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Case Study – Huntsville Aquatic Center

EDUCATION / HEALTHCARE / LODGING / GOVERNMENT / OFFICE BUILDING / RETAIL / SPECIAL



Huntsville Aquatics Center Uses Captured Heat from Cooling, Dehumidification to Heat Pool Water via Carrier Heat-Recovery Technology

OBJECTIVES:

The City of Huntsville, Alabama, decided to renovate and expand their 40-year-old Natatorium, home to one competition-sized pool, to provide state-of-the-art recreational, therapeutic and competition swimming facilities for users ranging from local residents to nationally-competitive swim teams. In addition to providing expanded opportunities for the community, the City planned to use the renovated facility to attract swim competitions, enhancing the regional economy. City officials reviewed proposals from a variety of firms, including a unique Carrier-based heat recovery design created by Mims Engineering on behalf of the Nola | VanPeurse Architects team.

SOLUTION:

The City of Huntsville selected Mims's design for the heating, ventilating and air conditioning (HVAC) system at the new Aquatics Center. Rather than opting for the specialized water-heating equipment traditionally used in the industry, Mims specified two AquaForce® 30XW chillers; two AquaForce® 30XA chillers; two Aero® 39MN air handlers; one Toshiba Carrier Variable Refrigerant Flow (VRF) system; and one Carrier 62D dedicated outdoor air system (DOAS). The system provides excellent indoor air quality, comfort cooling and critical dehumidification in the pool areas, locker rooms, lobby, and the 1,400 spectator seats. The heat from the 30XW chillers' operation is captured and used to heat the water in the new competition pool and the therapy pool. Mims Engineering won a prestigious award from the American Council of Engineering Companies for the innovative, energy-efficient design, and the Huntsville Aquatics Center has become a popular destination for high-profile swimming competitions.

Carrier System Provides IAQ, Comfort Cooling and Heat Recovery



A Carrier-based design centered on two AquaForce® 30XW heat recovery chillers uses heat captured from cooling and dehumidification to provide heated pool water for the competition and therapy pools at Huntsville Aquatics Center.



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“First costs are comparable [to traditional aquatics center systems], yet the Carrier heat recovery system delivers better energy efficiency, as well as excellent indoor air quality.”

Kevin Mims, Principal,
Mims Engineering



SYNOPSIS:

The City of Huntsville, Alabama, is home to a strong competitive swimming culture. Recently, the City managers decided to renovate and expand their 40-year-old Natatorium (home to one competition-sized pool) to provide state-of-the-art recreational, therapeutic and competition swimming facilities for local residents, as well as national and international competitive swim teams. The new \$22M, 56,409 ft² facility was slated to include a second competition-sized pool, extensive spectator capacity, and a wheelchair-accessible, warm-water therapy pool, as well as locker rooms. In addition to providing expanded opportunities for the community, the City planned to attract swim meets, enhancing the regional economy.

City officials reviewed heating, ventilating and air conditioning (HVAC) proposals from a variety of firms, including a unique Carrier-based heat recovery design created by Mims Engineering on behalf of the Nola | VanPeurse Architects team. Mims used Carrier’s Hourly Analysis Program (HAP) software to create the design.

Mims’s HVAC system design was selected for the new Aquatics Center. Rather than opting for the specialized water heating equipment traditionally used in the aquatics industry, Mims specified two AquaForce® 30XW chillers; two AquaForce® 30XA chillers; two Aero® 39MN air handlers; one Toshiba Carrier Variable Refrigerant Flow (VRF) system; and one Carrier 62D dedicated outdoor air system (DOAS). The system provides indoor air quality, comfort cooling and critical dehumidification in the pool areas, locker rooms, lobby, and the 1,400 spectator seats. The heat from the 30XW chillers’ operation is captured and used to heat the water in the new competition pool to 78° F and the therapy pool to 90° F.

Kevin Mims, Principal at Mims Engineering, said, “This HVAC system is more robust and provides better redundancy than traditional aquatics systems. First costs are comparable, yet the Carrier heat recovery system delivers better energy efficiency, as well as excellent indoor air quality, which can be a real issue in pool areas, where chlorine and humidity are a challenge. The system was also easier to install than traditional equipment, and has been operating well.”

The AquaForce 30XW is a water-cooled screw chiller that provides high efficiency cooling because of its excellent part-load efficiency. It uses environmentally sustainable R-134a refrigerant, and has a small footprint, making it well suited for retrofits or new construction. The 30XW chiller has heat recovery capability up to 140° F.

Another benefit of the Carrier equipment is its ability to integrate seamlessly with third-party building automation systems (BAS). Chris Folsom, Senior Sales Engineer for Carrier Commercial Applied Equipment in North Alabama, said, “The City of Huntsville uses a standardized controls system across all their facilities, and the Carrier HVAC equipment at the Aquatics Center integrated very well into that network.”

Serving approximately 238,000 people a year, the Center now offers swim lessons, exercise classes and wheelchair-accessible water-based physical therapy. It has also quickly become a popular destination for high-profile swim competitions. In its first 8 months of operation, it hosted three competitive meets that generated \$3.5M in revenues.

Ricky Wilkinson, Director of General Services for the City of Huntsville, said, “The Aquatics Center is the only facility in the region with two 50-meter pools and a therapy pool under one roof. This means when we host swim meets, we can offer athletes a dedicated pool for warm-ups and cool-down while the events are occurring in the other competition pool.”

The original competition pool is currently being integrated into the Carrier heat recovery system, which will produce additional energy savings in the future.

Project Summary

Location: Huntsville, AL
Project Type: New construction/renovation
Building Size: 56,409ft² (building expansion)
Built: 2017
Facility Usage: Public swimming, therapy and competition venue
Objectives: Provide comfort cooling/dehumidification to pool and ancillary areas of

public swimming facility; provide heated pool water for competition and therapy pools

Equipment: Two AquaForce® 30XW chillers; two AquaForce® 30XA chillers; two AERO® 39MN air handlers; one Toshiba Carrier Variable Refrigerant Flow (VRF) system; one Carrier 62D dedicated outdoor air system (DOAS)

Total Cooling Tons: 820

Major Decision Drivers: Carrier-based heat recovery design provided robust, redundant design with better efficiency than traditional specialized aquatics facility water heating equipment

Unique Features: Design uses captured heat from pool-area dehumidification to heat pool water; provides efficient comfort cooling/dehumidification for pool and ancillary areas of public facility

Installation Date: 2017