Cool and dry

Albany Medical Center improves humidity control in operating suites

Case story

Albany Medical Center (AMC) is an academic health sciences center in north eastern New York. It includes the 734-bed Albany Medical Center Hospital as well as the Albany Medical College. Founded in 1929, it is one of New York's largest teaching hospitals.

In 2013, Albany Medical Center completed a four-story, 334,400-square-foot, $360 million addition. The new "B-Building" addition holds twenty operating rooms for general, cardio-vascular, neuro, orthopedic and robotic surgery.

The challenge - setting a new standard

After completion of the addition, AMC decided to address uncomfortable conditions in the operating rooms. Due to operational procedures such as double gowning/ gloving during surgeries, required personal protective equipment and the intensive nature of the operations being performed, the cardiologists at Albany Medical Center requested a cooler environment. To alleviate uncomfortable operating room conditions the surgeons determined a preference for a 63°F dry bulb (DB) operating room temperature.

Considering surgeon comfort and the ASHRAE Standard 170 requirement that humidity in operating rooms be maintained between 20 and 60% RH the hospital determined that a new standard of 63(deg.) F dry bulb, and 40% relative humidity to be ideal. The existing heating, ventilating and air conditioning (HVAC) systems were not capable of achieving this new requirement.

Solution

It was not practical to replace the entire existing HVAC system. Instead the decision was made to consider an Alfa Laval Kathabar liquid desiccant dehumidification system. This desiccant system would treat the outside air supplied to the existing operating room air handling units (AHUs) in order to dry the air for the surgical suites.

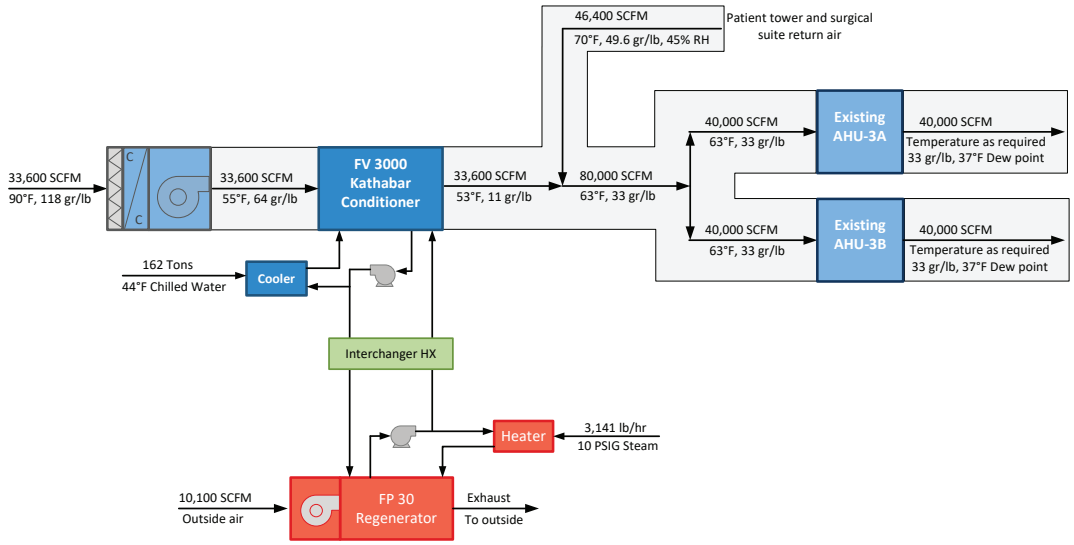
Fitting a tight footprint

Utilizing the custom capabilities of the Alfa Laval Kathabar system, Russ Danforth of FPI Mechanical, Inc. developed the project requirements. The dehumidification equipment needed to be sized and designed to fit into the basement mechanical room. Original plans called for treating both outside air and return air. However, due to the mechanical room's size constraints only outside air could be treated, using a custom multi-piece Alfa Laval Kathabar unit that would fit the space.

Russ said, "***Working closely with the Alfa Laval sales and engineering team, a custom designed solution was developed that suited both the logistics and the physical location within the mechanical room.***"

Final selection of the Alfa Laval Kathabar system included an FV 3000 conditioner and FP 30 regenerator. This equipment conditions 30,000 cubic feet per minute (CFM) of outside air supplied to two existing AHUs for the operating room suites as shown in the schematic diagram. Both existing AHUs are rated for 40,000 CFM each.

Because the conditioner removes the latent load from the outside air, the AHUs only needed to address the sensible loads for the operating rooms, allowing them to work more effectively.



Keeping on schedule

Together, FPI Mechanical and Alfa Laval Kathabar addressed the access constraints to the mechanical room by constructing the conditioner/regenerator in segments, with final assembly on site.

Albany Medical Center had a short timeline for installation to minimize potential disruptions to patient scheduling as well as to account for concurrent construction on an exterior pedestrian walkway being installed at the mechanical space access point. This tight window was the team's foremost priority during the planning process. As arranged, Alfa Laval delivered the complete system in June of 2015 and it was installed during the designated shutdown, eliminating any unanticipated scheduling issues. The final changeover was done during off hours when the operating suites were not in use. Disruptions to patient schedules were completely avoided.

The installation allowed Albany Medical Center to achieve their operational goals. The desired temperature of 63°F DB and 40% RH has been maintained continuously to within +/- 1% RH.

Superior energy savings

Albany Medical Center also received significant economic benefits from the project. To quantify the results, L&S Energy Services (an energy consulting company) was retained to complete a measurement and verification of savings study resulting from the Alfa Laval Kathabar dehumidification system installation. The results demonstrated annual electric savings of 422.4 kW and 1,151,906 kWh. In addition, the eliminated reheat energy more than offset the natural gas used to regenerate the desiccant. The evaluation indicated a net natural gas savings of 19,306 therms per year. Based on this analysis, Albany Medical Center received an energy efficiency incentive of $241,866 from National Grid. The equipment/installation payback is expected in less than two years.

Clean air

In addition, the Alfa Laval Kathabar system greatly reduced microbial contaminants in the outside air supply to the operating room AHUs, which is important in a surgical environment. Microbial sampling of the system demonstrated removal of nearly all bacteria and fungi from the outside air. The desiccant solution's germicidal properties provide additional safeguarding of the critical environment and lower the dew point of the supply air to the chilled water coils in the operating room AHUs. The coils in the AHUs remain dry, preventing wet surfaces that would otherwise promote microbiological growth, further improving air quality.

Results - enhanced comfort and control

The benefits all add up to a successful installation with improved operating room environment, performance, operational savings and surgeon satisfaction. The Alfa Laval Kathabar system provides simultaneous control of temperature and humidity while disinfecting the supply air to the critical space. From an energy perspective, the liquid desiccant dehumidification technology provides the most cost effective method of controlling operating room humidity.

Karen Seward, Albany Medical Center's Director of Facilities Engineering, was very satisfied with the overall process and outcome. Karen said, "***The Alfa Laval Kathabar system was delivered on schedule within our window of opportunity. To date, the system is maintaining the proper set points for the surgical suites. The project went according to plan, and the system has met all of the Albany Medical Center's requirements for the operating room environment and staff.***"

How to contact Alfa Laval
Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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