



Saint Mary's Hospital

Retrofitting 100-year-old Saint Mary's Hospital with a state-of-the-art custom air handler required innovative engineering solutions - the kind Scott Springfield Mfg. Inc. is recognized for in the HVAC industry.

Hospitals are often candidates for HVAC retrofits and upgrades. Their buildings can be in service well over 100 years, but today's medical techniques require state-of-the-art air handling solutions. Managing the patient's physical environment directly impacts the quality of care.

Saint Mary's Hospital exemplified the challenges that occur when air handler updates and retrofits are undertaken. The facility presented significant structural limitations requiring Scott Springfield's custom solutions in both design and installation.

> [LEFT] Saint Mary's stacked unit after installation

SAINT MARY'S HOSPITAL, in Reno Nevada, was opened by the Dominican Sisters in 1908.

100 ton capacity surgical custom air handler fit through the doorway shown below.



SPECIFICATIONS

A **20,000 CFM** make-up air unit, operating at **7.5 inches TSP**

Over 100 tons of cooling & over 1,500,000 BTUH heating

Unit delivers 47°F supply air in summer from 110°F outside air

Stacked unit with 6 fans (4 supply/2 return) minimize footprint, increases reliability

Built in 12 sections - largest piece just 46 inches wide

Section heights of 49 inches (top) and 90 inches (bottom)

Design considerations

Scott Springfield Mfg. Inc. was chosen to manufacture a custom air handling unit to serve the Saint Mary's surgery suite. The retrofit solution required a surgical AHU with state-of-the-art accuracy and reliability. The facility was very old and presented significant structural challenges.

Limited access into the mechanical space and the requirement for redundancy placed exceptional challenges on the air handler design. The existing mechanical room access door measured just 48 inches wide. The only viable solution: a twelve piece unit built to fit through the available access. The stacked design is comprised of four sections on the top level and eight sections on the lower level. Every section fit through the 72 x 48 inch door without sacrificing quality or performance. The largest sections were 46 inches wide and the smallest only 27 inches wide.

The installing contractor, Applied Mechanical Inc., was surprised with how quickly and easily the unique structural angle framed split design assembled in the mechanical room.

Custom air handlers for surgery require a highly redundant design. Multiple fans compensate for any breakdown and allow the system to be certain of proper air volume delivery. Multiple fans also reduce the footprint of the unit and are a great solution for smaller mechanical rooms.

DESIGN CHALLENGE

139 inch tall surgical air handler

100 ton cooling, 1.54MM BTUH heating

20,000 CFM using all outside air

The Saint Mary's Hospital surgical air handler was designed with a fan array of four supply fans and two return fans to ensure redundancy and reliability. Each fan is wired to a variable frequency drive and controlled by a unit-mounted Reliable[™] programmable logic controller (PLC). In order to allow for seamless operation in the event of a PLC failure, a backup PLC was mounted in the air handler.



[**ABOVE**] Six independent variable frequency drives provide the greatest reliability and flexibility to control the four supply fans and two return fans.

[**RIGHT**] PLC controllers and a redundant to monitor and control the fan bundles in the surgical air handler.

Engineering considerations

Surgical suites impose demanding requirements on air handlers. The unit must be exceptionally reliable. The air delivered to the surgery suite must be controlled to provide precise air volume, temperature, humidity and cleanliness. The unit must be serviceable and reliable for decades to come.

FILTERS AND COILS: This AHU was built with a (MERV 8/MERV 14) prefilter bank, as well as a HEPA final filter after the fan. For this application,



[**ABOVE**] IAQ Drain Pan and 304 stainless steel wash-down liner.

all coil ratings and fan selections compensate for lower air density at the jobsite elevation (4,500 feet).

Because the application serves a surgery suite, design criteria required a unit that would provide clean air along with a long operational life.

WATER MANAGEMENT: To prevent corrosion of the inner materials and to allow for cleanability, 304 stainless steel and a wash down liner were used throughout the coil, humidifier and mixing sections. Wash down liner and fully welded aluminum tread plate floor allow Saint Mary's staff to wash out debris from the coils humidifier and chase the water through the floor drain. Penetration of water into the insulation is prevented by the



wash down liner and 1.5 inch water dam - standard on all SSM units.

FAN CONTROLS: The six fans in this unit have independent Danfoss™ Micro-VFD drives to provide individual frequency control. The flow volume through each fan is measured and controlled by the PLC controller. The SSM fan control system allows facilities staff to verify flow volume through each individual fan and change the flow on demand. Redundancy is assured via individual speed control on each fan. This control method also ensures that the velocity profile within a tightly packed unit will remain uniform regardless of inlet condition, uneven filter loading, or discharge location effects. Additionally, the PLC controller allows SSM's air handler to connect to the Saint Mary's Hospital DDC system via BACnet[™].

Summary

Scott Springfield Mfg. Inc. manufactures equipment for custom and industrial air handler markets. We have the capability to effectively meet any of your air handler requirements. Saint Mary's Hospital is one example of the creative range of construction methods and best-in-class engineering solutions we offer for challenging applications. Other products manufactured by Scott Springfield Mfg. Inc. include custom gas-fired heating systems, heat recovery units, custom packaged air conditioning systems and a wide variety of control systems specific to your application.

FOR MORE INFORMATION, contact the Sales and Marketing Department at Scott Springfield Mfg. Inc.



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ISO 9001:2008 FM 67599