



Case Study – Mount Vernon

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICE BUILDING / RETAIL / SPECIAL



Carrier Preserves Mount Vernon's Past and Protects Its Future

Project Objectives

The 260-year-old home of George Washington, Mount Vernon, VA, was vulnerable to damage from weather fluctuations and humidity. Many artifacts could not be housed there and long-term preservation of the structure and its contents was a concern. Expertise in climate control for historic preservation was needed to replace the vintage 1899 heating system with modern HVAC equipment – not only to select the right components to keep the historic treasures safe, but to install the new system without damaging or visibly altering this national landmark.

Solution

Carrier's team of preservation cooling experts designed a system that houses air handlers in underground vaults, while keeping ductwork out of sight in closets and between rafters. The air-cooled, chlorine-free Ecologic™ chiller – which also cools other buildings on the grounds – was installed 200 yards from the mansion, hidden by trees. Most importantly, the new system is designed to avoid condensation problems that a modern HVAC system could cause in an uninsulated, wood-frame structure like Mount Vernon. Room and in-wall sensors continuously detect moisture content, enabling the Carrier controls to adjust humidity levels before condensation has a chance to form.

"Frankly the prospect of installing an air conditioning system in the mansion had always terrified us because of the potentially damaging effects it could pose to a structure of this age and historical significance.

The mansion is a one-of-a-kind original – not a restoration."

James C. Rees, IV,
executive director of
Mount Vernon
Estate & Gardens



Case Study – Mount Vernon continued

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“Climate control is one of the reasons we will be able to bring home so many of Washington’s artifacts, which have been maintained by collectors and museums around the country.”

Carter King Laughlin,
Mount Vernon curator

Project Synopsis

George Washington’s Mount Vernon is one of the nation’s most treasured historic landmarks. To ensure that future generations would be able to enjoy this beautiful mansion and other buildings on the estate grounds, preservationists called on Carrier to install a state-of-the-art HVAC system. Proper climate control would not only preserve the buildings’ infrastructure, but also protect the valuable artifacts housed inside. In fact, many items of significant historic interest could not be showcased in the mansion due to the uncontrolled indoor environment.

The project demanded significant expertise in preservation cooling. The Carrier team worked with the Mount Vernon staff for nearly two years to design a system that would provide precise climate control with minimal impact on the buildings. And there could be no possibility of damage from condensation problems, which can result from heating, cooling and humidity control in an uninsulated, wood-frame structure like Mount Vernon. The installation challenges were significant as well. Equipment had to be hidden from view as much as possible, both inside and out. Another concern was the environmental impact of the equipment and the future availability of refrigerant to keep the new system running.

The solution included an air-cooled Ecologic™ chiller, which uses chlorine-free, non-ozone depleting HFC-134a refrigerant, installed about 200 yards from the mansion and hidden from view by a tree line. Two of the system’s six central station air handlers are housed outside the mansion in below-ground vaults. Inside, the ductwork was carefully snaked through closets and between rafters, hiding it from view and preserving the building’s structural integrity. Multiple humidity sensors continually detect moisture levels in the air and inside the walls, enabling adjustments to humidification and preventing the formation of condensation. The chiller also cools the estate’s museum, servants’ hall and greenhouse, all recently renovated.

In addition to the historic buildings’ new HVAC equipment, Carrier also installed air conditioning in the director’s residence. Two high efficiency 12.0 SEER WeatherMaker® units were chosen for their energy-saving operation and their use of Carrier’s non-ozone depleting Puron® refrigerant.

The benefits of the new Carrier system are many. A valuable part of our nation’s history will be protected and preserved for future generations. Artifacts including documents, china, furniture and personal memorabilia will now be showcased in the home where they were originally used. And tourists visiting historic Mount Vernon will be more comfortable, too.

Project Summary

Location: Mount Vernon, VA

Building Age: 260 years

Project Type: Replacement

Building Type/Size: Wood-frame construction (mansion)/ Three-story

Building Usage: Historic landmark/museum

Objectives: Provide modern, environmentally sound climate control to protect and preserve historic structure and artifacts; install HVAC system without damage or alteration to structure

Major Decision Drivers: Expertise in preservation climate control; environmentally-friendly equipment

Design Considerations: Equipment must be hidden from view; minimal impact on structure

Total Cooling (tons): Ecologic chiller: 115

HVAC Equipment: Model 30GX Ecologic air-cooled HFC-134a chiller; two WeatherMaker model 38TXA Puron refrigerant

air conditioners; six model 39T central station air handlers

Unique Features: Preservation installation

Project Cost Range: \$100,000 to \$500,000

Installation Date: 1998

Contractor: Calvert-Jones Co., Inc.

For more information, contact your nearest Carrier Representative, call 1.800.CARRIER or visit our web site at www.carrier.com