be mixed with return air at an existing air handling system. This mixed air is already at a satisfactory dewpoint, so the existing air handling system simply provides this mixed air at the desired temperature to the controlled space.

When used as a complete climate control system, temperature control is accomplished along with humidity control in one system. Depending on the amount of make-up air and the mixed air condition, pre-cooling may not be required. In this case, make-up air mixes with return air at the dehumidification system. The mixed air passes through the desiccant rotor to be dehumidified. The dry air is then cooled using fluid from the existing chiller and supplied to the controlled space at the desired temperature and humidity.

Only DESICAiR has the H-Trac® and Dew-Trac® humidity control. These control methods compare the humidity setpoint with actual conditions and vary the reactivation energy in response to the humidity load. When loads are less, the reactivation energy is reduced, therefore lowering utility consumption. During periods of no load, the reactivation can be programmed to turn off to further save energy.

DESICAiR® desiccant dehumidifiers can use electric, steam, hot water, propane, or natural gas for reactivation. Units can be configured for indoor or outdoor installation. Cooling, heating and humidification options are also available to provide complete environmental control of the facility. Various air filtration can be accommodated. Double wall, aluminum construction allows for wash down to maintain cleanliness. DESICAiR® desiccant dehumidifiers have proven their benefits over years of use in healthcare facilities, as well as medical device and pharmaceutical manufacturing.