

CASE STUDY

New Rooftop Units Specified To Fit On Old Curbs, Saving Thousands In Retrofit Costs At Quail Springs Mall, Oklahoma City

After 23 years of providing year-round comfort to shoppers and tenants, the 13 McQuay rooftop HVAC units at Quail Springs Mall, Oklahoma City, were well beyond the industry norm for life expectancy, and were having trouble keeping up with modern heating and cooling demands. Senior HVAC technician Mark Toomoth determined that maintenance and operating costs justified their replacement.

Quail Springs Mall, owned by General Growth Properties Inc., Chicago, is one of the largest shopping centers in Oklahoma City. With over one million square feet, the two-story mall features 130 stores, including anchors JC Penney, Sears, Foley's and Dillard's. Toomoth's major stumbling block in solving such a large retrofit problem was the 18-inch concrete curbs, the "foundation" of each rooftop unit that carries wiring and ductwork through the roof to the mall below. Replacing them or even re-building them to accommodate new units would be prohibitively expensive.

At a minimum, most rooftop manufacturers' units would require that a three- or four-foot curb adapter be built above the existing curb to accommodate new electrical and duct connections. "Instead of the unit sitting on a low curb, it would be clearly visible above the parapets



Specified to the exact curb dimensions as the original units, the new modular McQuay rooftop units were installed easily and quickly on a Sunday morning before the mall opened. The old unit pictured at left will also be replaced.

which were designed to hide them in the first place," said Toomoth. "It would be unsightly from below." In addition, the added height would make it impossible to access the units for routine service and maintenance without a ladder or catwalk - both of which were unacceptable.

An even more expensive solution would be to completely rebuild the curbs to fit new units. After all, what manufacturer would still agree to make units to fit the same curb size as 23 years before?

New Units Meet ASHRAE 90.1-2001 Requirements

When Toomoth contacted McQuay's representative, Global Logic, Oklahoma City, he was pleased to hear that, yes, McQuay's factory-modular rooftop units could be specified to fit the exact dimensions of the existing curbs. Although Toomoth received bids with lower equipment costs, the bidders could not compete with the lower installed costs of the McQuay units. After that, everything worked like clockwork.



“All they had to do was bring in a crane, pull the old unit off, set the new unit on the curb, and reconnect everything,” said Toomoth. “Electrical or roof modifications were simply not required.”

The new 105-ton RPS rooftop units meet ASHRAE Standard 90.1-2001 for heating and cooling efficiency, which was another key consideration. “Oklahoma will comply with the ASHRAE Standard effective January 1, 2004,” said Toomoth, “and a priority of the project was to select components to meet those standards.” The new standard prescribes maximum energy usage for new construction, additions and system replacements. Complying with the new standard allows the mall's owners to save significantly on operating expenses year after year.

The McQuay units feature a blow-through system design, which requires less conditioned air than draw-through designs to meet the same cooling load. This minimizes the fan and compressor energy consumed for mechanical cooling. In addition, large diameter airfoil fans, variable frequency drive (VFD) fan speed control, high efficiency heat exchangers and economizer “free cooling” contribute to the high energy efficiency of the McQuay rooftop units. Lastly, the blow-through design increases the distance between the fan and the building, so shoppers barely hear the rooftop units.

McQuay's MicroTech II™ controls also simplified the entire project, in terms of both installation and



McQuay rooftop units supply heating, cooling and ventilation to Quail Springs Mall, Oklahoma City.

operation. The controls are factory-installed and tested, requiring minimal time to commission. Plus, the Protocol Selectability™ feature means that the controls interface equally well with any open, standard protocol (in this case, BACnet®). This makes installation easy and lowers the cost of tying in to the building automation system (BAS) - both during installation and over the life of the equipment as the BAS is expanded or upgraded.

Installation Doesn't Interfere With Shopping

The units were configured and tested at the McQuay factory and shipped to the site, where Marc McCormick, mechanical contractor with Air Engineering, Oklahoma City, had responsibility for installation. Again, the easy retrofit played a key role. “The mall obviously requires that the building is adequately cooled and

ventilated whenever it's open to the public, so we could only work when the mall was closed,” he said. “This was such an easy retrofit, we were able to do it all on a Sunday morning before the mall opened. Any other retrofit option would have involved immense quantities of work, such as cutting holes in the concrete roof and rewiring the units. That would have added up to a lot of expensive hours.”

The timetable for retrofitting the 13 rooftop units extends out over the next four years, with three to four units replaced each year. Three are in place already. Ultimately, the longevity of the existing units had the final say in Toomoth's choice of replacement units. Reliable equipment simply doesn't create complaints. “The rooftop units were installed when the mall was built; they've been operating for 23 years, well beyond their expected life cycle,” he said. “And that impressed me.”

