

# CHILLER & COOLING BEST PRACTICES

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March 2018



## COOLING SYSTEM OPTIMIZATION

**12 Chiller Plant Optimization Saves Energy, Maintains Stable Lab Environment**

**15 Controlled Partial Electrolysis Optimizes Process Water Treatment**

## COOLING TOWERS & CHILLERS

**20 How FM APPROVED Cooling Towers Help Reduce Risk**

23 2018 AHR EXPO SHOW REPORT



# CX ENERGY 2018 CONFERENCE & EXPO APRIL 23-26 LAS VEGAS, NV

## *The Premier Event in Commissioning Test & Balance Energy Management*

### WHO ATTENDS?

- Commissioning Providers
- MEP Engineers
- Energy Managers
- HVAC Testing Professionals
- BAS Experts
- Utilities
- Architects

### PROGRAM HIGHLIGHTS:

- Fundamentals of Test & Balance
- Using a Variable Flow Chiller in a Central Plant
- Energy Saving Trends for Data Center Cooling
- Testing HVAC Water Systems
- Re-Commissioning an Industrial Gas Chiller
- Demand Response Programs
- ASHRAE Air Flow Requirements and Solutions



CxEnergy technical presentations are approved for the AIA (LU/HSW) and USGBC LEED General Education CE.

## Pre-Conference Test & Balance Seminar for CxAs, Engineers & TAB Professionals

Tuesday, April 24  
8:30 am – 2:30 pm

*Separate Registration Required*

A Get-Acquainted Reception precedes the seminar on Monday, April 23, 5:00 pm - 6:30 pm

- Kitchen Hoods and Components
- USP 797/800 for Healthcare Pharmacies
- Air Velocity Measuring Instrumentation
- Smoke Control Verification — Airflow Measurement



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# COOLING SYSTEM OPTIMIZATION

## 12 Chiller Plant Optimization Saves Energy, Maintains Stable Lab Environment

By James Johnson, University of Maryland IBBR and Jonathan Kosobucki, Optimum Energy

## 15 Controlled Partial Electrolysis Optimizes Process Water Treatment

By Michael Boyko and Henry Mohrschladt, Dynamic Water



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# COOLING TOWERS & CHILLERS

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# FROM THE EDITOR



The Institute for Bioscience and Biotechnology Research (IBBR), at the University of Maryland, operates a 900-ton chiller plant accounting for most of the energy consumption of the facility. Optimum Energy provides us with an interesting story of the control software they installed to reduce the energy consumption from an average of 0.9 kW/ton to 0.60 kW/ton.

Roche Molecular Solutions operates two 756-ton cooling towers and three ammonia chillers totaling 1,600 tons. In order to mitigate bio-contamination on wet surfaces of the closed loop evaporative cooling towers, engineers decided to employ a Dynamic Water UET water treatment process using controlled partial electrolysis. This interesting case study examines this technology able to remove impurities, minimize scaling, reduce corrosion and eliminate bio-contaminations throughout the process equipment.

SPX Cooling Technologies provides us with an article on FM APPROVED cooling towers aimed at reducing potential property loss liabilities due to fires. Functioning cooling towers may contain a variety of combustible materials and dry areas which could catch fire when water flow is temporarily suspended. They state more and more projects are requesting this approval which complies with a FM Global Approval Standard for Cooling Towers, Class Number 4930 covering all types of tower designs.

The 2018 edition of AHR EXPO, held in Chicago, got the year started in style with record numbers of attendees and exhibitors. We hope you enjoy our Show Report on chiller, cooling tower and cooling system technologies. It's worth noting what a positive business environment we are all experiencing. The optimism is palpable and virtually all businesses I speak with are planning for growth – knock on wood!

This is a special year for us as we launch the inaugural 2018 Best Practices Expo & Conference, September 17-19, 2018 at the Chicago O'Hare Crowne Plaza. With the simple goal being to help plants improve profitability and sustainability, we are excited to bring experts and users together to learn, share and view the latest "Best Practice" energy conservation measures (ECMs) and technologies in compressed air, blower, vacuum and cooling systems. So far chiller and cooling system firms like MTA, Nano and Hydrothrift have already committed to participate. Please consider registering for the event!



Thank you for investing your time and efforts into **Chiller & Cooling Best Practices**.

**ROD SMITH**

*Editor*

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# RESOURCES FOR ENERGY ENGINEERS

## CHILLER & COOLING TOWER TECHNOLOGY PICKS

### New YORK YZ Magnetic Bearing Centrifugal Chillers

Johnson Controls introduces the YORK® YZ Magnetic Bearing Centrifugal Chiller, the first chiller fully optimized for ultimate performance with a next generation low-global warming potential (GWP) refrigerant — R-1233zd(E). Chosen for its efficiency, safety, availability, low environmental impact and cost, nonflammable R-1233zd(E) has an ultra-low GWP of 1 and is readily available from refrigerant manufacturers.

“We have long led the industry in delivering chiller innovations,” said Laura Wand, Johnson Controls’ vice president, Chiller Solutions, Building Technologies & Solutions. “With the new YORK® YZ, we have engineered the world’s most efficient low-GWP line of centrifugal chillers. Our broad range cooling capacity will serve our customers’ many diverse application needs.”

Johnson Controls used a holistic approach to system design and engineering, optimizing every component around a carefully selected next generation refrigerant for ultimate performance. The YORK® YZ chiller uses an integral, variable speed drive and advanced magnetic bearing technology featuring a single moving assembly suspended in a magnetic field not requiring lubrication. This technology requires 80% fewer moving parts than traditional oil- or refrigerant-lubricated drivelines. The result is enhanced reliability, reduced maintenance and improved efficiency. Compared to traditional fixed-speed oil-bearing chillers, the YZ delivers up to 35% annual energy savings.

The YZ chiller can deliver significant energy savings and lower operating costs by taking advantage of the off-design conditions where

chillers operate 99% of the time. The YZ operates with entering condenser water temperature as low as 40 °F (4.5 °C), providing enhanced performance in every operating condition and the widest operating envelope in the industry. The YORK® YZ uses an optimized single stage design to provide industry-leading real-world energy efficiency. The chiller can also operate with condenser temperatures below the evaporator temperatures, eliminating the need for a water-side economizer. This simplifies the system, requires less mechanical room space and saves money on components, piping, controls and maintenance.

“We continue to deliver industry-leading chiller options that best meet the needs of our current and continually expanding customer base around the world,” said Bill Jackson, Johnson Controls’ president, Global Products, Building Technologies & Solutions. “The YZ is another fantastic platform system that equips our customers with environmentally friendly performance in an optimized solution. Thank you to our YORK® Chiller team for leading the way.”

The YZ chiller brings together groundbreaking YORK® innovations refined over decades of real-world use to create a revolution in



*The YORK YZ Magnetic Bearing Centrifugal Chiller is the first chiller fully optimized for ultimate performance with a next generation low-global warming potential refrigerant — R-1233zd(E).*

chiller design and optimization. It represents a solution from the chiller experts, who like to think of the YORK® YZ chiller as tomorrow’s chiller, available today.

To learn more about the YORK® YZ Magnetic Bearing Centrifugal Chiller, visit [www.YORK.com/Next](http://www.YORK.com/Next).

### About Johnson Controls

Johnson Controls is a global diversified technology and multi-industrial leader serving a wide range of customers in more than 150 countries. Our 120,000 employees create intelligent buildings, efficient energy solutions, integrated infrastructure and next generation transportation systems working seamlessly together to deliver on the promise of smart cities and communities. Our commitment to sustainability dates back to our roots in 1885, with the invention of the first electric room thermostat. We are committed to helping our customers win and creating greater value for all of our stakeholders through strategic focus on our buildings and energy growth platforms. For additional information, please visit [www.johnsoncontrols.com](http://www.johnsoncontrols.com) or follow us @johnsoncontrols on Twitter.

### About Johnson Controls Building Technologies & Solutions

Johnson Controls Building Technologies & Solutions is making the world safer, smarter and more sustainable — one building at a time. Our technology portfolio integrates every aspect of a building — whether security systems, energy management, fire protection or HVACR — to ensure we exceed customer expectations at all times. We operate in more than 150 countries through our unmatched network of branches and distribution channels, helping building owners, operators, engineers and contractors enhance the full lifecycle of

## RESOURCES FOR ENERGY ENGINEERS

### CHILLER & COOLING TOWER TECHNOLOGY PICKS

any facility. Our arsenal of brands includes some of the most trusted names in the industry, such as Tyco®, YORK®, Metasys®, Ruskin®, Titus®, Frick®, PENN®, Sabroe®, Simplex® and Grinnell®. For more information, visit [www.johnsoncontrols.com](http://www.johnsoncontrols.com) or follow @JCI\_Buildings on Twitter.

#### SPX Cooling Technologies Expands Marley MD Cooling Tower Line

SPX Cooling Technologies, Inc., a full-line, full-service industry leader in the design and manufacture of evaporative cooling towers and air-cooled heat exchangers, announces an expansion of its popular Marley MD line of factory-assembled counter-flow cooling towers. New to the MD line are models with exclusive anti-fouling, low-clog film fill types, providing a higher degree of resistance for dirty water applications. Additionally, they expand the suitability of the Marley MD for process cooling and heavy industrial uses.

The Marley MD is a CTI-certified, fully rated cooling tower for a wide range of flow and temperature requirements. In addition to the

low-clog film fill, other value-added options aiding in dirty water applications include factory-installed basin sweeper piping. This helps limit dirt and debris buildup in the collection basin. The Marley MD tower comes standard with low-clog polypropylene water distribution nozzles and a low-sound fan. Additional fan and attenuation options are available to meet more stringent sound requirements.

The Marley MD cooling tower requires less plan area than a crossflow cooling tower for many applications. The tower features heavy-duty steel construction and a five-year mechanical warranty.

For more information on the MD cooling tower line, visit [www.spxcooling.com/products/marley-md](http://www.spxcooling.com/products/marley-md).

#### About SPX Cooling Technologies, Inc.

SPX Cooling Technologies, Inc. is a leading global manufacturer of cooling towers, evaporative fluid coolers, evaporative condensers and air-cooled heat exchangers providing full-service cooling solutions and support to customers in the power generation, petrochemical, industrial, refrigeration, and heating, ventilation and air conditioning (HVAC) markets for 95 years. For more information, please visit [www.spxcooling.com](http://www.spxcooling.com). SPX Cooling Technologies and its product brands are part of SPX Corporation.

#### About SPX Corporation

SPX Corporation is a supplier of highly engineered products and technologies, holding leadership positions in the HVAC, detection and measurement, and engineered solutions markets. Based in Charlotte, North Carolina, SPX Corporation had approximately \$1.5

billion in annual revenue in 2016 and more than 5,000 employees in about 15 countries. SPX Corporation is listed on the New York Stock Exchange under the ticker symbol "SPXC." For more information, please visit [www.spx.com](http://www.spx.com).

#### Daikin Applied Showcases Air Intelligence at Bi-Annual User Conference

Commercial building operators and contractors face many pressures today, from lowering energy consumption and reducing operating costs, to minimizing environmental impact and ensuring occupant comfort. However, it's not enough to simply look at a building as a place to do business. Organizations need the right insights and tools to reduce energy costs and emissions, and to ensure buildings are positively contributing to their strategic goals and outcomes.

Helping organizations leverage new technologies to enhance their buildings' air quality and enable tenants to breathe easier was a key focus for those attending the bi-annual Daikin Group Sales Meeting 2017 (DGSM) in San Antonio, Texas.

"At Daikin Applied, we believe your air can be doing more – for your business, and your people. Every day we aim to create better outcomes for our customers, so they can breathe easier. That's what we deliver through Air Intelligence," said Mike Schwartz, Daikin Applied Americas' CEO. "We're changing the way we think about HVAC to create smarter, more configurable solutions that empower owners and managers to optimize building environments for their people."

During the conference, Daikin Applied promoted building management and



The Marley MD tower comes standard with low-clog polypropylene water distribution nozzles and a low-sound fan.

## CHILLER & COOLING TOWER TECHNOLOGY PICKS

operational best practices to help organizations optimize their equipment and facilities. Additionally, Daikin Applied showcased new, advanced commercial HVAC equipment to demonstrate its commitment to producing better air for end-users through the application of smart solutions, including:

- **PreciseLine™ Large Capacity Blower Coil:** Daikin's large capacity horizontal blower coil affordably conditions air to precise levels up to 5,000 cfm, designed to match a building's air handling demand at a blower coil price point. The offering is a more compact unit meeting building demands, while maximizing space – helping facility managers' condition air for a larger space in a smaller package at an affordable price. also, its double-wall construction minimizes airborne pathogens and contaminants to provide better recirculation of room air and improved indoor air quality.
- **Data acquisition and analytics:** Daikin's Intelligent Equipment connects directly to 150 data points on rooftop units and 350 data points on air-cooled chillers to monitor energy consumption at the equipment level for deeper, more accurate performance measurement. Intelligent Equipment earned recognition as a finalist in the 2017 AHR Expo Innovation Awards in the Building Automation category.
- **Remotely connected rooftop units:** Daikin's rooftop product line is Intelligent Equipment-enabled and provides superior temperature and humidity control, enhancing the quality of the occupied space. At the DGSM, Daikin previewed its latest enhancement of Rebel: The Commercial Packaged 20-ton Heat Pump Rooftop with inverter scroll compression. The modulation of the variable speed compressor equates to 30% energy savings relative to ASHRAE 90.1-2016 part-load minimums – values rarely attained in a rooftop unit this large.
- **Air-cooled chillers:** Daikin's Pathfinder® (screw) and Trailblazer® (scroll) chillers are available with Intelligent Equipment® to help building owners and facility managers transform how they manage their HVAC equipment. Trailblazer chillers are designed for low-install costs and high performance with up to 10% better efficiency than competing offerings. Pathfinder AWW features the industry-first Variable Volume Ratio (VVR) technology, allowing the chiller's compressor to optimize performance for every condition and at every hour of the day, significantly improving efficiency levels. Pathfinder was recognized as a 2017 AHR Expo Innovation Award Winner for the cooling category.

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- **Next-generation magnetic bearing chillers:** The Magnitude® centrifugal chillers feature magnetic bearing technology, eliminating the need for oil, mechanical seals and gears. This enables longer machine life, as well as better efficiency and reliability, saving end users up to \$4 million in energy costs over the lifetime of the chiller. Daikin's unique RideThrough® and RapidRestore® technologies allow chillers to maintain stable operation during short power outages and drastically improve restart times, if needed.
- **Compact water source heat pumps:** Daikin's SmartSource® compact vertical water source heat pumps pack high-performance features into

a 48% smaller footprint. This provides engineers, contractors and facility managers with a solution freeing up space, as well as lowering energy usage and installation costs.

- **Flexible fan arrays:** Award-winning ECM fan arrays for Daikin's Vision® and Skyline® semi-custom air handlers use 46% less cabinet space, while delivering higher efficiencies and less noise. With the ability to accommodate up to 20 fans in 40 different arrangements to meet application requirements, along with fan and motor redundancy to ensure reliability, ECM fan arrays for indoor and outdoor air handlers are the perfect fit for mission-critical facilities where extra space is limited.

"No matter the type of commercial building, Daikin applies its advanced technologies to create the most effective solutions for each unique environment," said Schwartz. "We deliver technology that sets a new standard for the industry in producing quality air, because we know healthier air produces better outcomes where you work, where you create, and where you live."

Follow Daikin Applied on Facebook, Twitter, and LinkedIn for more on how building operators and contractors are leveraging Air Intelligence to create better outcomes.

#### Daikin Applied

Daikin Applied, a member of Daikin Industries, Ltd, designs and manufactures technologically advanced commercial HVAC systems for customers around the world. Customers turn to Daikin with confidence they will experience outstanding performance, reliability and energy efficiency. Daikin Applied equipment, solutions and services are sold through a global network of dedicated sales, service, and parts offices. For more information or the name of your local Daikin Applied representative, call 800-432-1342 or visit, [www.DaikinApplied.com](http://www.DaikinApplied.com).

#### About Daikin Industries Ltd.

Daikin Industries, Ltd. is a Forbes 1000 global company with 2014 revenues of nearly \$16 billion and more than 60,000 employees worldwide, making it the largest HVAC manufacturer in the world. Daikin is engaged primarily in the development, manufacture, sales and aftermarket support of heating, ventilation, air conditioning and refrigeration (HVACR) equipment, refrigerants and other chemicals, as well as oil hydraulic products. Daikin was named one of the world's most innovative companies by Forbes magazine. For more information, visit [www.daikin.com](http://www.daikin.com).



### process cooling: pharmaceutical

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-a major pharmaceutical manufacturer in the Southeastern US

A pharmaceutical plant needed to cool a critical ingredient used to make a medicine in pill form to below its boiling point of 70°F.

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## CHILLER & COOLING TOWER TECHNOLOGY PICKS

### Danfoss Introduces Refrigerant Option and Low Lift Capability for TT Series

Danfoss, the world's leading manufacturer of Danfoss Turbocor® oil-free, variable speed, magnetic bearing centrifugal compressors, has added to its portfolio of low-GWP (global warming potential) compressors by introducing an option to use R-513A, and expanded its operating map range to cover low lift applications for the TT Series compressor family.

Danfoss Turbocor® compressors are engineered and manufactured in Tallahassee and deployed around the world to help buildings reduce energy consumption and costs.

#### New Low-GWP Refrigerant Option

R-513A is a low-GWP, non-flammable (A1) alternative refrigerant to R-134a allowing chiller manufacturers to meet future HFC regulations, such as the European Union's F-gas regulation. All Turbocor® TT Series compressors produced starting in December 2017 with compressor firmware version 4.1 will be compatible with both R-134a and R-513A. Existing Turbocor® TT Series compressor revision F models using R-134a can be retrofitted to use R-513A by simply changing the electronic controllers.



The Danfoss Turbocor® TT Series compressor.

This new refrigerant option broadens Danfoss' comprehensive portfolio of Turbocor® compressors using low-GWP refrigerants. In addition to the TT Series compressors, Danfoss already offers the Turbocor® TG Series compressors using ultra-low-GWP refrigerant HFO-1234ze. Similar to R-513A, HFO-1234ze allows chiller manufacturers to be in compliance with upcoming refrigerant regulations restricting the use of HFC refrigerants.

In summary, the following Danfoss Turbocor® compressors now use low-GWP refrigerants:

- Available with HFO-1234ze: Danfoss Turbocor® TG Series Compressors – 40 to 150 tons
- Available with R134a and R513A: Danfoss Turbocor® TT Series Compressors – 60 to 200 tons

#### New Low Lift Capabilities

Danfoss also has expanded the operating range of its Turbocor® TT Series compressors to support low lift applications such as air-cooled heat pumps — enabling chiller manufacturers to expand their product offering to cover even more air-conditioning and process applications. The low lift operating range allows chillers to start and operate at low condenser water temperatures common during cold ambient temperature conditions. This gives manufacturers the flexibility to eliminate the use of expensive economizers on chillers.

“By expanding the use of low-GWP refrigerants, including the new low-GWP R-513A refrigerant option and the existing ultra-low GWP HFO-1234ze refrigerant, Danfoss Turbocor® TT Series compressors can continue to be a future-proof, environmentally-friendly solution today

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## RESOURCES FOR ENERGY ENGINEERS

### CHILLER & COOLING TOWER TECHNOLOGY PICKS

that complies with evolving refrigerant regulations and standards around the world, including the European Union F-gas regulation. With the expanded low lift capability, chiller manufacturers have the flexibility to benefit from the high-efficiency variable speed, oil-free operation of Turbocor® TT Series compressors in even more air conditioning applications,” said Jose Alvares, Danfoss Turbocor Compressors’ vice president, sales and marketing.

“Danfoss is committed to taking a proactive approach to energy-efficiency, sustainable technologies by offering multiple low-GWP refrigerant options,” Alvares said. “The low-GWP refrigerant offering combined with innovative oil-free, magnetic bearing technology provide the best solution for our customers to meet environmental regulations today and in the future.”

For more information about Danfoss Turbocor Compressors, please visit [www.turbocor.danfoss.com](http://www.turbocor.danfoss.com).

#### About Danfoss

Danfoss engineers technologies enabling the world of tomorrow to do more with less. We meet the growing need for infrastructure, food supply, energy efficiency and climate-friendly solutions. Our products and services are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. We are also active in the field of renewable energy, as well as district heating infrastructure for cities and urban communities. Our innovative engineering dates back to 1933 and today Danfoss is a world-leader, employing more than 25,000 employees and serving customers in more than 100 countries. We are

still privately held by the founding family. Read more about us at [www.danfoss.com](http://www.danfoss.com).

#### Carrier AquaSnap 30MP Chiller Now Meets Higher Efficiency Requirements

Designed for faster, less expensive installation in high-rise applications, Carrier is pleased to introduce the latest version of the slimmed-down AquaSnap® 30MP chiller now meeting all ASHRAE 90.1 efficiency requirements. Additionally, certain model sizes accommodate the 15 hp per circuit regulation common in many large cities, eliminating the need for costly 24/7 support. Trim enough to fit through a standard size door or elevator, and boasting a modular design easily connected to provide greater capacity, the 30MP is Carrier’s answer to the challenge of providing climate control in tough-to-reach spaces. Carrier, a world leader in high-technology heating, air-conditioning (HVAC) and refrigeration solutions, is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp.

The 30MP can be piped together in-line, helping to significantly reduce the first cost of any installation in new and retrofit applications, while providing up to 560 tons of cooling.



*The AquaSnap 30MP now meets ASHRAE 90.1 efficiency requirements.*

“Our product team works hard to support our customers and their system design needs with ongoing product development like that of this AquaSnap 30MP. This package has always been an ideal solution for retrofit applications, given its small size and portability. Now with its ability to meet ASHRAE 90.1 efficiency requirements and with certain model sizes 15 hp per circuit regulations, it can be a viable solution for tall buildings in even the largest U.S. cities,” said Chris Opie, Carrier’s director, North America Commercial Marketing. “We are excited to provide our customers with opportunities to solve complex chilled-water system needs affordably with this modular package.”

Additional 30MP features and options uniquely enhancing HVAC system performance include a digital compressor, separate multi-unit controller, single input power to electrical distribution Panel and a remote air-cooled option. Additional information can be found at [www.Carrier.com/30MP](http://www.Carrier.com/30MP) or by contacting your local Carrier expert.

#### About Carrier

Founded by the inventor of modern air conditioning, Carrier is a world leader in high-technology heating, air-conditioning and refrigeration solutions. Carrier experts provide sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial, retail, transport and food service customers. Carrier is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp., a leading provider to the aerospace and building systems industries worldwide. For more information, visit [www.carrier.com](http://www.carrier.com) or follow @Carrier on Twitter.

## CHILLER & COOLING TOWER TECHNOLOGY PICKS

### FLIR Announces the DM166 Thermal Imaging Multimeter

FLIR announces the FLIR DM166 thermal imaging multimeter with Infrared Guided Measurement (IGM™), the industry's most affordable digital multimeter/thermal imager combination. The FLIR DM166 features 80 x 60 thermal resolution, broad multimeter test functions and the flexibility for use in both high and low voltage applications.

Designed to provide faster troubleshooting in applications such as electrical distribution, electro-mechanical systems, HVAC/R and electronics, the FLIR DM166 features a FLIR Lepton® thermal microcamera core. This visually guides users to the precise location of a problem. The feature-packed multimeter helps users pinpoint issues faster, and then troubleshoot complex electrical distribution and electro-mechanical systems more effectively and efficiently.

Thermal imaging is a non-contact temperature measurement method, allowing the user to more safely scan for overheating system components. Additionally, with a rugged, drop-tested design and the safety rating electrical and HVAC professionals' need, the FLIR DM166 is field-ready for even the most demanding applications.

The FLIR DM166 carries a 10-year warranty on both the product and the thermal detector. It will be available in fourth quarter 2017 for \$499.99. For more information visit [www.flir.com/professionalDMMs](http://www.flir.com/professionalDMMs).

### About FLIR Systems

Founded in 1978 and headquartered in Wilsonville, Oregon, FLIR Systems is a world-leading maker of sensor systems that enhance perception and heighten awareness, helping to save lives, improve productivity, and protect the environment. Through its nearly 3,500 employees, FLIR's vision is to be "The World's Sixth Sense" by leveraging thermal imaging and adjacent technologies to provide innovative, intelligent solutions for security and surveillance, environmental and condition monitoring, outdoor recreation, machine vision, navigation, and advanced threat detection. For more information, please visit [www.flir.com](http://www.flir.com) and follow @flir.



The FLIR DM166 features 80 x 60 thermal resolution.



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Model ACW 1400 Ton Ultra Efficient Water-Cooled **Magnetic Bearing packaged** chiller for data center

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# Chiller Plant Optimization Saves Energy, Maintains Stable Lab Environment

By James Johnson and Jonathan Kosobucki

*The Institute for Bioscience and Biotechnology Research*

▶ The Institute for Bioscience and Biotechnology Research (IBBR) connects scientists from the University of Maryland, the National Institute of Standards and Technology and industry to find solutions to major scientific and medical challenges, such as new vaccines and the development of diagnostic and therapeutic products. With one of the nation's largest collections of high-resolution instruments, they look inside cells and manipulate molecules. IBBR researchers have figured out the molecular structure of proteins, unraveled the protein interactions involved in autoimmune disorders and discovered possible countermeasures for antibiotic resistance.

Their work is precise, infinitesimal and experiments do not end simply because the clock says 5 p.m., or there's a sweltering heat wave. IBBR scientists require around-the-clock access to their labs — and those labs require a stable environment. A change in room temperature of just one or two degrees could twist the outcome of an experiment. Increased humidity for example, could interfere with the sensitive scientific measurement equipment.

With high-energy-use equipment, their HVAC system must run day and night, in buildings that never go dark. Due to this, IBBR was one of the biggest energy hogs on campus,

as well as one of the most difficult to make more energy efficient. Challenged by a state mandate to reduce energy consumption, and a university commitment to reduce total energy consumption 20% by 2020, the IBBR facilities management team embarked on an aggressive plan to meet this goal. One of the first actions: a chiller plant optimization project.

When the project began, the plant baseline was 0.9 kW/ton, operating at just 50% output. Now, the plant runs 27% to 37% more efficiently, at 0.57–0.65 kW/ton, effectively keeping energy costs flat while building occupancy increased. IBBR has also reduced CO<sub>2</sub> emissions by roughly 125 tons per year while improving plant reliability. Lab environments now remain stable, even through icy, snowy winters and hot, humid summers.

## Two Buildings, One Plant Optimization

The IBBR campuses, part of the University System of Maryland, occupy over 200,000 sf of lab and office space in Rockville. The original building opened in 1989, with an additional wing added in 1995, for a building total of 75,000 sf. Each wing has separate chilled water plants, hot water systems and mechanical systems, built to size for the original construction. The systems were connected when the new wing was built,

but the components remain segregated. This allows the systems to operate as though they are a single plant, with built-in redundancy. Building 2, a 126,000 sf building, was built in 2007. It also houses a chiller plant and a steam-heating plant.

Combined, IBBR's environmental stabilization plant, maintains the lab environment by conditioning the air, controlling the temperature, humidity and quantity of air flowing to and through the labs in each building. This is accomplished with large, 100% ventilation air handling units and a combination of variable and constant volume terminal units. A Siemens Apogee building automation system controls and monitors the plant.

Facilities staff knocked out easier projects first to reduce energy consumption. They took steps to conserve water, where IBBR was using at a rate of 1 million gallons a month. They attacked the lighting, consuming 20% of the lab's energy, through reducing the number of fixtures installed throughout the labs. Then, the real work began. Because the HVAC system accounts for as much as 70% of the lab's energy use, they first turned their attention to optimizing the 900-ton chiller plant in Building 2.

### Optimizing a 900-ton Chiller Plant

Although it was just five years old when IBBR launched its project, Building 2 turned out to be the better candidate for HVAC optimization. Its 900-ton plant has two 450-ton variable speed York YK electric centrifugal water chillers, two condenser water pumps, two cooling tower cells, two primary pumps and two secondary pumps.

The chiller plant was originally designed to achieve 2 gpm per ton of cooling on the chilled water side, and 3 gpm per ton of cooling on the condenser side. It was outfitted with several variable speed pumps, but the primary chilled water and condensing pump ran at a constant volume, while the cooling towers were configured to maintain a consistent speed. Lastly, the water temperature was controlled with a cooling tower bypass valve. These were prime targets for efficiency measures.

The chillers were manufactured at the same time, but one of them had never run as efficiently as the other, and had ongoing problems with surging. The plant has to provide 3,800 hours of cooling for the year, so the facilities staff started their review of individual plant components with the chillers. They found optimizing each component separately could significantly increase the plant's overall efficiency, allowing it to operate at the lowest possible kW/ton without degrading the atmosphere of the labs.

### The Solution: A System Built on Relational Algorithms

IBBR chose Optimum Energy's OptiCx™ HVAC optimization platform with OptimumLOOP™ control software for chilled water systems. It offered several advantages: it used much of the existing plant equipment, included a dedicated Optimum engineer to oversee implementation and consult on best practices and the software "self learns" the most efficient

operating conditions of each component. From the variable speed drives and sensors installed on chillers, pumps, valves and tower fans, the OptimumLOOP software collects data on the water flow, electrical power consumption, load conditions and more. It compares the data to control algorithms, assesses plant conditions in real time and then automatically changes pump and fan speeds. This allows leaving chilled water temperature, equipment staging and other operational changes to maximize efficiency.

IBBR began deploying the solution in 2013, after completing the university's procurement process and getting some funding from their local energy provider. The first step was installing new variable drives to convert IBBR into an all-variable-flow plant, as well as the sensors on each plant component.

Next came connecting OptimumLOOP with the Siemens building automation system, and upgrading the building automation system network in Building 2 to Ethernet. This would ensure the data flow wouldn't challenge the local network capacity. When this phase was finished, IBBR had OptimumLOOP up and running across the chiller plant — just in time for the cooling season of 2014.

### Energy Use Drops 30 Percent

In the first year of full operation, the optimized plant cut the IBBR's energy use by an average of 266,836 kWh/year (30%), for operations savings of about \$36,000 per year. Originally, each primary chilled water pump ran consistently at 60 Hz. Now, they each run at an average of 55 Hz. By itself, this may not appear to deliver huge savings, but the change in speed provides about 20% savings for these pumps alone. OptimumLOOP's relational control algorithms helped maximize overall plant performance and meet the optimal parameters for current conditions. IBBR found running individual pieces of equipment at more efficient speeds adds up to one big number.

2014 was a year of testing and tuning. For instance, in trying to protect itself from surging, the chiller control panel ended up hampering energy efficient operation. The chief problem was old data. Through working with Optimum engineers, the IBBR facilities team urged chiller mechanics to update the data at the control panel. Siemens engineers adjusted the chiller code in their system to address condensing water control issues.



IBBR's areas of focus including biomolecular engineering, therapeutics, measurement science and host-pathogen interactions.

## CHILLER PLANT OPTIMIZATION SAVES ENERGY, MAINTAINS STABLE LAB ENVIRONMENT

In addition, the greater visibility into plant operations provided by OptimumLOOP's connection to the BAS revealed unusually poor plant efficiency. At one point the plant was operating at a kW/ton rate 10 times higher than expected. This had to be incorrect, but the kW values coming back from the plant all appeared to be within expected ranges, while supply and return temperatures were also normal and verified. The problem turned out to be the flow meter needed repaired and reinstalled.

Plant efficiency became progressively better over the course of the year, reaching 0.57–0.65 kW/ton plantwide. 2015 brought consistent energy reduction, and the plant began running in an optimized mode almost all the time, adapting and responding to real-time loads and changing ambient conditions. By the end of summer 2016, IBBR had wrung all

possible efficiencies out of the environmental stabilization plant.

### Beating the University Mandate

From the beginning, the IBBR facilities team took the long view of the optimization project, in part because Building 2 was only at 50% capacity when the work began. Now the labs are nearly fully occupied, with scientists running their experiments daily — and that has been the true test. The optimized plant has been able to operate just as efficiently with a full load. IBBR's energy consumption has remained flat even as user occupancy has nearly doubled.

For the IBBR facilities team, what really mattered, was to continue to support the researchers throughout the optimization process. Now the HVAC system remains a

behind-the-scenes hero. Scientists' work goes on unimpeded, and their lab conditions have remained constant, consistent and repeatable — precisely the best environment for fighting disease at the molecular level.

With the plant now running 30% more efficiently on average, IBBR is aggressively moving forward with bigger, more complex projects to cut energy consumption even further. Their goal? To help the University of Maryland beat its own climate targets. **BP**

*James Johnson is the Director of Facilities and Lab Services for the University of Maryland IBBR. Jonathan Kosobucki is the Director of Key Accounts for Optimum Energy. To learn more about Optimum Energy visit [www.optimumenergyco.com](http://www.optimumenergyco.com)*

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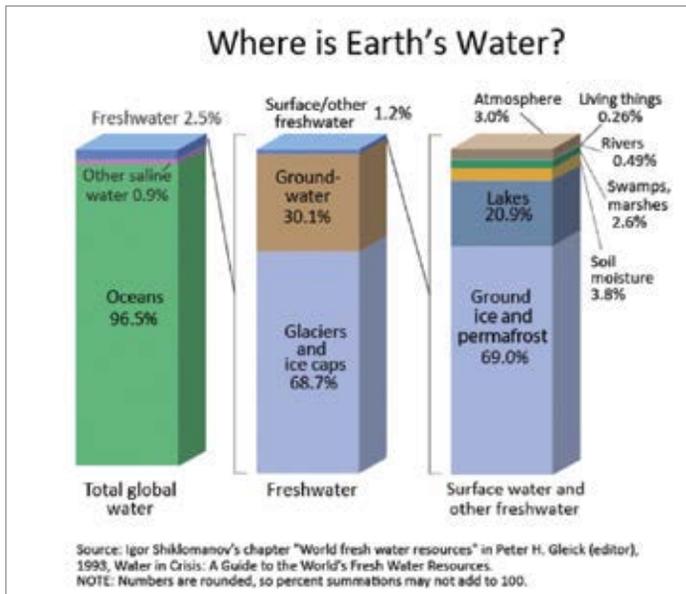


Marley 756-ton evaporative cooling tower

# Controlled Partial Electrolysis Optimizes Process Water Treatment

By Michael Boyko and Henry Mohrschlatt, Dynamic Water

► Of all the water on Earth, 97% is seawater. Only 3% is fresh water and only a small fraction of this is available for potable use.



Truly pure water is one of the rarest commodities and a precious resource. Chemical analysis of even the purest drinking water yields trace amounts of a variety of minerals, from calcium to iron and heavy metals. Chemical compounds, although typically found in small amounts, make it through standard water purification processes, as do biological materials.

Such minor impurities in water might not generate serious concerns in the day-to-day water usage in household applications. However, in commercial and industrial applications, this level of impurity poses risks negatively impacting production at best, and endangering lives at worst. For example, manufacturers of electronics, computer components (such as semiconductors, microchips, and circuit boards), chemical compounds (for research and production), medical equipment and pharmaceuticals have a nearly unquenchable need for what is called "ultrapure" water. Failure at any point along the chain of process and manufacturing will negatively impact equipment (via corrosion and scaling) and formulations (via contamination).



**“Such minor impurities in water might not generate serious concerns in the day-to-day water usage in household applications. However, in commercial and industrial applications, this level of impurity poses risks negatively impacting production at best, and endangering lives at worst.”**

— Michael Boyko and Henry Mohrschlatt, Dynamic Water

# CONTROLLED PARTIAL ELECTROLYSIS OPTIMIZES PROCESS WATER TREATMENT

Industrial cooling and refrigeration equipment used in manufacturing and environmental control rely heavily on water to either cool, or otherwise regulate product or formulation temperature during processing. While such equipment can appear to function efficiently without input of truly pure water, the unknown cumulative build-up of scale and corrosion would be costly due to high maintenance, related damage, reduced efficiency, and ultimately, premature equipment failure.

## A Controlled Partial Electrolysis Process

Technology for process water treatment historically presented challenges of both economy and affectivity until the development of Universal Environmental Technology (UET) in the 1990s. The UET system



Cooling tower condenser tube exhibiting scaling and corrosion, before UET treatment.



Cooling tower cold-water basin exhibiting scaling and biological growth, before UET treatment.

employs a controlled partial electrolysis process within a series of tubular reactors on a basin side loop. This process removes impurities, minimizes scaling, reduces corrosion and eliminates bio-contamination throughout the process equipment.

A computerized controller continuously adjusts the electrolysis process across 42 parameters every 6 milliseconds. Firing a direct-current electric charge from an anode to a cathode through the water medium, a near-constant electrolysis separates H+ and OH- ions from their counterparts. This establishes a chemical equilibrium retaining the minerals required to maintain correct pH balance, rapidly producing mineral scale in a soft and easy-to-clean form within the UET reactors. The resulting process water is now in a state of dynamic equilibrium that will not deposit scale in the process piping, chillers or towers.

The patented UET process has proven a global success, and is now employed in more than 5,000 installations worldwide. These include manufacturers of aircraft, automobiles, heavy equipment, computers, electronics, food, beverage formulators and makers of pharmaceutical products.

Variability of both ambient and internal process temperatures combined with moisture can create an adverse environment. Bacteria, fungus, microalgae and the like will rapidly produce in wet, dark and stagnant conditions. As scale builds, microscopic nooks and crannies are formed where bio-contaminants can flourish.

SAVINGS FEB – DEC 2016 VS. 2017		
	2016 (WATER SOFTENER)	2017 (DYNAMIC WATER'S UET)
Cycles	5.7	13.9
Conductivity Setpoint (µS/cm)	3,500	8,500
Makeup (gallons)	2,075,635	1,882,320
Blowdown (gallons)	235,922	82,972
Chemical Treatment Cost	\$19,200	\$0
Salt for Softener (lbs/yr)	10,000	0

Conductivity varies due to seasonal use and weather conditions



**The Client**

A recent (2017) adopter of the UET water treatment process was Roche Molecular Solutions. This particular division of Hoffman-La Roche manufactures medical diagnostic equipment for labs, hospitals and clinics. Roche’s Pleasanton facility used traditional chemical water treatment and was experiencing continual challenges with corrosion and bio-contamination risk.

Believing it would increase sustainability, Roche initially opted for a generic water softener system for its closed-loop evaporative cooling system. As issues with corrosion and bio-contamination continued, Roche sought out Dynamic Water to investigate the UET technology.

➤ **Cooling Tower System**

- 2x Marley NC-756 cooling towers  
1,512 tons (2x 756 tons)

➤ **Chiller System**

- 3x Vilter water-cooled ammonia chillers  
1,600 tons (2x 400, 1x 800)

➤ **UET Reactor Sizing**

- 4x4 UET Reactor

Following a thorough due diligence of both the UET process and users of the UET system, Roche’s engineers decided to employ the Dynamic Water Technologies UET system. Within two months, there was a significant decrease in bio-contamination on wet surfaces of the cooling towers. The result allowed the company to avoid using chemicals, eliminate briny softener waste and save water. In accordance with the company’s mission to increase sustainability, water savings have increased substantially, along with the elimination of all chemicals.

The Dynamic Water UET can cycle up to higher concentrations, while more effectively mitigating bio-contamination, corrosion and scale. These results are further accomplished without the need of harsh chemicals or salt.

Although a UET system cycles higher than a water softener, it does not generate increased temperatures. DWT hands on approach of working

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# CONTROLLED PARTIAL ELECTROLYSIS OPTIMIZES PROCESS WATER TREATMENT

closely with the Roche's Facilities Operations and Maintenance and the Safety, Health & Environment teams customized a system to suit Roche's needs.

## Results

Raw numbers from 2016 (with water softener) vs. 2017 (with UET) are as follows:

	2016	2017
Makeup (gal) MU	193,315	9%
Blowdown (gal) BD	152,950	65%

Scaling the heat load of 2017's cycles of concentration to match 2016's evaporation, the savings are as follows:



Cooling tower fill media exhibiting severe scaling, before UET treatment.



Cooling tower fill media free of scaling, after UET treatment.

### 2016 vs 2017 Scaled Savings

Water (gal)	2016	2017
	151,088	7% MU, 64% BD

Treatment in 2017 was done without the need for chemical treatment or salt, while also eliminating softener brine reject.

Approach temperatures of the chiller system remained unchanged despite cycling much higher than water-softener levels without using the water softener.

True to Roche's commitment to sustainability, they have been increasing their water savings year after year. They have been decreasing the amount of water they evaporate, despite later years showing higher temperatures.

Scaling the heat load from 2017's cycles of concentration to the previous years yield the following results:

### 2015 vs 2017 Scaled Savings

Water (gal)	2015	2017
	378,895	14% MU, 79% BD

### 2014 vs 2017 Scaled Savings

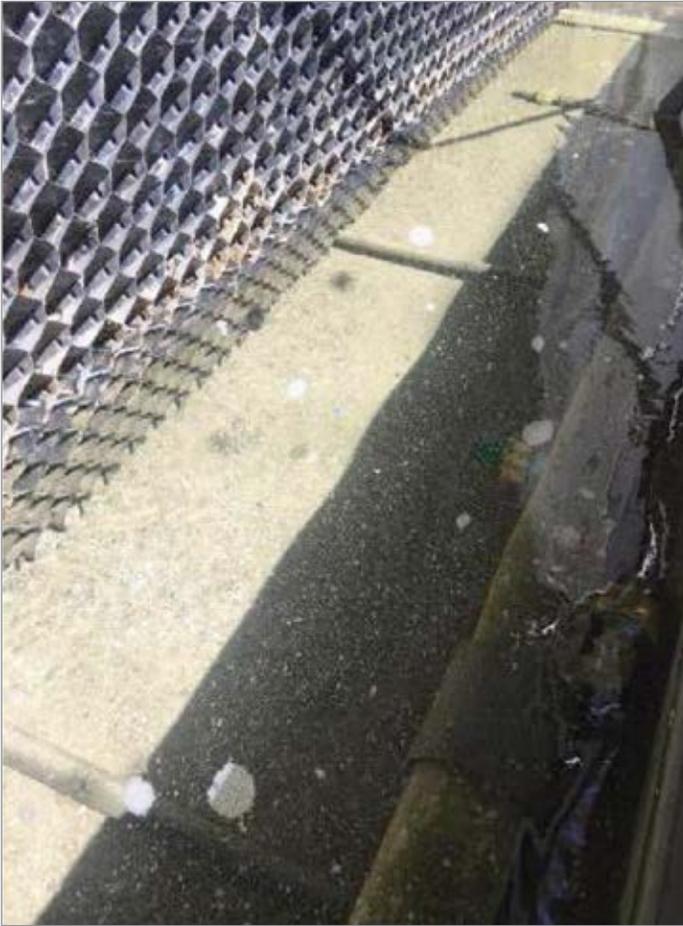
Water (gal)	2014	2017
	746,525	23% MU, 87% BD

Compared to 2016's water softener, Dynamic Water's UET can cycle up much higher concentrations, while more effectively treating bio-contamination and preventing scale without the use of chemicals or salt. There is no brine by-product, and function is not impeded by scale or corrosion.

"The elimination of all our chemical systems, including softened water systems, and reduction in both water and sewer costs, have helped

### 2017 VS. PREVIOUS YEARS

Water usage for 2015 and 2014 from February to July compared to 2017 (pre-water softener).			
	2015	RAW SAVINGS VS. 2017	
Makeup (gal)	2,666,460	784,140	29%
Blowdown (gal)	479,731	396,759	83%
Cycles	5.56		
	2014	RAW SAVINGS VS. 2017	
Makeup (gal)	3,306,600	1,424,280	43%
Blowdown (gal)	859,373	776,401	90%
Cycles	3.85		



Cooling tower cold-water basin free of scaling and biological growth, after UET treatment.



UET 4x4 reactor.

WATER COMPOSITION (AVERAGES)			
	MAKEUP WATER	BASIN WATER 2016 (USING SOFTENER)	BASIN WATER 2017 (USING DWT'S UET SYSTEM)
Conductivity (uS/cm)	350 - 680	3,500	8,130
pH	8.2	9.1	8.5
Total Hardness (ppm)	174	114	1800
Chlorides (ppm)	162	720	1697
Silica (ppm)	12	57	67
Iron (ppm)	0.00	1.00	0.0
Free Chlorine (ppm)	0.0	0.5	0.3

Roche in becoming more sustainable and are what our Safety, Health & Environment group wanted to see,” notes Ted Schnipper, P.E., CEM, the operations & maintenance manager for Roche Molecular Solutions who spearheaded the transition. “Eleven months into the UET’s operation, our water is crystal clear with no evidence of scale, corrosion or bioburden.”

### Conclusion

They are expected to see an annual savings of \$73,000 and 264,000 gallons of water and sewer savings. Energy savings are estimated at 364,000 KW per year.

The UET system offers significant reduction in typical corrosion conditions. With this new implementation, it is estimated that Roche’s equipment lifespan may more than double. This is especially valuable if the current treatment program has experienced corrosion due to acid feed. **BP**

To learn more about Dynamic Water visit [www.dynamicwater.com](http://www.dynamicwater.com)

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# How FM APPROVED Cooling Towers Help Reduce Risks

By Scott Maurer, SPX Cooling Technologies

*The Marley® NC® Cooling Tower is the only FM APPROVED single-cell crossflow cooling tower available in the market.*

▶ When water flow is temporarily suspended, as in the event of a fire, some cooling towers containing combustible materials and dry areas may be at risk. Some organizations practice loss prevention by considering an FM APPROVED cooling tower to potentially reduce structural damage and interruption of business.

## Consider an FM APPROVED Cooling Tower to Reduce Risk

Cooling towers may contain a variety of combustible material, including polyvinyl chloride (PVC) fill, fiberglass reinforced polyester (FRP) casing, fan stacks, fan decks, fan blades, and acrylonitrile butadiene styrene (ABS) and polypropylene nozzles, as well as wood and fiberglass structural components. Functioning cooling towers may also contain dry areas that could catch on fire when water flow is temporarily suspended during maintenance, or repairs involving electrical work or welding.

In addition, fire damage in cooling towers can extend to the tower's adjacent cells and to nearby buildings or equipment.

To avoid these risks, consider selecting an FM APPROVED cooling tower. FM Approvals is a nationally recognized testing laboratory and international leader specializing in the testing and certification of property loss prevention products and services. The company is a business unit of FM Global, a worldwide commercial and industrial property insurance company specializing in loss prevention engineering for one of every three Fortune 1000 companies.

Products who earn the FM APPROVED mark meet FM Approvals' rigorous loss prevention standards of quality, technical integrity and performance. In addition to cooling towers, FM Approvals tests detection, fire alarm and signaling equipment; ducts, pipe and duct insulation; and combustion control equipment, among many other categories.

FM APPROVED cooling towers are increasingly specified or required for projects around the world. For example, cooling tower specifications at several major US universities require “cooling towers be FM APPROVED” and “cooling towers with sprinkler systems are not acceptable” as an alternative. Additionally, facility owners’ insurance companies may recommend FM APPROVED towers to reduce potential property loss.

### FM APPROVED Cooling Tower Certification Process

To become FM APPROVED, cooling towers must meet the requirements outlined in the Approval Standard for Cooling Towers, Class Number 4930. This is a comprehensive standard, last updated in 2016, covering all types of tower design, including single-cell, multi-cell and rooftop-installed towers.

As part of its approval process, FM Approvals performs a full-size product fire test. This involves burning one or two complete cooling tower cells in a prescribed manner and is witnessed by representatives of FM Approvals. To pass the burn test, the tower must be capable of operating at a reduced design capacity after a fire. Requirements vary based on whether single-cell or multi-cell approvals are sought. In addition, the fire must not propagate within or beyond the cell.

Cooling tower manufacturers can submit for testing any combination of materials to evaluate performance. In addition to fire tests, the FM Approval process includes vendor and manufacturer audits, cyclic wind pressure and missile testing, as well as reviews of structural calculations, seismic calculations and material formulations.



*FM APPROVED towers display this logo when the entire system passes stringent test criteria.*

For example, SPX Cooling Technologies, Inc., global manufacturer of cooling towers and specialized heat exchangers, has a well-established relationship with FM Approvals. In the 1970s, The Marley Company (now SPX Cooling Technologies) approached FM Approvals to develop a protocol to test product differentiation based on fire resistance. Over 40 years later, Marley-brand cooling towers from SPX continue to offer several cooling tower design series carrying FM APPROVED certification. This includes factory-assembled products such as the Marley® NC, Marley NC Everest™, Marley MD and Marley AV Cooling Towers and the Marley MH Fluid Cooler.



*An air inlet screen helps qualify a cooling tower as FM APPROVED, because in the event of a fire, it keeps fill materials and debris contained within.*

## HOW FM APPROVED COOLING TOWERS HELP REDUCE RISKS

It is worth noting the FM Approval applies only to the entire cooling tower package. Individual components, such as the heat transfer fill media, cannot be labeled as “FM APPROVED” or be considered as having improved fire safety if installed in a cooling tower that is not FM APPROVED. A cooling tower without FM Approval cannot be considered FM APPROVED simply by adding fill materials from an FM APPROVED model. In addition, replacement components for FM APPROVED towers must come from the original equipment supplier with current FM APPROVED status for the cooling tower to continue to be FM APPROVED.

### Benefits of FM Approvals

The FM APPROVED mark on a product implies a high level of reliability by requiring manufacturers to meet enhanced equipment design standards and hazard exposure testing. The rigorous FM Approvals standards indicate the quality of these towers, differentiating them from others in the market not FM APPROVED.

FM Approvals certification ensures in the event of a fire, the cooling tower system will continue to function at a reduced design capacity, allowing critical business operations to continue while recovery is underway. FM APPROVED rooftop towers must demonstrate they prevent burning debris from falling onto the roof surface.

In addition, FM APPROVED cooling towers do not require the installation of an automated sprinkler system. Installation and maintenance of external sprinkler systems can be costly to owners. In the rare event of a fire, it is expected the automatic sprinkler system would function as designed and fire would not spread to adjacent cells. In an FM APPROVED cooling tower, the fire is contained in the cell where it originated, allowing the rest of the cooling tower

cells to continue operating. This can be especially important in critical applications like hospitals, district cooling applications, data centers and power plants who cannot risk an unplanned outage. By choosing an FM APPROVED cooling tower, owners can avoid the costs and maintenance associated with external sprinkler systems, while reducing costly interruption of business in the case of a fire.

FM APPROVED cooling towers are logical considerations for facility owners who do not wish to install a secondary sprinkler fire protection system, owners concerned about damage due to fires and natural hazards and owners who cannot tolerate interruptions to operations.

### FM APPROVED Cooling Tower Options

SPX Cooling Technologies offers Marley® NC® Series cooling towers, including the only FM APPROVED single-cell crossflow cooling tower on the market. Large-capacity factory-assembled cooling towers, such as the NC Everest™ tower, offer a viable alternative to field-erected towers. This tower is FM APPROVED for use without a fire protection system.

FM APPROVED cooling towers can reduce the risk of property damage due to fires and natural hazards, and may reduce build time as the installation of a sprinkler system may not be required. This makes the use of an FM APPROVED cooling tower an important consideration when choosing a cooling tower for a broad range of critical applications in comfort and process cooling. **BP**

*Scott Maurer is the Global Product Manager at SPX Cooling Technologies, Inc.. To learn more about FM Approval visit [www.fmapprovals.com](http://www.fmapprovals.com)*

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**“FM APPROVED cooling towers can reduce the risk of property damage due to fires and natural hazards, and may reduce build time as the installation of a sprinkler system may not be required.”**

— Scott Maurer, SPX Cooling Technologies



# 2018 AHR EXPO SHOW REPORT Chiller & Cooling Tower Technology

By Wes Lucko, Chiller & Cooling Best Practices Magazine

► The 2018 AHR EXPO was held January 22 to 24 in Chicago. The 2018 AHR Expo had a projected attendance of more than 68,000 registered visitors and exhibitor personnel, as well as over 1 million square feet sold. The Show was expected to be by far the largest and best attended HVAC Expo in the United States, with over 2,000 exhibiting manufacturers and suppliers.

## Central Plant Chillers

At the HydroThrift booth I spoke with Mike Wlodarski and Keith Beatty about their line of custom chillers, and why such heavy customization is required depending on the application. A recent design HydroThrift worked on was an explosion proof chiller for a petrochemical plant,



Mike Wlodarski, Paul Heston, Ron Lair and Keith Beatty (left to right) at the HydroThrift booth.

## 2018 AHR EXPO SHOW REPORT



Manlio Valdes and Paul Valenta (left to right) at the CALMAC/Trane booth.



Max Kobelski from Danfoss next to the oil-free Turbocor compressor.



Anthony Fizalone, Olena Olenych, Kevin Werely, John Morris and Andrea Shorr (left to right) in front of their Motivair MLC-SC-FC free cooling chiller.

where chilled water is required for eyewash safety stations in case of chemical leaks and/or contamination. HydroThrift's chillers are, in some cases, able to operate in extreme ambient conditions from -20 °F to 130 °F. Each application is designed as a fully packaged component to facilitate on-site installation.

CALMAC's booth showcased ice storage tanks. These are integrated with Trane (HVAC) systems to take pressure off of the energy grid. The ice storage tanks store energy, similar to a battery, and use that energy to cool commercial buildings during times when the cost of energy is high. This reduces the strain on public utilities, reduces operating costs for building owners and allows for better use of renewable forms of energy. Trane showcased "Agility," a new water-cooled centrifugal chiller product line. Agility is a completely redesigned chiller in the 175-425 ton range with a new and different compressor and heat exchanger. It uses next-generation, high-efficiency evaporators proprietary to Trane. The evaporators decrease size by 25% and total chiller refrigerant charge by up to 25%, versus other medium pressure heat exchangers available on the market today. Agility delivers over 40% better IPLV than the ASHRAE 90.1-2016 requirement with a 25% lower refrigerant charge than other medium pressure chillers. It is designed to increase energy efficiency and reduce greenhouse gas emissions.

Danfoss showcased their Turbocor Compressors. Conventional compressors and chillers consume more energy due to the presence of lubricating oil hindering heat transfer. Even a chiller with an oil content of 4% may lose 9% efficiency. Many chillers are overcharged with oil resulting in actual energy efficiency much lower than the equipment's rating. Friction-free magnetic bearings, such as the ones found in the Turbocor, eliminate the cost of those inefficiencies as well as the maintenance costs associated with oil service. Sensors at each magnetic bearing monitor the shaft location 100,000 times per second ensuring precise positioning. The magnetic bearings, two stage centrifugal compression, a variable speed permanent magnet motor and intelligent electronic controls combine to create a sustainable energy efficient solution that is compact, lightweight and quiet.

Motivair displayed their MLC-SC-FC chillers with integrated "Free-Cooling." They are designed to provide optimal performance, year round, in varying ambient temperatures. The "Free-Cooling" MLC-SC models come standard with Motivair's advanced PLC control package. When ambient temperatures fall overnight or during cooler seasonal weather, the integrated "Free-Cooling" system is automatically activated. The system operates by directing the return chilled glycol through the "Free-Cooling" coil, before it enters the evaporator. This is achieved

via an automatic motorized valve, controlled by the PLC, whenever the ambient falls below the return chilled glycol temperature set point. One of Motivair's most recent projects involved a 22-fan unit (over 40 foot long) of the MLC-SC-FC chiller. Due to the location of where this system was to be installed, the entire chiller had to undergo seismic testing in order to pass the installation requirements. Motivair trucked the 22-fan unit to the University of Buffalo where massive shake tables were able to test the durability and reliability of a fully functioning chiller during a simulated earthquake.

The MTA booth showcased their new modular free-coolers, the FC4TAE and the FC4ALL. The range of FC4TAE and FC4ALL series liquid coolers consist of 7 packaged models equipped with finned water coils, axial fans, free-cooling, water valve and a microprocessor controller. The "modular concept" employed to design this range enables FC4TAE and FC4ALL units hydraulic integration with any liquid chiller in the TAEvoTech and Aries Tech. The use of free-cooling mode provides impressive energy savings and is particularly suitable for industrial processes where the production of chilled water is required all through the year. Under this system, the low temperature of the outdoor air is used in winter, autumn and spring to completely or partially cool the process fluid normally cooled by the chiller with the aid of its refrigeration compressors. During modular free-cooling operation, the FC4TAE and FC4ALL modules are controlled and managed by the on board microprocessor, cooling the process fluid "free of charge," with the compressors either shut down (total free-cooling) or in partial operation (partial free-cooling).

Arctic Chiller Group's Mark Rogan showed me around the PolyTherm modular chiller. It has a cooling capacity range from 30 to 480 tons and heating capacity range of 450 MBH to 7,200 MBH. The 6-pipe design features three independent loops, eliminating the need for extra heat exchangers and pumps. It eliminates the need for duplicate equipment and significantly reduces space requirements by combining duties and reducing glycol requirements. Any module can operate in either cooling mode, heating mode or simultaneous heating and cooling mode to meet real-time system demand. While in simultaneous mode, combined heating and cooling efficiencies up to 28 EER can be achieved.

Johnson Controls unveiled the York YZ chiller with a cooling capacity range of 165-1,000 tons. I spoke with Laura Wand, the Vice President and General Manager of Chiller Solutions who said, "In selecting a low-GWP refrigerant for the groundbreaking YORK YZ, we considered safety, efficiency, availability, environmental impact and cost. We chose R1233zd(E) refrigerant because it is nonflammable, low in toxicity



Dan Rogowski, John Medeiros and Howard Kielar (left to right) at the MTA booth.



Mark Rogan at the Arctic Chiller Group booth.



Johnson Controls unveiled the York YZ chiller. It is the first chiller fully optimized for the usage of the next generation low-GWP refrigerant.

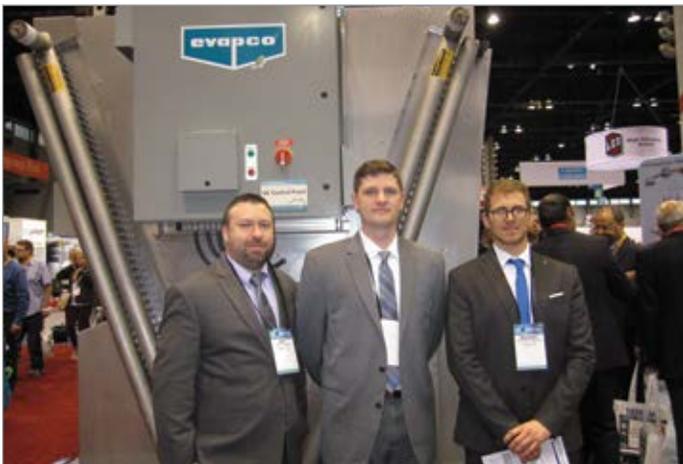
## 2018 AHR EXPO SHOW REPORT



Scott Degier next to the Multistack AMA modular chiller.



Lachlan Richmond-Smith next to a Smardt 2,400-ton chiller.



Matt Shank, Dustin Cohick and Massimo Varano (left to right) stand next to the Evapco dry & adiabatic cooler.

per ASHRAE specifications (A1), readily available from refrigerant manufacturers, exceptionally efficient with proper chiller design optimization and has an ultra-low global warming potential of 1.” The YORK YZ was built to have better efficiency at all design conditions, resulting in impressively low total direct and indirect emissions.

Multistack presented their AMA air-cooled modular chiller with integral total heat recovery. 30% of all Multistack products generate heat of some form. This machine has the ability to either reject the heat out of the building, or recover 100% of it and deliver it back into the hot water system. For every ton of cooling, 1.25 tons of heat is also generated. I spoke with Multistack National Sales Manager, Scott Degier, who said, “The benefit behind modular chillers of this type, is you can plan for today in terms of capacity needs. Not only are you guaranteed to only consume the minimum amount of energy required, but you can always expand your chiller unit as your plant expands over time.” Comparable water cooled systems lose 1.5 to 2 gallons of water every ton hour that is producing refrigeration through blow down and the evaporative process. Degier stated, “On a 60 or 70 ton heat recovery load, depending on how much we run it, that water loss would equate to half a million to a million gallons of water annually. Not only are we saving energy, we are saving water.”

Smardt showcased a massive 2,400-ton water-cooled centrifugal chiller. Atop of it were six independent Danfoss oil free, VFD Turbocor compressors. Smardt oil-free centrifugal compressors use magnetic bearings and variable-speed drive to deliver a quantum leap in IPLV efficiencies compared with conventional oil-lubricated centrifugal, reciprocating, scroll and screw compressors. Magnetic bearings replace conventional oil-lubricated bearings, delivering chiller energy savings of 35% or more over conventional chillers while ensuring long-term reliability.

### Cooling Towers

Evapco showcased their eco-Air Series V-configuration Adiabatic Condenser ranging in capacity from 13 to 415 nominal tons. The basic principle of operation is the superheated refrigerant vapor enters the inlet header connections. Heat from the refrigerant dissipates through the coil tubes surface and out to the fins. The adiabatic air pre-cooling system involves fully wetting a fibrous pad located on the airside of the coil. Ambient air is drawn through the adiabatic pre-cooling pads by the fans located on top of the unit. The air saturates as it passes through the adiabatic pad, decreasing the dry bulb temperature to within a few degrees of the wet bulb temperature.

This new air temperature is referred to as the depressed dry bulb. The pre-cooled air is then drawn through the tube and fin surface, providing a substantial increase in heat rejection capability. Heat from the process fluid transfers to the air, which is then discharged to the atmosphere. Condensed refrigerant exits the unit through the outlet connections. This drastically reduces water consumption.

Baltimore Aircoil Company unveiled the Nexus Modular Hybrid Cooler. This cooler simplifies both the design and installation of fluid cooling systems. The units are up to 8 feet shorter in height, 40% smaller in footprint and 35% lighter in weight than traditional fluid coolers. Modules are designed to be moved with a pallet jack, and fit in a freight elevator, eliminating the need for special rigging equipment. Structural steel requirements can be reduced by up to 50%, and permanent ladders or elevated platforms can be eliminated. All fans, pumps, accessories and controls are factory installed, and wired, for true single-point wiring.

SPX Cooling Technologies, Inc. announced the new Marley MD Everest counterflow-cooling tower. It is designed to meet today's HVAC demands and is suitable for a wide range of applications, delivering over 85% more cooling capacity compared with other preassembled counterflow towers. The MD Everest facilitates faster installation and safer assembly processes by arriving at the site in modules pre-constructed in a controlled factory environment. The structure meets seismic and wind load requirements per ASCE and IBC building codes. At 2,500 tons, it is an ideal one-to-one chiller match. It also achieves a low drift rate, down to 0.0005% of circulating water flow, so less water escapes the tower.

REYMSA manufactures a broad range of all-fiberglass cooling towers. The all-fiberglass body allows for seamless construction, drastically reducing the possibility for leaks. On average, the towers lifespan is 30+ years while requiring minimum maintenance due to its resistance to corrosion. Its modular design allows for increased capacities to accommodate any heat load.

### Cooling System Technologies

The Superior Signal Company showcased their leak detection devices utilized in air, vacuum, refrigerant and any gas system. Director of Sales, Matthew Rooke described the AccuTrak VPE 1000 as the first low cost digital ultrasonic detector at a fraction of the cost compared to other leak detection methods, such as a helium test. The VPE-1000 uses a technique called "heterodyning" to translate ultrasound to a



The Baltimore Aircoil Company Nexus Modular Hybrid Cooler.



Eric Rasmussen at the SPX Marley cooling tower booth.



Ricardo Cavazos and Steve Carter (left to right) in front of their all-fiberglass cooling tower.

## 2018 AHR EXPO SHOW REPORT



Jim and Helen Kovacs from Superior Signal, with Wes Lucko from Chiller & Cooling Best Practices® Magazine (left to right), showcasing the AccuTrak Model VPE-1000 leak detector.



Mark Bickler and Lee Benesh (left to right) at the APEX Engineering Products booth.



Harry Ostaffe at the Bacharach booth.

lower frequency our ears can interpret. The instrument is so sensitive it can hear the blink of an eye, yet most background noise will not interfere with detection accuracy.

APEX Engineering Products Corporation specializes in cleaning solutions for water-operated equipment. One of their products, RYDLYME, is a non-hazardous, non-corrosive, non-injurious, non-toxic, yet fully biodegradable descaler. It is heavily fortified with wetting and penetrating agents. The product actually dissolves water scale, lime, mud, rust and other water formed deposits from water-operated equipment. It is NSF/ANSI Standard 60-certified, meaning it is approved as a safe drinking water treatment chemical. It is also NSF-registered for use in industries such as beverage, pharmaceutical, bottling and food processing plants. Lee Benesh demonstrated RYDLYME's safety by pouring the solution into his hand while holding a seashell. Sure enough, the seashell dissolved before my eyes and his hand was fine.

Bacharach showcased their refrigerant leak detection equipment. As the use of CO<sub>2</sub> gas increases in popularity as a natural refrigerant due to its low environmental impact and increasing HFC regulations, Bacharach is offering an effective CO<sub>2</sub> leak detection monitor for industrial and retail refrigeration applications. This instrument is selective, taking into consideration both response times and operating temperatures in these applications. The Bacharach sensor is rated for use at temperatures as low as -40 °C / -40 °F. Sensors that are not designed to perform in this environment may be inoperable or provide inaccurate CO<sub>2</sub> readings. Bacharach refrigerant leak detection instruments are specifically designed for the application to effectively support the user requirements for which they were intended.

### Conclusion

AHR EXPO is an incredible, powerhouse of a show for all involved in the cooling system industry. Since 1930, the Show has provided a unique forum for the entire HVACR industry, including OEMs; engineers; contractors; manufacturers; distributors; commercial, industrial and institutional facility operators.

I look forward to next year's Expo, in Atlanta, January 14-16, 2019. **BP**

[www.ahrexpo.com/upcoming-shows/](http://www.ahrexpo.com/upcoming-shows/)

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# INDUSTRIAL COOLING SYSTEM INDUSTRY NEWS

## Inaugural 2018 Best Practices EXPO & Conference

Improving plant profitability by optimizing chiller and cooling systems is a major focus of the inaugural 2018 Best Practices EXPO & Conference, to be held at the Chicago O'Hare Crowne Plaza Conference Center, September 17-19, 2018. Chiller & Cooling Best Practices® Magazine Publisher, Rod Smith said, "Identical to our publications, the mission of this event is to help plants increase their profitability by optimizing their industrial utilities. It's a proven fact cooling, compressed air, blower and vacuum systems offer plants low-hanging fruit to increase productivity and profitability!"



The 3-day four-track conference will bring leading experts from the chiller and cooling system industry together with cooling system users at manufacturing plants. Attendees will learn ways in which to optimize the components of their chiller and cooling systems, such as cooling towers, heat exchangers and refrigeration compressors.

The Best Practices EXPO & Conference is thrilled to announce ComEd® as the Utility Host Sponsor of the event. ComEd is the largest electric utility in Illinois and provides service to approximately 4 million customers across Northern Illinois, 70% of the state's population. As a Utility Host Sponsor, ComEd will be speaking at either the Opening or Plenary Session, as well as chairing a conference session on Utility Incentive Programs. ComEd will be featured on the EXPO floor at booth 301. At their 10x20 booth they will be displaying ways their ComEd Energy Efficiency Program can help factories implement efficient solutions that save energy, while improving production and reducing waste.

## ComEd Energy Efficiency Program

The EXPO floor will feature approximately 65 booths displaying the technologies needed to optimize cooling, compressed air, blower and vacuum systems. Smith said, "We'd like to thank MTA Corporation and CTA Chillers as the first chiller exhibitors to sign up!"

To register for the 2018 Best Practices EXPO & Conference, please visit [www.cabpexpo.com](http://www.cabpexpo.com) and for exhibition/sponsorship opportunities contact Rod Smith, Tel (412) 980-9901, email: [rod@airbestpractices.com](mailto:rod@airbestpractices.com).

## Trane Acquires CALMAC Corporation

Trane®, a leading global provider of indoor comfort systems and services and a brand of Ingersoll Rand, announced it has acquired CALMAC® Corporation, a privately held company specializing in cool energy technologies, including IceBank® storage tanks. CALMAC ice storage tanks are integrated with Trane commercial heating, ventilation and air conditioning (HVAC) systems to take pressure off of the energy grid. The ice storage tanks store energy, similar to a battery, and use this energy to cool commercial buildings during times when the cost of energy is high. This reduces the strain on public utilities, reduces operating costs for building owners and allows for better use of renewable forms of energy.

"We are pleased to incorporate CALMAC solutions into our leading portfolio of energy efficient systems and services," said Donny Simmons, the Commercial HVAC business of Ingersoll Rand's president. "With CALMAC, we are well positioned to offer customers even greater choices for reducing energy and operating costs, and capitalizing on the multi-billion energy services market opportunity."

"CALMAC is pleased to be part of Trane," said Mark MacCracken, CALMAC's chief executive officer. "We know that with the support and investments from Trane and its parent, Ingersoll Rand, CALMAC can expand the availability and distribution of our products, serving



Trane announced it has acquired CALMAC Corporation.

## INDUSTRIAL COOLING SYSTEM INDUSTRY NEWS

new and existing customers with the energy storage and ice solutions they demand.”

More than 4,000 businesses and institutions in 60 countries rely on CALMAC’s thermal energy storage to cool their buildings. This includes some prominent buildings in the U.S., such as Rockefeller Center and the Credit Suisse Building in New York City, as well as an Ingersoll Rand North America headquarters building in Davidson, NC. The energy efficient thermal storage systems reduce energy usage by roughly 35%. They accomplish this by decreasing the need for carbon-emitting “peak plants,” power plants kicking in when there is high demand for electricity.

CALMAC operates from one location in Fair Lawn, NJ. The CALMAC acquisition is consistent with Ingersoll Rand’s strategy to help customers solve climate and industrial challenges including energy and fuel efficiency, food waste and productivity. The value of this acquisition was not disclosed or material.

### About Ingersoll Rand

Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands, including Club Car®, Ingersoll Rand®, Thermo King® and Trane®, work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results. For more information, visit [www.ingersollrand.com](http://www.ingersollrand.com).

### Carrier Celebrates 30 Years of Energy Modeling Software

Carrier is proud to celebrate the 30th birthday of its Hourly Analysis Program (HAP) with its engineering customers around the world. The celebration commemorates the original launch of HAP, and its evolution over the past 30 years. Carrier sales engineers are also sharing their excitement about the future release of HAP version 6.0 software, expected next year. Carrier, a world leader in high technology heating, air-conditioning and refrigeration solutions, is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp.

Introduced in 1987, HAP was among the first hour-by-hour energy modeling tools to run on an engineer’s own desktop computer. Before HAP software was available, energy modeling was accomplished manually, or with software tools run on the vendor’s mainframe computer. The original HAP software was groundbreaking by making energy modeling more affordable, more accessible and more flexible for engineers.

In addition, HAP was one of the first tools to offer seamlessly integrated system design and energy modeling capabilities for heating, ventilating and air conditioning (HVAC) applications. Over the past 30 years, HAP has been continuously improved to keep pace with changes in HVAC technology, industry practices, ASHRAE standards and computer technology. It is now used by engineering firms worldwide.

“It’s important for us to celebrate this anniversary with our HAP subscribers, as their engagement and feedback over the years has been key to HAP’s longevity and success,” said Chris Opie, Carrier’s director, North America Commercial Marketing. “Through literally thousands of interactions – with our software help desk experts, in training classes, surveys, and focus groups – our customers have guided us in advancing the software and keeping it at the leading edge of HVAC engineering tools.”

“Those customer consultations have led us to create a new generation of HAP software starting with HAP version 6.0,” Opie added. “HAP version 6.0 will include graphical methods for defining building floor plans and elevations, to greatly improve modeling productivity, as well as advances in load calculation and simulation capabilities.” Expected to be available in 2018, HAP v6.0 will transform how building spaces are designed, while retaining its familiar look and feel to help users apply their expertise and remain productive with the software.

To support consulting engineers, Carrier University provides on-line and classroom training for system design theory. Carrier University also offers specific programs, on-line videos, seminars and symposiums, newsletters and even fully-functioning 90-day free trials of select programs, including HAP.

The HAP program is part of the Carrier eDesign software suite created specifically for the HVAC system designer. Additional information about



*Carrier is celebrating 30 years of smart and efficient HVAC System Software design with engineer customers around the world.*

Carrier eDesign suite of software programs, contact your local Carrier expert or visit [www.carrier.com/eDesign](http://www.carrier.com/eDesign).

### About Carrier

Founded by the inventor of modern air conditioning, Carrier is a world leader in high-technology heating, air-conditioning and refrigeration solutions. Carrier experts provide sustainable solutions, integrating energy-efficient products, building controls and energy services for residential, commercial, retail, transport and food service customers. Carrier is a part of UTC Climate, Controls & Security, a unit of United Technologies Corp., a leading provider to the aerospace and building systems industries worldwide. For more information, visit [www.carrier.com](http://www.carrier.com) or follow @Carrier on Twitter.

### Danfoss Expansion Turbocor Compressors Operations in Florida

Governor Rick Scott announced manufacturer Danfoss Turbocor Compressors will be building a new facility in Tallahassee, Florida, and will add 120 new jobs. The new facility will expand the company's existing footprint within Innovation Park in Tallahassee, including the engineering and manufacturing operations of Danfoss and its brand-new Application Development Center that opened earlier this year.

Governor Scott said, "I'm proud to announce that Danfoss will be building a new facility and creating 120 new jobs for families in Leon County. Florida manufacturers like Danfoss help create job opportunities across our state, and we permanently eliminated the sales tax on manufacturing machinery and equipment last year to make it easier for these businesses to continue growing in Florida."

The new jobs will include full-time research and development positions within advanced manufacturing. Construction is expected to begin in early 2018 and is expected to be completed in 2019. Danfoss is the pioneer of oil-free, magnetic bearing, variable speed technology and manufacturer of high-efficiency electronic components, controls, compressors, and variable frequency drives for air-conditioning, heating, and refrigeration systems.

Ricardo Schneider, president, Danfoss Turbocor Compressors, said, "The investment in this new facility signifies Danfoss' commitment to bringing new, innovative technologies to the market, and to partnering with our customers to engineer high-efficiency, reliable, environmentally-responsible solutions. In Tallahassee, we have the tremendous opportunity to collaborate with world-class researchers in aerodynamics, power electronics, and magnetic technologies at Florida State University. We are excited and proud to grow our capabilities here



*Rendering of the new Danfoss facility in Tallahassee.*

and further build on the success and potential of our relationship with great local partners like FSU."

### About Danfoss

Danfoss engineers technologies enabling the world of tomorrow to do more with less. It meets the growing need for infrastructure, food supply, energy efficiency and climate-friendly solutions. Its products and services are used in areas such as refrigeration, air conditioning, heating, motor control and mobile machinery. The company is also active in the field of renewable energy, as well as district heating infrastructure for cities and urban communities. Its innovative engineering dates back to 1933 and today Danfoss is a world-leader, employing more than 25,000 employees and serving customers in more than 100 countries. Read more about Danfoss at [www.danfoss.us](http://www.danfoss.us).

### About Enterprise Florida, Inc. (EFI)

Enterprise Florida, Inc. (EFI) is a partnership between Florida's businesses and government leaders and is the principal economic development organization for Florida. EFI facilitates job growth through recruitment and retention, international trade and exporting, promotion of sporting events, and capital funding programs to assist small and minority businesses. EFI launched "Florida – The Future is Here" to promote the state as the nation's premier business destination.

### About Leon County Office of Economic Vitality

Leon County Office of Economic Vitality is an economic development model ensuring accountability, transparency, citizen engagement and professional management of economic development projects. The Office of Economic Vitality aims to develop programs and initiatives while simultaneously leveraging ideas, innovations and intellectual capital through the continuous coordination of the community's economic development partners.

## INDUSTRIAL COOLING SYSTEM INDUSTRY NEWS

### SPX Mobile Display Trailer Highlights Marley Cooling Tower Components

SPX Cooling Technologies, Inc., a full-line, full-service industry leader in the design and manufacture of evaporative cooling towers and air-cooled heat exchangers, has outfitted an 18-foot mobile trailer with displays of field-erected cooling tower components. Visitors to the trailer can see the quality and design of Marley components compared with other OEM versions in side-by-side hands-on displays.

The mobile trailer features several Marley innovations, including the new M Series Geareducer<sup>®</sup>, Comp-DS<sup>™</sup> Driveshaft, HP 7000 Fan and a range of heat transfer fill types. The new M Series Geareducer features gears of high strength, case-hardened alloy steel machined to AGMA Quality Class 9 and above. Designed to fit into non-Marley cooling towers for easy replacement, the M Series has heavy-duty double row bearings for 100,000 hours of life or more. To further extend service life, its finned exterior and large oil passageways help maintain lower oil temperatures. The new Geareducer operates without the need for oil pumps, filters or coolers.

The Comp-DS Driveshaft offers a high-performance, lightweight and low-maintenance alternative to steel driveshafts. Marley's patented, unitized, carbon-fiber flexible elements with slip-fit, stainless steel hubs are easy to install and align. They are designed for fans up to 36 feet in diameter and for motors up to 300 hp. All materials are specially selected for cooling tower duty, and constructed to provide maximum protection against corrosion and UV damage.

The Marley HP 7000 cooling tower fan features a unique flared-tip design creating a performance advantage by aiding air movement next to the fan cylinder wall. The airfoil is optimized to move more air with less effort than fans equipped with straight-blade tips. Also offering reduced drag loss, the HP 7000 results in 9% power reduction and lower noise operation.

The mobile trailer also showcases heat transfer fill media types suitable for a range of water qualities. Additionally, scaled-down cross-sections of Marley F400 counterflow and F600 crossflow towers illustrate design and component differences of each tower type.

For more information on the cooling tower mobile trailer, visit [www.spxcooling.com/parts](http://www.spxcooling.com/parts).

#### About SPX Cooling Technologies, Inc.

SPX Cooling Technologies, Inc. is a leading global manufacturer of cooling towers, evaporative fluid coolers, evaporative condensers and air-cooled heat exchangers providing full-service cooling solutions



SPX has outfitted an 18-foot mobile trailer with displays of field-erected cooling tower components.

and support to customers in the power generation, petrochemical, industrial, refrigeration, and heating, ventilation and air conditioning (HVAC) markets for 95 years. For more information, please visit [www.spxcooling.com](http://www.spxcooling.com). SPX Cooling Technologies and its product brands are part of SPX Corporation.

#### About SPX Corporation

SPX Corporation is a supplier of highly engineered products and technologies, holding leadership positions in the HVAC, detection and measurement, and engineered solutions markets. Based in Charlotte, North Carolina, SPX Corporation had approximately \$1.5 billion in annual revenue in 2016 and more than 5,000 employees in about 15 countries. SPX Corporation is listed on the New York Stock Exchange under the ticker symbol "SPXC." For more information, please visit [www.spx.com](http://www.spx.com).

### ASHRAE Launches New Building Energy Quotient Portal

ASHRAE announced the recent launch of the Building Energy Quotient (Building EQ) Portal, providing a faster, more automated approach to receive a Building EQ Performance Score.

"The primary goal of the Building EQ program is to promote more energy efficient buildings and give owners actionable recommendations to improve a building's energy use," says Hugh Crowther, Building EQ committee chair. "We're excited to launch this integrated resource that will help users identify opportunities to lower building operating cost and make informed decisions to increase value." Building EQ rests on ASHRAE methodologies and standards and the experience of credentialed practitioners. These characteristics assure owners they are receiving reliable and consistent results and recommendations.

Two different evaluations, *In Operation* and *As Designed*, can be used independently to compare a candidate building to other similar

buildings in the same climate zone. They can also be used together for an assessment of a building's design potential compared to actual operation. *In Operation* compares actual building energy use based on metered energy information. *As Designed* compares potential energy use based on the building's physical characteristics and systems with standardized energy use simulation. The *In Operation* rating is available now and the *As Designed* rating will be available in early 2018.

Building EQ *In Operation* rating assists in the preparation of an ASHRAE Level 1 Energy Audit to identify means to improve a building's energy performance. This includes low-cost, no-cost energy efficiency measures, and an Indoor Environmental Quality survey with recorded measurements to provide additional information to assess a building's performance.

Metered energy data can now be downloaded into the Building EQ Portal from the ENERGY STAR™ Portfolio Manager. Other features include an Online Data Entry and submission process, Median EUI calculation aligned with ENERGY STAR® and an improved submission approval process.

The portal delivers the following items:

- *Building EQ Performance Score* rates the building's performance and is shown on the screen at all times for all projects.
- *User Input Report* documents the data entered into the Building EQ Portal for a specific project and is available for all submissions.
- *Building EQ Label Report* displays the Building EQ Performance Score and is available for approved submissions.
- *Building EQ Disclosure Report* presents key energy use information for compliance with disclosure ordinances and will be available for a fee for approved submissions.
- *Audit Report Spreadsheets* will be automatically populated with the information gathered during the *In Operation* assessment for use in a final audit report, and will be available for a fee for approved submission.

To learn more about the Building EQ Portal, visit [www.ashrae.org/buildingEQ](http://www.ashrae.org/buildingEQ).

### About ASHRAE

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment.

The Society and its more than 56,000 members worldwide focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today. More information can be found at [www.ashrae.org/news](http://www.ashrae.org/news).

### Geoclima Achieves AHRI ACCL Certification

After achieving the AHRI WCCL certification for water cooled range of chillers at the beginning of this year, Geoclima has just obtained the AHRI ACCL certification, for air cooled chillers.

Applying to the ACCL program (Air-Cooled Water-Chilling Package), Geoclima's air cooled chiller range has earned the trusted AHRI Certified® mark, with the sole exception of evaporative systems and free cooling series. These are excluded from the certification program, but includes Circlemiser, the new ultra-high efficient series of Geoclima air cooled chillers.

AHRI certification is considered worldwide to be the major standard, and the most trusted source of performance certification for heating, air conditioning, water heating and commercial refrigeration equipment. In fact, although it is not mandatory, AHRI certification is very often a specified requirement by consulting engineers, building owners and contractors everywhere, from Australia to the U.S.A. Tests have been carried at a third Party's laboratory under contract to AHRI.

The AHRI Certification of both water cooled and air-cooled chillers represents a step forward in our international growth, recently strengthened with the establishment of Geoclima USA, Inc.

### About Geoclima

Geoclima is an Italian company with more than 20 years of experience in the HVAC sector, specialized in the design and production of non-standard chillers for applications in air conditioning and refrigeration systems, with particular attention to quality and environment. Established in 1994 in Italy, Geoclima has continued to expand worldwide and now it can count on production facilities in Italy, Russia and Thailand and sales and service offices in Italy, Austria, Russia and Australia. Geoclima group also includes companies specialized in production of AHUs, heat exchangers and flanges. This presence in different countries and in different areas of HVAC makes it possible for Geoclima to provide complete service and turnkey solutions.

For more information, visit: [www.geoclima.com](http://www.geoclima.com).



# THE MARKETPLACE

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