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Custom Packaged Rooftop Systems Contribute to LEED® Gold for Delta Dental of Michigan

case study



Reliability, energy efficiency and an integrated, all-in-one solution topped the list of HVAC requirements for major renovation and new construction at Delta Dental of Michigan's (Delta Dental) 59-acre headquarters campus in Okemos, Michigan (a suburb of Lansing). The company's goal was to grow the size of its headquarters in an environmentally conscious manner. The result is a facility that is energy efficient, filters in natural light and enhances the work environment for Delta Dental employees.

Major Renovation and a New Addition

To meet its goals, the campus was expanded to 300,000 square feet. The interior of the company's existing headquarters building was gutted and refurbished. The renovated, four-story, 160,000 square-foot facility now includes a 40,000 square-foot expansion featuring adjoining wings and a two-story glass lobby. The construction management team at Walbridge was able to keep extensive demolition waste out of landfills and reuse the building frame.

A new 100,000 square-foot building was constructed and connects to the expanded headquarters building by skyway and tunnel. The new building, at four stories, includes open office space, executive offices, a glass-enclosed boardroom and a cafetorium—the building's signature feature—overlooking an enlarged and restored pond. continued

At a Glance

- Custom-packaged rooftop systems are integrated into the architecture, freeing up interior space for more productive uses.
- Factory-built HVAC design provides sole-source responsibility for the major equipment and the mechanical room installation.
- Energy-efficient HVAC design contributes to LEED points earned for "Optimize Energy Performance" and "Outdoor Air Delivery Monitoring".

Case Study: Custom Packaged Rooftop Systems Contribute to LEED® Gold for Delta Dental of Michigan

Custom Packaged Rooftop Systems Support LEED Goals

The master plan engineering team at Albert Kahn Associates, Inc. chose Mammoth custom-packaged rooftop systems to meet the heating, ventilating and air conditioning (HVAC) requirements for both the major building renovation and the adjoining new building. Scott Kemp, P.E., mechanical engineer with Albert Kahn Associates, led the mechanical design of the HVAC.

According to Kemp, Mammoth custom-packaged DX (direct expansion) systems were selected to support the project goal of earning the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) Gold certification for New Construction. "The mechanical systems had to provide excellent, energy-efficient operation. The systems also had to be effective for both the renovation and the new-construction portions of the project."

Mammoth DX systems met the goals to provide efficient mechanical equipment operation. Installation advantages to the owner included single sourcing and keeping most of the HVAC equipment out of the buildings and on the roof.

"The efficiency of the Mammoth air conditioning systems contributed to the overall building performance which, when compared to ASHRAE 90.1 Appendix G baseline, was able to provide an energy cost savings of approximately 14.7 percent."

Scott Kemp, Albert Kahn Associates PE



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The renovated main facility includes a 30,000 square-foot expansion featuring adjoining wings and a two-story glass lobby.

"We wanted to take advantage of the factory labor over a field-built installation to save time and improve quality," noted Kemp. "Sole-source responsibility for the major equipment and for the mechanical room installation was also an advantage."

An Integrated HVAC Solution

"The Mammoth rooftop systems are integrated into the architecture of the building roofs and contain all of the HVAC equipment," said Jeff Wooten, LEED AP, principal with Griffin International, and the Mammoth sales representative on

the project team. "They included Mammoth evaporative condensing DX systems, which are some of the most efficient air conditioning systems built, with significant energy benefits. The Mammoth rooftop systems also incorporate FANWALL TECHNOLOGY® air handling equipment—one of the most efficient ways to move air—and high-efficiency boilers to support the sustainable design requirements of the Delta Dental campus."

UVC lamps, mounted in the airstream, help to provide the purest air possible while minimizing drain pan and coil maintenance. In addition, the evaporative condensing system uses Dolphin® chemical-free water treatment, thereby avoiding the use and handling of toxic chemicals.

The boilers in each Mammoth system are cross-connected for redundancy. The rooftop system on top of the new building also includes domestic water heating to accommodate

both buildings. A third Mammoth system—located in the existing mechanical room in the renovated building—features an evaporative-condensing air conditioning system, sized at 44,800 cfm to augment the load on the building.

Staged Construction

Construction on the two main buildings was staged, in part so that Delta Dental employees could remain on site. The three-phased project began with construction of a remote data center in the back of the site. The new office building was then constructed.

“The new building was completed first so that workers could be relocated there before the old building was renovated,” said Peter Smeekens, senior project manager with Walbridge, the construction management firm that led the project. Delivery of the three Mammoth systems was also staged to meet the construction schedule.

“The overall coordination with John E. Green Company, the installing contractor, went well



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The new building, at four stories, includes open office space, executive offices, a glass-enclosed boardroom and a cafetorium overlooking an enlarged and restored pond.

and as planned,” Smeekens said. “John E. Green Company did a fine job with the installation and Griffin International provided excellent support as the Mammoth representative,” added Kemp of Kahn Associates. “Overall, the installation went very smoothly.”

Commissioning: A Joint Effort

Walbridge’s proprietary V-Start program initiated the commissioning effort for the mechanical systems at the Delta Dental campus. “Following our documentation of mechanical equipment metrics,

commissioning of systems across the facilities was a joint process,” Smeekens of Walbridge said. Third-party commissioning on the facilities was provided by Albert Kahn Associates for the two office buildings and ThermalTech Engineering of Cincinnati for the remote data center.

Delta Dental looks forward to many years of occupant comfort, reliable service and energy efficiency from the Mammoth custom packaged rooftop systems.



A Mammoth custom packaged rooftop system supplies 233 tons of cooling and 6,000 MBH of heating to the renovated main facility.



The rooftop system on the new facility provides 151 tons of cooling and 8,000 MBH of heating. It also provides 200 MBH of domestic water heating for both facilities with a 500 gallon storage tank.

LEED Point Specifics

The two Mammoth custom-packaged systems on the roofs and the Mammoth mechanical systems located inside the mechanical room of the renovated building all contributed to the Delta Dental campus earning LEED Gold certification. Specifically, the units contributed to outdoor air delivery monitoring (EQc1) which supports occupant comfort and well-being as well as overall building energy efficiency. They also contributed to EAc1, Optimize Energy Performance, which reduces the building operational costs when compared to standard HVAC systems. One point was earned for Outdoor Air Delivery monitoring and three for Optimize Energy Performance.

"The efficiency of the Mammoth air conditioning systems contributed to the overall building performance which, when compared to ASHRAE 90.1 Appendix G baseline, was able



Photo by ©Fred Golden

to provide an energy cost savings of approximately 14.7 percent," Kemp said.

In addition to the high-efficiency air conditioning and boiler systems, additional LEED program credits were granted based on a number of sustainable design features at the Delta Dental campus. These include the use of both vegetative and white-membrane roofs that minimize

the heat island effect, reduce storm water runoff, filter pollutants and provide natural thermal insulation. Other sustainable design elements include thermally efficient windows, low-energy lighting and daylight harvesting to reduce electricity consumption.

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