

## Multistack and eH<sub>2</sub>O Team Up at Houston Hotel

New Technology Chiller, Water Treatment Save Significant Energy and Water Costs

Houston, Texas

### Multistack® chillers provide these advantages:

- Ideal for renovation, retrofit projects. Modular design eases installation in limited-space mechanical rooms. Modules fit through standard-width doors and into passenger elevators
- N+1 redundancy, ideal for critical cooling applications
- High efficiency and reliability with Danfoss Turbocor Mag-Lev™ compressors
- Low maintenance requirements
- Fast delivery

### eH<sub>2</sub>O pulse water treatment benefits:

- Keeps HVAC system components and heat exchangers free of scale, maximizing efficiency while reducing energy and maintenance costs
- Effective water treatment that provides extreme water conservation
- Significantly reduces makeup water needs and expense
- The Green way to water treatment by eliminating water treatment chemical expenses, storage and handling, and eliminates chemical pollution



Multistack modular chillers feature efficient, reliable MagLev™ compressors.

In 2010 the 12-story, 287-room Holiday Inn at the Texas Medical Center on South Main Street in Houston initiated a renovation project that included replacing the hotel's two 30-year-old centrifugal chillers that were nearing the end of their useful life. Air-conditioning a large hotel in Houston, Texas, is a tough job requiring top quality, efficient and reliable HVAC equipment to keep guests comfortable. In addition to the extremely warm and humid summertime conditions, water treatment for air conditioning chiller systems is an absolute necessity—compounded by the fact that the State of Texas has weathered some of the most extreme droughts in recent history, making water resources even more valuable. Here's how this major Houston hotel completed the project, is providing excellent guest comfort, saving money and helping to protect the environment.



The Holiday Inn Medical Center at 6800 Main Street in Houston, Texas, is a popular destination due to its very close proximity to the MD Anderson Cancer Center, Saint Luke's Health System and Texas Children's Hospital at the Texas Medical Center.

### Multistack Chillers Ideal for Retrofit Applications

Saul Escobar, Building Engineer at the Holiday Inn (which manages the hotel for FelCor Lodging Trust Inc.), said, "We replaced two centrifugal chillers that were installed when the hotel was built in 1980. We chose the Multistack® water-cooled centrifugal chillers for their quality, efficiency and economy. They are running very well."

The hotel decided to install three 80-ton Multistack centrifugal chillers equipped with MagLev™ compressors in early 2010. In the summer of 2011 a 180-ton Multistack chiller with a FlexSys™ controller was installed.

Multistack modular chillers are ideal for replacement projects. The modular design of these chillers easily fit through standard, single-width doors and into passenger elevators. This makes installation easier and less costly by eliminating special lifting equipment and saves significant amounts of jobsite labor needed to disassemble and reassemble non-modular chillers. Multistack chillers are also factory charged and run-tested, simplifying jobsite startup.

Continued on next page...



“We chose the Multistack water-cooled centrifugal chillers for their quality, efficiency and economy. They are running very well.”

– David Kohutek,  
VP of Engineering,  
FelCor Lodging Trust

*Left, one of the Multistack modular chillers installed at the Holiday Inn Medical Center. At right, is the eH<sub>2</sub>O pulse-powered water treatment system that removes minerals from the HVAC water system without the need for water treatment chemicals or large quantities of makeup water.*

David Kohutek, Vice President of Engineering for hotel owner FelCor Lodging Trust (which owns more than 70 major hotel properties in the United States), said, “We started using the Multistack chillers with the MagLev™ compressors several years ago. They’ve performed very well for us. They’re very efficient and also easy to get into cramped mechanical rooms.”

The Multistack chillers provide an efficiency advantage by running only as many compressors and refrigeration circuits as needed to meet actual cooling load. Multiple compressors and refrigerant circuits provide redundancy to assure hotel guest comfort.

Energy consumption of the 240-ton Multistack chillers installed at the Holiday Inn Medical Center is only 0.69 kW per ton-hour at full load and 0.347 kW/ton-hour at 50 percent load. The 180-ton chiller consumes only 0.67 kW per ton-hour at full load and 0.310 kW per ton-hour at 50 percent load. In addition, the Multistack chillers require significantly less energy to start as compared to a traditional large centrifugal chiller—resulting in significant demand charge avoidance.

Maintenance and serviceability are also much easier. With the MagLev oil-free compressor design, there’s no compressor maintenance. The micro-refrigerant charge reduces service and maintenance and means that Multistack modular systems are nearly always compliant with ASHRAE 15 and CSA B52 standards. As a result, ventilation, monitoring, and SCBA equipment is not required in many installations, eliminating significant costs and installation delays often associated with chiller replacements in older buildings.

Another factor in Holiday Inn’s choice of Multistack chillers was availability. Multistack built and shipped the chillers when needed by the customer. The 180-ton chiller’s operation is controlled by the MagLev™ FlexSys™ controller that provides fingertip access to all important operating and system information through a simplified, integrated 15” SVGA full color touch screen. No laptop computers, special programs or cables are needed to field commission, complete system tuning or initiate compressor and system diagnostics. Documented, sustainable energy savings and reductions in a facility’s “carbon footprint” are among the FlexSys controller deliverables. For example, a color-coded “energy” bar continuously monitors compressor performance while both historical and instantaneous graphics are available to document compressor performance. Multistack chillers are ideal for hotel installation as they are inherently quieter than conventional chiller systems. Multistack uses a variety of techniques to insure quietness, including specially selecting compressors for the application and using the trademark Multistack panel system.

#### **eH<sub>2</sub>O Pulse System Cleans Up**

Water in the Houston area has a high concentration of minerals that will quickly scale and foul chiller system heat exchangers and cooling towers. After installing one of the new chillers, Multistack representatives noticed heat exchanger fouling and recommended that the Holiday Inn work with eH<sub>2</sub>O LLC of South Lyon, Michigan, to install eH<sub>2</sub>O’s Tri-Tron pulse-powered water treatment system to not only clean up the heat exchanger, but prevent fouling of the other new Multistack chillers’ heat exchangers.

*Continued on next page...*



*The eH<sub>2</sub>O non-chemical water treatment system including Tri-Tron pulse-powered mineral precipitation device, sanitron ultraviolet purified with automatic cleaning, and Microtron conductivity controller.*

Saul Escobar described the water treatment situation at the hotel prior to and after installing the eH<sub>2</sub>O pulse system: "We were having a lot of issues with heat exchanger strainers clogging up due to the hard water here. We had to clean the strainers once a week. Since installing the eH<sub>2</sub>O system we only need to clean the strainers once every three months. Our HVAC system water conductivity is now almost always below a 1200  $\mu\text{S}/\text{cm}$  (microSiemens) level."

The conductivity levels cited by Escobar are documented on the system's log sheets and validate the eH<sub>2</sub>O system's effectiveness in keeping the water systems clean, thereby drastically reducing the need for makeup water.

The eH<sub>2</sub>O system provides outstanding scale, corrosion and microbiological protection—chemical free and U.S. EPA accepted—preventing heat exchanger fouling, improving chiller and cooling tower performance and significantly reducing make-up water expense. In fact, water that has been treated by the eH<sub>2</sub>O pulse system is considered secondary-use water and exempt from most water budget and rationing legislation. In addition to protecting the Multistack chillers and HVAC equipment, the Holiday Inn is saving significant maintenance and service costs.

### How the eH<sub>2</sub>O System Works

Water conductivity in the HVAC system is monitored by the eH<sub>2</sub>O Microtron digital controller. This controller commands an electrically-actuated ball valve to open when water conductivity reaches a level of 1350  $\mu\text{S}/\text{cm}$  conductivity, routing water and dissolved minerals through the Tri-Tron flow cell and pulse applied field created by the generator and probe. The ball valve closes when water conductivity reaches 1250  $\mu\text{S}/\text{cm}$ .

When the dissolved minerals encounter this charge, they precipitate out as very fine calcium carbonate crystals and bond into larger conglomerates that are filtered out, preventing them from forming scale and damaging heat exchanger surfaces and HVAC system components. The process also raises the pH of the water for improved corrosion control. Conglomeration also encapsulates bacteria and other organics in the water—water clarity with filtration is remarkable while providing microbiological control. The pulse energy itself disrupts bacteria so they cannot reproduce for added microbiological control.

The eH<sub>2</sub>O treatment system also includes the Sanitron ultraviolet purification component for additional microbiological control and is U.S. government approved for Legionella control.

**"The eH<sub>2</sub>O system performs very well. It has done a good job cleaning up the water system at the Holiday Inn Medical Center. It has really cleaned up the system and, of course, the cleaner it is, the greater the efficiency of the HVAC system."**

– David Kohutek,  
VP of Engineering,  
FelCor Lodging Trust

Unlike most water treatment systems, the Tri-Tron pulse system significantly reduces dissolved solids concentration—normally achieved by bleeding or discharging water, requiring replacement with fresh city water that has a much lower dissolved solids concentration. In addition, potentially hazardous chemicals are usually added to conventional water treatment systems to control scale, corrosion, and microbiological growth in the cooling tower water. As a chemical water treatment system bleeds these high dissolved solids, the chemicals and water are discharged into the

*Continued on next page...*

sewer and then fresh water and chemicals are injected into the system. Chemical water treatment is wasteful, inefficient and harmful to the environment.

### Benefits

Because the eH<sub>2</sub>O system removes minerals from the system via filtration without dumping and dilution, water conservation is significant—as much as a 35- to 90-percent reduction compared to chemical water treatment systems. The Holiday Inn Medical Center is realizing a 44 percent water conservation savings due to the eH<sub>2</sub>O system.

eH<sub>2</sub>O Owner and President, Rob Peterson, says that since installing the Tri-Tron pulse system in June, 2011, the Holiday Inn has had no water treatment problems while saving significant money in terms of maintaining optimum HVAC efficiency, reduced maintenance costs and eliminating chemical water treatment costs.

David Kohutek said, “The eH<sub>2</sub>O system performs very well. It has done a good job cleaning up the water system at the Holiday Inn Medical Center. It has really cleaned up the system and, of course, the cleaner it is, the greater the efficiency of the HVAC system.

“We’ve installed eH<sub>2</sub>O systems at other hotel sites and we’ll be installing more. We’re very pleased with it. We’re typically saving \$300 a month at hotels because we don’t have to purchase water treatment chemicals. And it’s the green thing to do. We also don’t have to store and handle these chemicals.”

Kohutek adds, “We’re very pleased with the service and support that we get from both Multistack and from Rob Peterson at eH<sub>2</sub>O.”

The Holiday Inn Medical Center is not only saving significant energy costs through improved air conditioning system efficiency; they are saving significant operation and maintenance labor costs, make-up water costs and have eliminated the cost of water treatment chemicals.

For more information about Multistack chillers, go to: [www.Multistack.com](http://www.Multistack.com); for more information about eH<sub>2</sub>O pulse water treatment systems, go to: [www.eH2O.com](http://www.eH2O.com)

“We’ve installed eH<sub>2</sub>O systems at other hotel sites and we’ll be installing more. We’re very pleased with it. We’re typically saving \$300 a month at hotels because we don’t have to purchase water treatment chemicals. And it’s the green thing to do. We also don’t have to store and handle these chemicals.”

– David Kohutek,  
VP of Engineering,  
FelCor Lodging Trust



1065 Maple Avenue, Sparta, WI 54656 • (608)366-2400 • [www.multistack.com](http://www.multistack.com)

©Multistack, LLC 2011

