

Churchill Downs Gets an IAQ Grooming

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Renovation Offers Comfort in Smoking Areas

LOUISVILLE, Ky. — Lift your Mint Juleps for a toast the first Saturday in May. The 133rd running of the Kentucky Derby, a stakes race for three-year-old thoroughbred horses, will take place at the recently renovated Churchill Downs facility.

The race, which is staged annually in Louisville, caps the two-week-long Kentucky Derby Festival. Outstanding comfort, especially IAQ, was a prime consideration for the historic landmark's owners.

\$121 MILLION RENOVATION



Outstanding comfort, especially indoor air quality (IAQ), was a prime consideration for the owners of the historic Churchill Downs, where the Kentucky Derby is run. The Downs began its expansion-renovation project in 2002. The finished project includes new grandstands, Millionaires Row and Jockey Club suites, a new clubhouse, and renovation of the original twin spires.

Churchill Downs began its monumental expansion and renovation project in 2002, under the direction of architects and engineers from the Louisville firm of Lockett & Farley. The renovation lasted almost five years.

The project included new grandstands, Millionaires Row and Jockey Club suites, a new clubhouse, and a renovation to the original twin spires. The renovation has added three new stories to the main spectator facility, taking the present structure to a height of more than six stories. The project was completed in two phases.

Three main objectives impacted the HVAC design criteria for the sales team from Harshaw Trane in Louisville:

- First, the larger facility needed to be capable of handling larger crowds for a variety of events. The ability to provide a larger venue allows the facility to be used for other events, such as concerts. The facility is off to an auspicious start in this regard; Churchill Downs will be hosting The Police and Sting on July 14.
- The second objective focused on comfort and performance. Club suite owners spend a lot of money for their privileges. Anything less than thorough comfort would not be acceptable. Comfort parameters addressed by the HVAC system include ventilation, air filtration in a smoking environment, and temperature and humidity control — without compromising efficiency or simplicity. Churchill Downs ownership wanted an efficient system that would be easy to understand, operate, and maintain.

• Last but certainly not least, the project had architectural considerations. The new system replaced mostly packaged rooftop units and split systems. Churchill Downs' owners wanted the new mechanical equipment hidden from view to maintain the aesthetics of the historical landmark.

IAQ AND HVAC

According to John Dorn, Trane sales engineer, "The system was designed to meet the specific needs of the new Churchill Downs facility. They had a clear understanding of what they wanted and that allowed us to tailor the equipment to meet their objectives."

For Phase 1, engineers chose a low-temperature, low-flow, variable-primary-flow (VPF) system capable of supplying 38°F water with two 1,000-ton chillers. The system included one Systecon water-source heat pump package and a large number of Trane air-handling units, some inside and some outdoors where they could be

hidden from view. Several of the air-handling units were fitted with Dynamic V-Bank air cleaners for filtration and odor control.



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The VPF design eliminates the need for constant-flow chiller pumps and uses variable-flow chilled-water pumps to circulate water through the chilled-water loop. The design adds a modulating bypass valve in the bypass line to deliver the amount of water necessary to maintain the minimum evaporator-flow limit of each operating chiller. By contrast, the bypass line in a primary-secondary system helps ensure constant chiller flow at all times.

Like the secondary pump in a primary-secondary system, the pumps in a typical VPF system operate to maintain a target differential pressure, the designers said. As the plant controller stages the chillers on and off to match cooling capacity with system load, the difference between the return-water and supply-water temperatures remains nearly constant.

A 400-ton packaged, air-cooled chiller was used to condition the facility until the completion of the main central chilled/hot-water plant during Phase 2.

Phase 2 included Millionaires Row, the clubhouse, and anything else that had yet to reach the finish line. The permanent, 2,000-ton central plant and two Tower Tech Inc. cooling towers were installed during this phase.

Two built-up, 175,000-cfm air-handling units serving the majority of Phase 2 wagering facility were fitted with two and one-half stories of V-Bank air cleaners for filtration. The IAQ products use electronic polarized media to remove up to 97 percent of particles down to 0.3 microns in size; they also are effective at capturing odors and gas-phase contaminants, the manufacturer said.

The entire system is controlled by a Trane Tracer Summit building automation system, which maintains the desired indoor comfort conditions, as well as controlling energy consumption on a consistent basis. This single, integrated system is accessible over a Churchill Downs internal network.

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