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AUGUST 2025



**Care and
Comfort Rule
at New LCO Facility**

16



**Commercial
Flexibility
Through
Collaboration**

26



**Power Generation Facilities:
Protecting Critical Operations
From the Disruptive Impacts
of Lightning**

32

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SPRINKLERS TODAY!**

DEDUCT THE FULL COST OF QUALIFIED PROPERTY IMPROVEMENT!

CARES ACT

The Coronavirus Aid, Relief, and Economic Security (CARES) Act closed a loophole that was included in the TCJA by making QIP 15-year property. This change made businesses of all sizes, regardless of the amounts spent on equipment, eligible to deduct the full cost of commercial fire sprinkler systems using bonus depreciation.

The time is now to upgrade your building's fire safety with a fire sprinkler system or a sprinkler retrofit. Under the new Section 179 guidelines, the one year deduction period phases out after 2022. Any new sprinkler system or retrofit completed between September 27, 2017 and December 31, 2022 will be able to be fully expensed in one year. After 2022, the allowed deduction percentage is as follows:

2021: 100%	2023: 80%	2025: 40%
2022: 100%	2024: 60%	2026: 20%

2027 and after: The depreciation schedule becomes permanently set at 15 years.

WHAT IS QIP?

The Tax Cuts and Jobs Act (TCJA), passed in December, 2017, gave small businesses the ability to deduct the full cost of Qualified Improvement Property (QIP) up to \$1.04 million in the year of installation using Section 179.

QIP is defined as improvements to the interior of an existing building that is not residential property. Commercial fire sprinkler systems, including upgrades of existing systems or retrofitting in existing structures, are considered QIP.

The Section 179 deduction is not phased out over time. However, there is a phase out of the amount allowed as a deduction based on a maximum spending amount of \$2.59 million on equipment in a year. Businesses that spend over that amount will see a dollar for dollar reduction of their eligible deduction. So a business that spends \$3.63 million or more on equipment in a given year would not be allowed any Section 179 Deduction.

WHAT HAS CHANGED?

Prior to the TCJA allowing Section 179 on qualified improvement property, including sprinkler systems, property of this type was only allowed a deduction on a straight line basis over a period of 39 years. In other words, a company spending \$390,000 on a commercial sprinkler system prior to the TCJA would only deduct \$10,000 per year for 39 years.

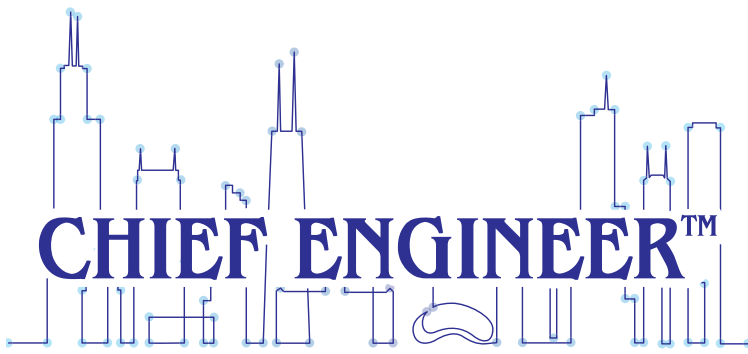
While many believe that the intention of Congress was to make Qualified Improvement Property 15-year property, which would have made this property eligible for bonus depreciation, the TCJA left the life of this property at 39 years. So, a taxpayer who did not elect to use the Section 179 Deduction or who has that deduction phased out would have been left to depreciate the remaining balance of the assets over a 39-year period.

Neither of these deductions is currently available for fire sprinkler systems installed in residential high rises. The National Fire Sprinkler Association (NFSA) continues to fight to obtain incentives for residential structures.

For more information on how these tax incentives might impact the business of your contractors, we would recommend that they contact their tax professionals, as situations differ based on the facts and circumstances for each business. As a general rule, we would not recommend that the Local provide tax advice to the contractors.



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VOLUME 90 • Number 8

Official Magazine of the



THE CHIEF ENGINEERS

ASSOCIATION OF CHICAGOLAND

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The Chief Engineers Association of Chicagoland magazine is published
12 times per year by the Chief Engineers Association of Chicagoland.

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Subscription rate is \$36.00 per year in the United States and Canada; \$110.00 per year in all other foreign countries.
POSTMASTER: Send address changes to 22 W. Washington St., Suite 15112, Chicago, IL 60602

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A Native-American construction firm teams with architects and designers to build a state-of-the-art new health facility for the Lac Courte Oreilles tribe.

26 Commercial Flexibility Through Collaboration
Replacing an aged-out cooling system at a nursing care facility took some creative thinking to fit the budget and the existing space — but the retrofit was a success.

32 Power Generation Facilities: Protecting Critical Operations From the Disruptive Impacts of Lightning
Application-specific lightning solutions for protecting utility operations and infrastructure require consultation with experts in integrating and installing advanced technologies.

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Dear Members,

It's always so incredible how quickly summer flies by. Once the CEAC events are over for the summer, many of us get into the swing of the season, hitting the links, grilling links on our patios, going to festivals or on vacation. It's a busy season and here in Chicago, as you know, we like to get the fun in while we can, before the temperatures drop and the cold rains of fall put a damper on things.

But before we broke for the season, we did have a great night out at Rate Field watching our Chicago White Sox take on the San Francisco Giants. Our thanks go out to Tom Phillips, again, for setting the Chiefs up with the Fan Deck, and we thank everyone who attended and made it so much fun, from the first pitch through the Flo-Rida postgame show. This is a great organization, and it's been a more recent tradition, the Sox game in June, but it's become a summer highlight for us, and I'm glad to see that it has for so many of you, as well.

The biggest CEAC tradition is coming up very quickly — the Chief Engineers 85th Golf Outing at Cog Hill. It's the most popular event of the year, and one that requires an awful lot of planning and hard work each time. We're grateful to Kevin Kenzinger and Brendan Winters for taking on the heavy lifting each year. Registration for this event — which will take place Friday, Sept. 12, with a shotgun start at 9:00am — is open, and sponsorship opportunities are still available. Please reach out to golf@chiefengineer.org with any questions or to sponsor.

Before we embark on a new year of meetings and events, I'll encourage any Chief Engineers out there who are engaged in any particularly interesting or remarkable projects to let us know about them so that we can share the details with our readership. This magazine is our forum — if there's something exciting happening that would pique the interest of your peers, please let us know about it by emailing the editor of the Chief Engineer, Karl J. Paloucek, at kjpaloucek@gmail.com or Tom Phillips at tphillips@chiefengineer.org.

August will bring its heat, as we all know, but getting our boilers and heating systems in shape for the cooler seasons to come should be on our minds right now. And as always, if you need outside support, don't hesitate to reach for your newly updated QuickShopper for our Associate Members, who so deserve our continued support.

Stay safe and stay cool!

Sincerely,


Doug Kruczek





ASHRAE Conference in Phoenix Charts Bold Path Toward Healthier Indoor Environments

ASHRAE successfully concluded its 2025 Annual Conference, held June 21-25 in Phoenix, Ariz. The conference drew 1,990 registered HVAC&R and building science professionals, as well as supporters from around the world to explore critical topics such as heat pumps, refrigerants, thermal energy storage, decarbonization strategies, workforce development and more.

Attendees engaged in more than 80 technical sessions spanning eight tracks. The most highly attended sessions included:

- Using Artificial Intelligence to Make You Irreplaceable
- LIVESTREAM: Gen AI in HVAC Industry: State of Art, Case Studies and Future Applications
- A Tale of Two Campuses: Energy Storage at Arizona's Flagship Universities
- Generative AI applications in HVAC Industry: Tools, Techniques and Best Practices
- Hot! Hot! Hot! Best Practice and Challenges of Heat Recovery from Data Centers
- Registration is still available for virtual access to both conferences, which includes technical sessions and PDH certificates, at tinyurl.com/3a6tpwby

The conference also marked a leadership transition, as Bill McQuade, P.E., CDP, Fellow ASHRAE, LEED AP assumed the role of 2025-26 ASHRAE Society President. In his inaugural remarks, McQuade unveiled the Society Year theme, *Healthy Buildings: Designing for Life*, calling on the professional community to champion indoor spaces that support health, productivity and quality of life.

"The ASHRAE vision is 'A healthy and sustainable built environment for all.' We are all so proud of the work that ASHRAE

has done to protect our climate and outdoor environment by improving energy efficiency, eliminating ozone depleting refrigerants, conserving resources, and decarbonizing buildings," said McQuade. "We have answered the call in the past and helped to solve the difficult problems in times of great need. It is a new day and time for another 'good turn.' We can build on a half-century of progress in the energy performance of buildings and now focus the same effort on the indoor climate and environment. We need to become healthy indoor environmentalists."

McQuade's full remarks and presentation can be found at ashrae.org/president.

A standout moment of the conference took place during the Women in ASHRAE Happy Hour event, where a proclamation was presented on behalf of Phoenix Mayor Kate Gallego declaring June 23, 2025, as International Women in Engineering Day in the City of Phoenix. The proclamation recognized ASHRAE's efforts to "include women who are making significant advancements and serving as leaders in their field."

The conference also featured ASHRAE's annual Honors and Awards program, celebrating the exceptional contributions of members. Outgoing President M. Dennis Knight, P.E., BEMP, Fellow Life Member ASHRAE, delivered his final State of the Society address, highlighting achievements from the 2024-25 Society Year.

"A year ago, in Indianapolis, I issued a call to action: to tell our stories — your stories — about how ASHRAE and this industry foster mentors, role models and collaborators," said Knight. "I encouraged us to articulate our 'why': Why HVAC&R is a great career; why it matters; and why it is essential to the future of our planet. As I conclude my term, I'm proud of what we've accomplished together. I hope this presidency has inspired a new generation to lead with passion and purpose. Remember: every story matters, and every conversation can spark change. Our success — organizationally and personally — happens one conversation at a time."

The ASHRAE Learning Institute (ALI) offered 18 courses during the conference. Among the most attended were:

- *Advanced Concepts in Designing and Retrofitting Energy Efficient Data Centers*
- *Humidity Control I: Design Tips and Traps*
- *V in HVAC – Health and Energy Improvements Using the Indoor Air Quality Procedures*

All registered attendees, both in-person and virtual, will have access to the virtual conference platform during the conference and 12 months post-conference.

The 2026 ASHRAE Winter Conference will take place Jan. 31-Feb. 4, 2026, in Las Vegas, Nev. The AHR Expo will be held Feb. 2-4, 2026.

ASHRAE Unveils 2025–2028 Strategic Plan to Advance Healthy, Sustainable and Resilient Buildings Worldwide

ASHRAE has released its 2025–2028 Strategic Plan, developed to accelerate the transformation to a more sustainable built environment through global leadership in indoor environmental quality (IEQ), decarbonization and workforce development.

The plan centers on three overarching goals:

Lead globally in IEQ, decarbonization and resilience through widely adopted standards, alliances and member-driven technical resources.

Deliver impact-focused engagement by tailoring outreach to key stakeholders, empowering professionals and forging partnerships that strengthen the HVAC&R and built-environment workforce.

Expand access to ASHRAE’s knowledge and opportunities by removing structural, financial and communication barriers and elevating the role of chapters and regions as local innovation hubs.

“Our 2025–2028 Strategic Plan is about advancing buildings that truly support human wellbeing,” said 2025–26 ASHRAE President Bill McQuade, P.E., CDP, Fellow ASHRAE, LEED AP. “This plan ensures that ASHRAE’s work translates into real-world benefits, which include cleaner air, safer indoor spaces, and communities that are better equipped to thrive in a changing climate.”

Four Strategic Initiatives:

- Healthy, Sustainable and Resilient Communities**
 ASHRAE will accelerate the development and adoption of standards, best practices and technical guidance that enhance indoor environmental quality, reduce greenhouse gas emissions and improve the resilience of buildings and communities in the face of climate-related and environmental challenges.
- Empowered Workforce**
 As a continuous focus, the Society will grow its education and professional development efforts to help close the global skills gap. ASHRAE aims to prepare engineers, technicians and decision-makers with the tools and knowledge needed to implement IEQ improvements, achieve decarbonization goals and strengthen resilience across the built environment.
- Organizational Agility**
 ASHRAE will invest in digital transformation and streamlined communication platforms to improve the speed and clarity of information sharing between chapters, regions, technical committees and industry partners, ensuring that the Society remains responsive, collaborative and impactful.

- Emerging Technologies**

The Society will actively identify, evaluate and promote emerging innovations, including AI-powered systems and smart building technologies that support integrated solutions for energy efficiency, occupant health and operational performance.

Key Enablers:

- Rigorous Research**

ASHRAE’s technical work will continue to be grounded in impartial, high-quality research.

- Artificial Intelligence**

ASHRAE will leverage automation and advanced analytics to improve decision-making across the design, construction and operations lifecycle.

- Global Network**

With a broad and diverse membership base, ASHRAE will continue to foster collaboration across disciplines, regions and sectors to ensure that its collective expertise drives meaningful solutions for global building challenges.

Implementation of the 2025–2028 Strategic Plan is already underway, with ASHRAE aligning its programs, standards development and outreach efforts to reflect the plan’s priorities. The Society will provide ongoing updates and progress reports as it works to deliver measurable outcomes.

To read the full plan, visit ashrae.org/strategicplan. 



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NECA 2025 Chicago Convention and Trade Show

Sept. 12-15, 2025

McCormick Place West Convention Center Chicago, Ill.

Still the undisputed leader in the electrical construction industry, the NECA Show continues to grow. The NECA Show puts you face-to-face with manufacturer execs so you can discuss your specific needs for the jobsite, shop, or office. Our goal is to provide the products and services electrical professionals need to stay competitive in the marketplace.

The NECA Show Floor is an interactive classroom. This is the place to test new products and learn about solutions that will drive efficiencies and better results.

- Talk with company execs from 350+ exhibitors
- More than 100,000 square feet of booths filled with thousands of products and services covering all aspects of the growing electrical construction industry
- Attend any of the 33 trade show education workshops: Technology & Innovation, Leadership, and Construction Solutions
- Visit the Showstopper Showcase (newest products) sponsored by Electrical Contractor magazine to see what's been introduced in the market within the last 12 months
- Stop by the NECA Survey booth and help us continue to improve your convention experience. Who knows? You might even win cash and prizes!
- Stay on top of the games in the NECA Sports Zone
- Take a stroll through NECA Park, where you can explore the history of NECA, play games, and relax in an interactive environment

Registering for NECA 2025 Chicago: It Makes Perfect Business Sense

Where else can you participate in educational sessions geared to the needs of NECA contractors, connect with manufacturers and service providers you rely on, and meet up with your fellow contractors? Only at NECA 2025 Chicago. You get all that information and face-to-face networking in just three days, meaning fewer days out of the office, lower travel costs and immediate results!

Member Registration Includes:

- 2,670 minutes of Convention Education sessions
- Three lunches on the Trade Show floor
- Opening Reception with heavy hors d'oeuvres and beverages

- Business Development Seminar
- Closing Celebration with open bar
- Daily Prize Drawing tickets
- Showstoppers Showcase
- Three General Sessions
- 14 hours of exclusive NECA Show access
- 1,650 minutes of workshops on the NECA Show Floor

On the show floor, you'll find:

Emerging Innovation Hub

The Emerging Innovation Hub is where you'll find all that is NECA and all that is new! Explore topics in the electrical construction industry and find cutting-edge answers to your business questions. The Hub includes:

- The Grid Startup Lab and Limited Energy Pavilion
- NECA Services
- Innovation Zone / Innovation Overload Podcast
- Prize Stamping Booth

NECA Education

Learn right on the show floor. Trade Show Education is open to all attendees and includes three workshops:

- Technology & Innovation
- Leadership
- Construction Solutions

NECA Park

Kick off your NECA Show experience at the NECA PARK, sponsored by Schneider Electric — a vibrant networking hub located right at the entrance. Enjoy interactive games, grab a snack, explore the history of NECA, and celebrate our industry's award winners. It's the perfect place to connect, unwind, and get inspired before hitting the show floor.

While at the park, don't forget to indulge in some puppy love and stress relief at the Pause for Paws, sponsored by Graybar, supporting a Chicago-based area animal rescue dedicated to making a difference in the lives of animals.

NECA Innovation

NECA Industry Innovation is dedicated to driving innovation and technological advancements in the electrical construction industry, collaborating with contractors, industry stakeholders, and technology providers to identify emerging trends and strategic opportunities. NECA helps members to stay at the forefront of industry advancements, enhance productivity, and deliver high-quality electrical services.

NECA Gives Back

The goal of the NECA Adopt-a-School program is to support children, teachers and their communities. By promoting the electrical industry and helping schools in need, attendees can support the future of NECA and grow our workforce, all at the same time. This year, NECA Adopt-a-School will focus on Hope Academy in Chicago. The Silent Auction, sponsored by 3M, will be back with sports memorabilia, exotic trips, fine wine and liquor packages, jewelry, and more.

Enter the Daily Raffle

Spin the Wheel and explore the latest products and services from more than 300 industry exhibitors.

Only full conference registrants are eligible. To enter, make sure to drop your ticket 15 minutes before the show closes at the NECA Booth. The Grand Prize Ticket must be stamped each day at the NECA Booth, with a drawing held after the closing general session for a chance to win \$10,000.

For more information or to register for the NECA 2025 Chicago Convention and Trade Show, visit www.necaconvention.org.



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Q-PAC to Join AMCA: Announces Construction of AMCA 270 Airflow Tunnel


Q-PAC, recently announced that it will officially be joining Air Movement and Control Association (AMCA) International. The move marks a significant step forward in Q-PAC's ongoing mission to create the world's smartest fan for commercial air handlers.

As part of its commitment to simplifying airflow, Q-PAC also recently broke ground on the construction of a state-of-the-art AMCA 270 airflow tunnel, which will be operational in the fall of this year. This facility will meet AMCA's 270 testing standards, pushing the boundaries of airflow measurement accuracy and reliability for multimotor plenum fans.

Joining AMCA reinforces Q-PAC's position as the leader in the design and manufacturing of multimotor plenum fans and places them alongside other leaders in air movement technology. Through AMCA membership, Q-PAC will actively participate in shaping and driving global standards that define the future of HVAC airflow. It also reinforces their dedication to third-party verification, product performance integrity, and industry-wide best practices.

"We've created a new type of fan, and the industry is skeptical. We acknowledge that. However, we're out to prove this isn't just a claim. Joining AMCA and building this airflow tunnel are the first steps in proving that building owners deserve a better fan. The fact that new air handlers are shipping with 50-year-old technology is insane. The industry deserves better, and multimotor plenum fans and Q-PAC are forging a new path." said Q-PAC's CEO, Matt Kent. "Joining AMCA and certifying our fan will change how fans are measured. We don't believe extrapolating the performance of a single ECM plug-fan gives an accurate representation of how a fan with multiple motors operates. Our mission is to have experimentally tested data to prove performance."

Q-PAC believes that it is investing in more than just testing infrastructure — it's investing in the future of airflow. Q-PAC asserts that the state-of-the-art tunnel will provide unmatched capabilities in airflow analysis and fan system development, offering insights that fuel its ongoing quest to build the world's smartest fan for commercial air handlers. The lab will provide the ability to test a multitude of MPF configurations ranging from 2,000 to 70,000 CFM for a single fan.

This investment is intended to help ensure that every Q-PAC fan is designed with the highest level of precision, and is prepared to meet the complex demands of modern HVAC systems, especially in critical applications like healthcare, education and office buildings, where comfort is key. 



By joining AMCA and beginning construction on an AMCA 270 Airflow Tunnel, Q-PAC aims to invest in the future of airflow.



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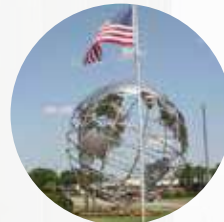
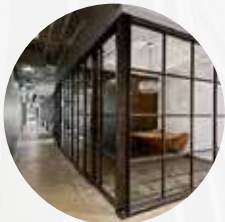
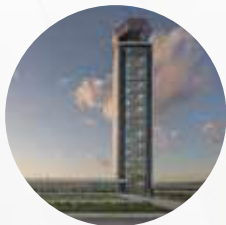
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THERMOGRAPHY AND PREDICTIVE MAINTENANCE

An infrared (IR) camera or similar device allows us to escape the visible light spectrum and view an object based on its temperature and its proportional emittance of IR radiation. How and why is this ability to detect and visualize an object's temperature profile important in maintaining systems or components? Like all predictive maintenance technologies, IR tries to detect the presence of conditions or stressors that act to decrease a component's useful or design life. Many such conditions result in changes to a component's temperature — for example, a loose or corroded electrical connection results in abnormally elevated connection temperatures due to increased electrical resistance. Before the connection is hot enough to result in equipment failure or possible fire, the patterns are easily seen through an IR imaging camera, and the condition can be identified and corrected. Rotating equipment problems will normally result in some form of frictional change that will be seen as an increase in the component's temperature. Faulty or complete loss of refractory material will be readily seen as a change in the component's thermal profile. Loss of a roof's membrane integrity will result in moisture that can be readily detected as differences in the roof thermal profile. Early identification of such problems that otherwise might go unnoticed can go a long way to avoiding excessive repair or downtime costs. Once the problem is located, thermography and other test methods — as well as experience and common sense — are used to diagnose the nature of the problem.

Training for infrared thermography is available through a variety of system manufacturers and vendors. In addition, the American Society of Non-destructive Testing (ASNT) has established guidelines for non-destructive testing (NDT) (Level I, II or III) certification (NASA 2000). These three levels are designed to take the student from Level I — where the student is competent with equipment function and use, to Level II — where the student is fully capable and experienced and can complete diagnostics and recommendations, to Level III, where the student is fully experienced to supervise and teach Level I and II students.

The cost of thermography equipment varies widely depending on the capabilities of the equipment. A simple spot radiometer can cost from \$500 to \$2,500. An IR imager without radiometric capability can range from \$7,000 to \$20,000. A camera with full functionality can cost from \$18,000 to \$65,000. Besides the camera hardware, other program costs are involved. Computer hardware, personnel training, manpower, etc., needs to be accounted for in the budget.

Payback can vary widely depending on the type of facility and use of the equipment. A production facility whose downtime equates to several thousands of dollars per hour can realize savings much faster than a small facility with minimal roof area, electrical distribution network, etc. On average, a facility can expect payback in 12 months or less. A small facility may consider using the services of an IR survey contractor. Contracted services are generally the most cost-effective approach for smaller, less maintenance-intensive facilities. There are several CEAC Associate Member organizations that offer such services for whatever application you might require.

Rotating equipment applications are a small subset of the possible areas where thermography can be used in a mechanical predictive maintenance program. In addition to the ability to detect problems associated with bearing failure, alignment, balance and looseness, thermography can be used to define many temperature profiles indicative of equipment operational faults or failure in steam systems, heaters and furnaces, pumps or anything involving fluids, as well as motors and any rotating equipment.



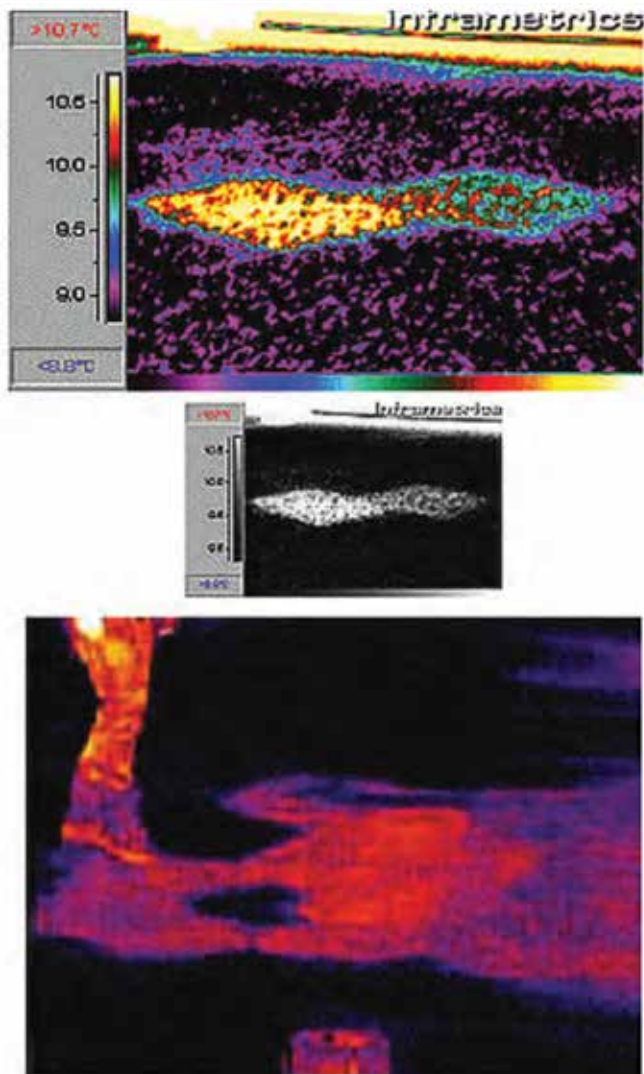
IR scans of multiple electric motors can highlight those with hot bearings indicating an imbalance or wear problem.

IR Diagnostics of a Pump

A facility was having continual problems with some of its motor and pump combinations. Pump bearings repeatedly failed. An IR inspection confirmed that the lower thrust bearing was warmer than the other bearing in the pump. Further investigation revealed that the motor-pump combination was designed to operate in the horizontal position. In order to save floor space, the pump was mounted vertically below the motor. As a result, the lower thrust bearing was overloaded leading to premature failure. The failures resulted in a \$15,000 repair cost, not including lost production time (\$30,000-per-minute production loss and in excess of \$600-per-minute labor).

IR Diagnostics of Steam Traps

Steam trap failure detection can be difficult by other forms of detection in many hard-to-reach and inconvenient places. Without a good trap maintenance program, it can be expected that 15 to 60 percent of a facility's traps will be failed open. At \$3/1,000 lb — very



IR thermography is a powerful tool for locating roof leaks. As shown in the images, lighter colored regions indicate areas of potential leakage.

conservative — a ¼-in. orifice trap failed open will cost approximately \$7,800 per year. If the system had 100 traps and 20 percent were failed, the loss would be in excess of \$156,000. An oil refinery identified 14 percent of its traps were malfunctioning and realized a savings of \$600,000 a year after repair.

IR Diagnostics of a Roof

The old adage “out of sight, out of mind” applies forcefully to roof maintenance. We generally forget about the roof until it leaks onto our computers, switchgear, tables, etc. Roof replacement can be very expensive and at a standard industrial complex easily can run into the hundreds of thousands of dollars. Depending on construction, length of time the roof has leaked, etc., actual building structural components can be damaged from inleakage and years of neglect that further drive up repair costs. Utilization of thermography to detect loss of a roof’s membrane integrity is an application that can provide substantial return by minimizing area of repair/replacement. Roof reconditioning cost can be expected to run less than half

of new roof cost per square foot. Add to this the savings to be gained from reconditioning a small percentage of the total roof surface, instead of replacement of the total roof, and the savings can easily pay for roof surveys and occasional repair for the life of the building with change left over.

In one case, a state agency in the northeast operated a facility with a 360,000 square foot roof area. The roof was more than 22 years old and was experiencing several leaks. Cost estimates to replace the roof ranged between \$2.5 and \$3 million. An initial IR inspection identified 1,208 square feet of roof requiring replacement at a total cost of \$20,705. The following year another IR inspection was performed that found 1,399 square feet of roof requiring replacement at a cost of \$18,217. An IR roof inspection program was implemented and the roof surveyed each year. The program resulted in less than 200 square feet of roof requiring replacement in any one of the following 4 years. (One-year results were as low as 30 square feet.) The total cost for roof repair and upkeep for the 6 years was less than \$60,000. Had the facility been privately owned, interest on the initial \$3 million at 10 percent would have amounted to \$300,000 for the first year alone. Discounting interest on \$3 million over the 5-year period, simple savings resulting from survey and repair versus initial replacement cost (\$3 million to \$60,000) amount to \$2,940,000. This figure does not account for the interest on the \$3 million, which would result in savings in excess of another \$500,000 to \$800,000, depending on loan interest paid.

Whether you or your team members opt to undergo IR testing training or it’s more practical to hire outside help, routine IR testing is one of the smartest tools in your arsenal that can help to abate costly repairs and resulting downtime. For more information, reach out to your CEAC Associate Member organizations that provide IR testing services.

CEAC Associate Member companies providing infrared testing services include*:

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jbelectric.com

Quad Plus Testing
qp-testing.com

Temperature Service Company
temperatureservicecompany.com

Thermoscan, Inc.
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Source: U.S. Dept. of Energy *Inclusion here does not imply endorsement on the part of the U.S. Dept. of Energy.

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The image shows an industrial facility with a complex network of white insulated pipes. Two prominent pipes at the top are labeled 'HEATING WATER RETURN' and 'HEATING WATER SUPPLY' with yellow arrows. Below the pipes, two large green pumps with white cylindrical bodies are mounted vertically. Each pump has a circular green grille on its side and is connected to a network of copper pipes. Pressure gauges are visible on the copper piping. The background shows a ceiling with structural beams and other industrial equipment.

Care and Comfort Rule at New LCO Facility

By John Vastyan

For decades, the Lac Courte Oreilles (LCO) Tribe, located in Wisconsin, has faced declining access to healthcare. The tribe has struggled with heart disease, stroke, cancer, diabetes, arthritis and chronic diseases, many of which are preventable.

At last, an answer has developed in the form of a gleaming new facility in Hayward, Wis. It represents a nearly-\$60 million investment in the healthcare future of the local Chippewa community.

The new, 75,000-square-foot LCO tribal health center will replace two aging facilities elsewhere on the LCO reservation. The facility enables comprehensive health and wellness services to be provided in one state-of-the-art location with the ability to accommodate more than 77,400 annual patient visits.

Dr. Gary Girard, the former director of the LCO Community Health Center, who helped develop the plans for the new facility said, "The new building [makes it possible] to double the number of patients served annually."

The new health center houses medical and dental clinics, a pharmacy, behavioral health services, substance use disorder recovery resources, a chiropractor, an optometrist, a podiatrist, a clinical lab and a dedicated space for medical imaging.

LCO Secretary-Treasurer Bill Trepanier said, "The Community Health Center — with its level 4 ambulatory bay [to provide emergency care], and a host of preventive medical, mental healthcare and dental care is a beacon of innovation and resilience, reflecting not just the spirit of our community but the

enduring strength of our people across Indian Country."

Roseville, Minn.-based Woodstone, Inc., won the contract as the facility's general contractor. The company is a leading national Native American-owned construction firm with a diverse offering of services and expertise. The firm specializes in a wide range of projects such as hospitality, healthcare and gaming work, and multifamily, senior care and educational facilities.

Jonathan Scott, Woodstone project manager, said of their work at the LCO healthcare facility, "We were hired by LCO to help them with their vision for a new healthcare facility that would replace the existing and outdated facility they previously used.

"This new facility includes a very sensible and functional design, with optimal year-round comfort. In addition to the other services mentioned, it includes space for urgent care, a pharmacy and radiology," added Scott. "We teamed up with Brunton Architects and Engineers to design the building; we also worked with key members of the tribe to assure their design needs were met. Our collaborations brought their vision to life. The results are a beautiful multi-functional healthcare facility that will serve many generations."

Plumbing & Mechanical Systems

KBK Services, Inc., based in Ashland, Wis., and with offices in Medford, Wis., was tapped by the general contractor, Woodstone, Inc., to install all plumbing and mechanical systems.



On the left, two of the Taco SelfSensing SKV pumps are shown; the VFDs (variable frequency drives) are mounted to the right.



VFDs, shown here, are connected to the Taco SelfSensing SKV pumps.

KBK, established in the 1940s, provides a wide range of plan and spec, and design-build commercial and industrial work — from backflow testing and breadth of hydronic and HVAC installation and service work to welding fabrication — while specializing in educational, hospitality and healthcare work.

“This job was well within our wheelhouse,” said Shawn Lund, KBK Services project manager. KBK Services is a full-service plumbing and HVAC contractor. KBK crews began their rough-in work in May of 2023, and closed out their responsibilities by Christmas 2024.

The LCO facility’s hydronic heating and cooling systems is a two-pipe design, with all of the cooling, and much of the heat distribution served through fan-coil air handling units (AHUs) coupled with 4-inch to 12-inch single-duct Titus VAV boxes.

The exception is a substantial network of in-floor radiant heat installed for exterior rooms along the north wall. “Those areas are slab-on-grade, with no basement level below them,” explained



The VFDs that serve the Taco SKV pumps are manufactured by Danfoss.

Lund. “Winter months can be brutally cold in Hayward, so the addition of radiant heat provides full assurance of comfort for those interior spaces event when winter’s at its worst.”

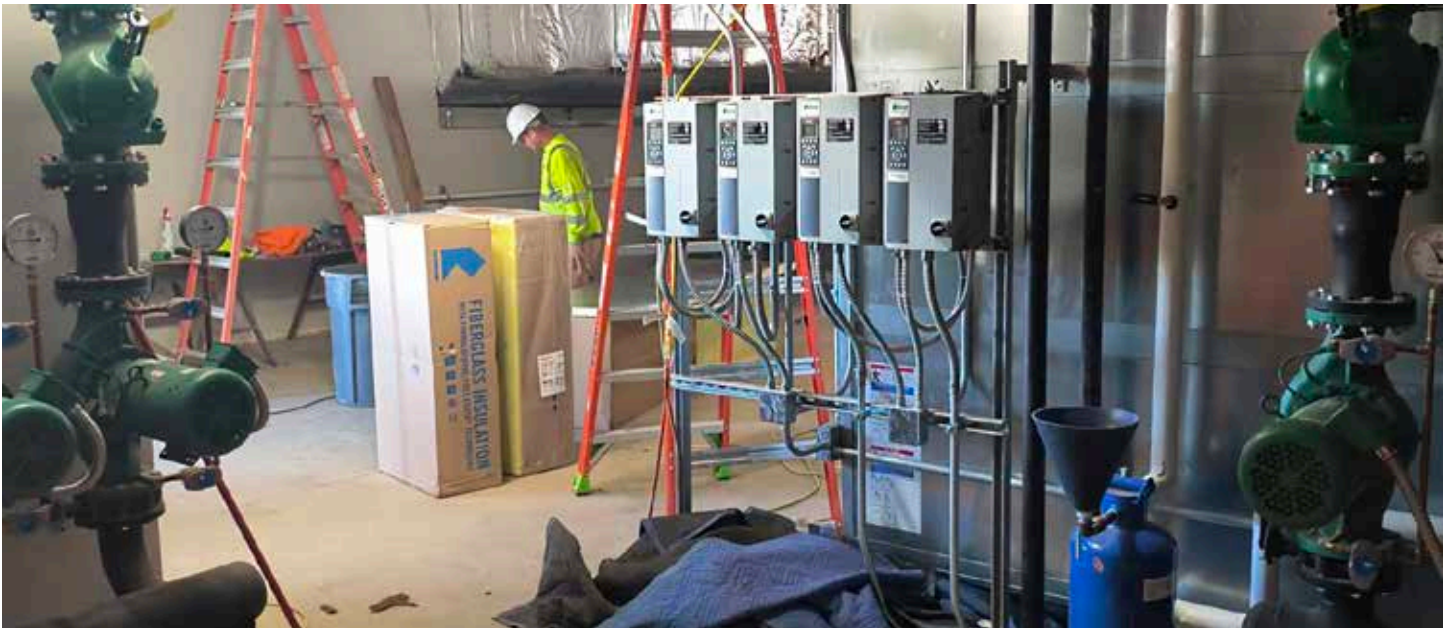
Lund explained that equipment specifications for the heating and chilled water systems were made by Brunton Architects and Engineers, based in North Mankato and Minneapolis. A 186-ton Daiken chiller was chosen as the source of chilled water, serving two large air handling units and 68 area-specific terminal units. Connected to the AHUs for provision of heat are two 1500 MBH Riello boilers. Year-round comfort is achieved with hydronic flow managed by four Taco SKV Series (model 4007D) SelfSensing vertical in-line pumps connected to Danfoss VFDs.

Pump Smarter, Not Harder

“SelfSensing with ProBalance pumps can be run in a constant-flow mode when governing primary chiller and boiler circulation — just as they’ll do at this facility,” added Lund. “Or, they could be applied to provide variable flow mode for secondary pumps, and constant pressure mode for booster pumps. A key



Key components of the mechanical system include Taco SelfSensing pumps, and a Taco buffer tank.



A construction worker inspects progress in the mechanical room at the 75,000-square-foot LCO tribal health center Ashland, Wis., under construction.

advantage is efficient and accurate system balancing.”

Pump performance curves are embedded in the Danfoss VFD controller’s memory. During operation, pump power and speed are monitored, enabling the controller to establish the hydraulic performance and position in the pump’s head-flow characteristic. This allows the pump to continuously identify required head and flow at any point, providing accurate pressure control without the need for external sensor feedback. With built-in diagnostics, the VFDs (variable frequency drives) continuously monitor the system and provide early warning alerts, reducing downtime and enhancing system performance — important for a health care facility.

ProBalance pinpoints true system resistance without inducing false head, balancing internally and automatically. This means lower installed cost, no errors in setpoint, and a simplified construction schedule.

The pumps include automatic alerts for no-flow, dry-run and end-of-curve operation, and are electronically protected for overload and locked rotor conditions. SelfSensing SKV pumps — like those used for this job — are available in sizes from 1.5 hp to 60 hp. (Taco’s SKS line is available from 1.5 hp to 250 hp.)

“A real benefit for us, as installers, is that these pumps offer the ability to see all facets of system performance,” continued Lund. “And if adjustments are needed, they have the ability to easily balance pump curves to precisely fit system resistance. This greatly reduces system balancing and commissioning time while moving that capability to the installer, instead of an expensive add-on control or commissioning agent.”

Previously, commissioning agents would need to invasively insert differential pressure sensors at a furthest point from the control VFD to accomplish flow metering, in addition to requisite programming, hardware and wiring — all at substantial cost.

“For building owners, this means custom integration with dramatically reduced installed cost, greater system intelligence, and continuous monitoring and control of system performance, and energy management for the life of the building,” added Lund.

SelfSensing pumps do not require sensors installed in the pipe and come with the VFD factory-tuned to that specific pump model. Pre-programming of the Danfoss VFDs to precisely control pump speeds and match system demand means the facility’s HVAC system operates at peak performance, delivering reliable comfort while minimizing energy use.

To simplify installation further, the drives are factory-wired and mounted directly to the pump or can be alternatively wall-mounted, depending on the mechanical room design.

“With SelfSensing pumping, there are no holes in the pipes for tubes or taps connecting remote, differential sensors together with the pumps,” said Richard Medeiros, director of commercial training at Taco. Self-sensing pump system design offers superb accuracy for variable flow, higher energy efficiency, lower installed costs and improved system stability.”

“This is one we can take pride in,” assessed Steve Kohn, Fluid Handling, who helped with specification of the pumps. “We formed a great design team, with the goal to deliver a hydronic system, with radiant delivery in primary patient rooms, worthy of the facility’s noble cause: first-class healthcare for the Chippewa Indian community of Hayward. We’re confident that we’ve ensured reliable, energy-efficient, sustainable system operation for generations to come.”

John Vastyan owns Common Ground, a trade communications firm based in Manheim, Pa.

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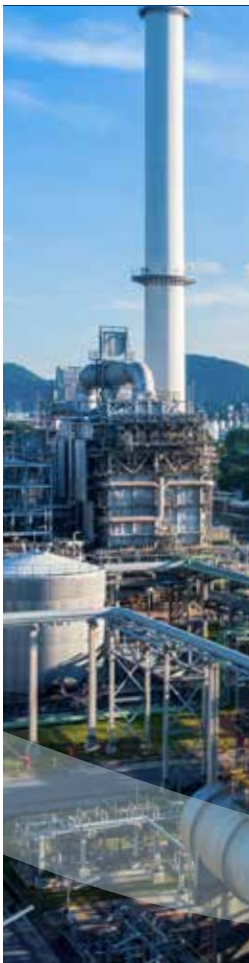


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\$4,000 | Lunch Sponsor

Halfway house sponsor. Spots limited

\$3,500 | Dubs Special

One hole sponsorship and one foursome on Dubs Dread

\$4,000 | Tee off Bloody Mary Bar

(limit 2 at registration), set up sponsor table, exposure to two courses during registration

\$2,000 | Drink Cart Sponsor (limited)

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\$2,000 | Par 3 Hole Sponsor

Sponsor table set up on hole

\$1,500 | Par 4 or 5 Hole Sponsor

Sponsor table set up on hole

\$150 | Individual Dinner Ticket

comes with two drink tickets and one dinner ticket

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Course 2 - Ravines

\$450 per golfer | **\$1,800** per foursome

Course 4 - Dubs Dread

\$500 per golfer | **\$2,000** per foursome

Course assignments will be sent out the week of the outing. Check-in will be at assigned course.



Watts recently renewed its membership with the U.S. Green Building Council.

Watts Renews USGBC Membership to Deepen Commitment to Sustainable Building Leadership

As part of an ongoing push towards a more sustainable future, Watts has renewed its membership with the U.S. Green Building Council (USGBC), reinforcing its long-standing commitment to sustainability and environmental stewardship.

Watts is recognized as a sustainability leader within the USGBC community.

“Being a USGBC member helps us to prioritize sustainability at Watts and keep up to date on sustainability innovations. Between the Greenbuild Conference and online training, there are a variety of resources available for us to continue to grow our knowledge,” said Watts Product Sustainability Engineer Vas Gnanadoss. “With LEED v5 being released, we have used the USGBC resources to help us better understand the standard and to help improve the design our products accordingly.”

As part of its transparency and accountability efforts, Watts

publishes an annual Sustainability Report that outlines its progress, goals, and impact across environmental, social, and governance (ESG) areas. In addition to corporate-level reporting, Watts is expanding product-level sustainability communication through clear labeling on packaging and literature, as well as sustainability flyers that highlight each product’s specific environmental benefits and Environmental Product Declarations (EPDs). These tools highlight the environmental impacts of some of their top products and help customers make informed decisions while reinforcing Watts’ commitment to measurable, meaningful sustainability.

To learn more about Watts’ sustainability initiatives, visit watts.com/our-story/sustainability.






Watts' golf-themed Q3 edition of its Learn & Win Sweepstakes is set to run from through Sept. 30, 2025.

WATTS LAUNCHES Q3 "LEARN & WIN" SWEEPSTAKES FEATURING GOLF-THEMED PRIZES

Watts has announced the launch of its Q3 edition of the Learn & Win Sweepstakes, set to run from through Sept. 30, 2025. Designed with golf enthusiasts in mind, this quarter's promotion offers premium, name-brand prizes that aim to elevate a player's game both on and off the course.

The Learn & Win Sweepstakes rewards customers for expanding their knowledge of Watts' industry-leading solutions. By participating in training opportunities, customers deepen their understanding of Watts' solutions while gaining the chance to win one of several high-end golf prizes.

To enter, customers earn Learn & Earn tickets by completing Watts training through eLearning modules, attending Lunch & Learns, or participating in in-person sessions at a Watts Learning Center. Each ticket serves as an entry into the prize drawing of their choice. The more training completed, the more opportunities customers have to win.

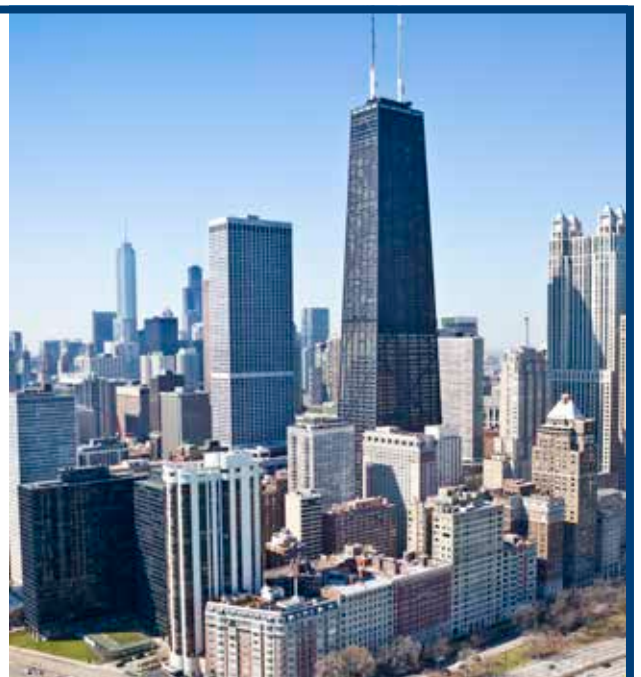
For more information about the Q3 Learn & Win Sweepstakes, visit watts.com/learnandwin. 



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Commercial Flexibility Through Collaboration

By Dan Vastyan

(left to right) Troy Lawson, Ben Warren and Landon Warren.



Four 10-ton Fujitsu VU-V systems were installed to supply cooling and supplementary heat to the medical facility.

Now well into 2025, employers large and small are adopting return-to-office policies, calling remote workers back into the fold. Meanwhile, public and private spending on medical facilities is increasing. Investments focus on modernizing hospitals, outpatient centers and related infrastructure. And, real estate and construction costs are at an all-time high.

In the world of commercial real estate, there's never been greater incentive to retrofit and upgrade existing space. For engineers and HVAC installers, operating within the constraints of an existing building envelope — or existing systems — requires flexibility.

This was the reality faced by Warren Systems, Inc., last year when they were chosen to replace a cooling system at an office and senior care facility owned by Lapeer County Medical Care, in Lapeer, Mich.

Two large, 75-year-old air handlers supplied air conditioning to part of the 202-bed skilled nursing care facility, each containing a 35-year-old DX (direct exchange) cooling coil and a hydronic coil for space heating.

The boiler system was still serviceable, but the cooling system had aged out, and facility managers were looking for the most cost-effective form of replacement. The 35 professionals at Warren Systems, specializing in commercial work, have served Michigan and surrounding states for 20 years and were able to offer several options.

Lapeer Medical wanted to replace the cooling system in half the building immediately while also seeking a plan to retrofit the other half in the near future.

Fitting the Budget

"Originally, we were asked to bid the project as a conventional VRF system, with separate indoor units for each room," said Ben Warren, general manager. "This didn't fit the budget or the space constraints of the old building, so we took a closer look at the existing air handlers to determine if they could be paired with custom-made coils and a VRF DX Kit."

Ben and his brother Landon Warren, service manager, discussed the project with Scott Breimayer and Skylar Kaczanowski, technical service advisors at Johnstone Supply's West Michigan location.

Warren Systems had retrofitted existing air handlers with custom VRF coils in the past, but not with Fujitsu's AIRSTAGE equipment, which Johnstone Supply carries. That said, they had used AIRSTAGE VRF equipment enough in the past to be confident in the equipment and the support they received from Johnstone.

"Warren Systems does great work and does not often require assistance from us," said Kaczanowski. "You give them instructions, show them once and they take it from there. But given the custom nature of this project, they wanted a sounding board. We brought Wayne DeCosa, Fujitsu applications engineering manager, into the conversation. We had a few questions about function settings and unit operations, and he can always answer questions quickly."

The proposed retrofit was not only feasible, but it also reduced the upfront cost by 30 to 50 percent compared to a conventional VRF installation. Removing indoor heads from the equation eliminated the need to install hundreds of feet of copper line set, so the DX approach also eliminated all mechanical work within the occupied space.

Careful Design

"We had an air balance test conducted on all 10 zones and checked the capacity of the existing coil, said Ben Warren. "Using those specs in Fujitsu's Design Simulator gave us the proper VRF equipment. After that, we had a custom, four-circuit interlaced coil built for the project by Coil Replacement Company (CRC)."

Four 10-ton AIRSTAGE VU-V condensers were specified for the 40-ton mix coil. This provided redundancy without the need for dampers.



Service technician Troy Lawson accesses the VU-V control panel.



Johnstone Supply's Skylar Kaczanowski reads VRF system sensors with Ben and Landon Warren.

By using Fujitsu's DX Kit, coils can range from 1.5 tons to 14 tons per unit. Installations can be modular, with multiple large coils, as Warren Systems required at Lapeer Medical.

"We found that the existing blowers — both the supply and return fans — in the big air handler were in good shape, but they needed new drives to accommodate the four DX Kit circuits," said Ben Warren. "We installed VFDs on each fan to modulate with the VRF system."

This approach didn't require an upgraded control system. Before the retrofit, the system simply called for stage-one or stage-two cooling to the condenser. The only change needed to the controls was how the system is operated.

"Because the VU-V system is set up for demand, we had to add an operational setpoint on the Fujitsu side," said Kaczanowski. "This tells the VRF condensers how hard to run. The control system still uses a discharge setpoint temperature, only now a 0-10v signal is used. I completed this in a single day working with a controls company."

Install and Support

Installation work took the Warren Systems team two weeks in the spring of 2024. The four VU-V condensers are installed on the roof of the building. Hail guards were added to the condensers to protect against Michigan's harsh weather.

The new custom coil was installed within the large air handler, downstream of the existing hydronic coil. While the AIRSTAGE system is not sized for the full heating load of the building, it can be used in place of the boiler system depending on outdoor ambient temperature, or as a source of emergency heat if the boiler system fails.

After commissioning the system with Kaczanowski, Landon Warren confirmed that the new coil provides discharge air temperatures ranging from 50-58°F.

"We've done a lot of VRF projects in the past and have learned some hard lessons due to lack of support from the distribution channel," said Ben Warren. "Fujitsu partners with the right people. Johnstone provided outstanding support throughout this entire process. That's why we work with them."

"I used to work for a VRF manufacturer," said Landon Warren. "Most contractors want to install what they know instead of taking a chance with something new. My advice is to get on the phone with people who can support you. They may have a better, easier, more profitable solution, and most importantly — one that will result in a happier customer. If you can't get that level of support externally, look elsewhere or bring that expertise in-house."



Insulated expansion valves in the mechanical room.

Further Improvements

“The existing system was pretty crude, which comes as no surprise considering its age,” said Ben Warren. “The hot deck/cold deck system worked in such a way that the hot water coil was constantly circulating, even when cooling was called for. We installed a shutoff valve that communicates with the heating circulator so that the loop goes cold in cooling mode.”

As with any medical facility, there’s an extreme demand for fresh air and filtration, and that load is constantly changing. The fresh air intake and exhaust louvers are downstream of the return air plenum. Warren System installed enthalpy sensors,

allowing the air handler and VRF system to accommodate the increased load of the makeup air.

“There’s a minimum fresh air setting, as you’d expect, but we can also draw 100 percent filtered outdoor air to economize,” explained Ben Warren. “From what we’ve been told, Lapeer Medical’s energy savings is astronomical. It’s hard to quantify because the building is very large with only one meter, the second air handler hasn’t been retrofitted, and data from a full year hasn’t been collected and scrutinized yet. However, the customer has been thrilled with the energy reduction and improvements in comfort.

Next Steps

The new cooling system at Lapeer Medical operated flawlessly last summer, but there’s work yet to be done. Warren Systems designed a similar, though smaller, system for the remaining portion of the building, more recently retrofitting the second air handler.

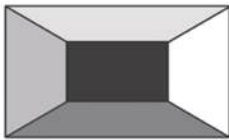
Warren Systems remotely monitors the VRF systems via Fujitsu’s AIRSTAGE Cloud, a cloud-based BMS that includes monitoring, management and maintenance of all Fujitsu products and select third-party equipment.

“This project demonstrates the flexibility that can be achieved when you couple an excellent rep with an excellent contractor,” said DeCosa. 📱📱

Dan Vastyan is president of Common Ground, a trade communications firm based in Manheim, Pa. He has researched and written about state-of-the-art mechanical systems since 2009.



Ben Warren and service technician Troy Lawson discuss system thermostats in the mechanical room.



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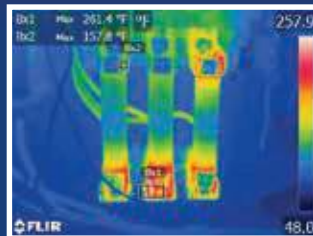
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When completed, Ozinga's low-carbon cement manufacturing facility will be the largest in North America. (PRNewfoto/Ozinga)

Ozinga Breaks Ground on North America's Largest Low-Carbon Cement

Ozinga recently broke ground on a cutting-edge low-carbon cement manufacturing facility in East Chicago, Ind. Equipped with one of North America's largest vertical roller mills, the new plant will produce one million tons of low-carbon cementitious materials annually.

Strategically located with direct access to rail, truck, and water (via the Great Lakes and the inland waterways of the U.S.), the facility will serve customers across the United States and Canada, reinforcing Ozinga's commitment to sustainable infrastructure, supply chain resilience, and American manufacturing.

The East Chicago facility and its related operations are projected to create approximately 150 construction and long-term full-time jobs, fueling regional economic growth. Operations are expected to begin in 2026. 🏗️ 🏗️

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Power Generation Facilities: Protecting Critical Operations From the Disruptive Impacts of Lightning

By Del Williams



Selecting the right combination of a range of solutions requires deep expertise and an understanding of each facility's unique vulnerabilities.

Power generation facilities are among the most vulnerable to operational disruptions caused by direct lightning strikes and their secondary effects, due to a combination of their physical structure, operating environment, and critical reliance on sensitive equipment. Even in areas with infrequent thunderstorms, severe lightning events can still occur, leading to catastrophic damage, injury, downtime, fines, and negative impact to corporate reputation.

When this occurs, the financial consequences can be devastating. A single strike can ignite fires, destroy valuable assets, and lead to costly downtime and environmental damage.

This is leading many power generation facilities to adopt lightning defense strategies designed to protect structures, equipment, and personnel. However, with many technological advances since the invention of the Franklin Lightning Rod more than 250 years ago, navigating the maze of potential lightning protection solutions can be daunting.

Lightning defense is a specialized body of knowledge that has accumulated since the days of Ben Franklin. Broadly speaking, lightning defense encompasses two key

approaches: lightning protection and lightning avoidance, such as charge transfer technologies. Proper grounding and surge protection are also critical.

Due to the wide range of available technologies, mounting an effective defense against lightning-related threats typically requires a tailored strategy that integrates multiple solutions, each having its own specific purpose for minimizing damage or avoiding it altogether. The optimal combination depends on the specific site conditions and the nature of the operation.

To navigate this complexity effectively, it is essential to engage qualified lightning protection experts who can conduct thorough site evaluations, identify and prioritize vulnerabilities, and recommend appropriate protection solutions.

“Rather than offering a one-size-fits-all solution, lightning protection and mitigation recommendations should be tailored to a facility’s unique vulnerabilities, whether that involves direct strike avoidance, secondary damage caused by a nearby strike, or grounding improvements,” says Brian Daugherty, Engineering Sales Manager at Lightning Eliminators & Consultants, Inc. (LEC), a pioneer in the field of



Considering the increasing risks posed by lightning-related events, power generation facilities cannot afford to rely on outdated or piecemeal lightning protection strategies.

lightning protection in since 1971.

According to Daugherty, LEC engineering and sales engineers have, combined, more than 160 years of experience in lightning protection. Today, LEC's solutions protect critical operations and structures for some of the world's most recognized companies, including Federal Express, UPS, Marathon Petroleum, Chevron, ExxonMobil, Telluride Ski Resort, and thousands more.

Vulnerabilities Exposed

According to Daugherty, power generation facilities are particularly vulnerable to lightning strikes due to several interrelated factors. Sites are often located in open areas such as flat plains with elevated structures, which naturally increases their exposure to lightning. Many generation facilities, especially those using fossil fuels,

natural gas or nuclear power, have tall structures such as stacks, turbines, cooling towers or transmission towers that naturally attract lightning.

Modern generation facilities also rely heavily on sensitive electronics and digital control systems (e.g., SCADA, PLCs, CEMS) that are highly sensitive to transient overvoltages. Even indirect strikes can disrupt or damage these systems.

Since generation facilities operate continuously and are often critical to grid stability, even momentary disruptions can lead to significant operational or safety consequences. Restarting after shutdowns can be a slow and complex process, making lightning-induced outages particularly costly during high-demand periods.

Reputational damage is an often overlooked but impactful risk. Frequent lightning-related disruptions can erode

public trust, particularly if service delivery or product quality is compromised.

Even when a direct strike is avoided or successfully mitigated, the residual effects — such as earth currents, atmospheric transients, secondary arcing, electromagnetic pulses (EMP), and ground potential rise (GPR) can severely degrade system components. These secondary effects can result in equipment failure, operational downtime, or even false and erroneous system behavior.

Compounding the challenge, utility demands are expected to rise over the next five years largely because of the growth in electric vehicles, electric heating systems like heat pumps, and the rapid expansion of data centers. Charging stations for electric vehicles, especially high-speed chargers, require large amounts of electricity at once, placing new and heavy demands on local grids. In homes and businesses, electric heat pumps are replacing gas or oil systems, sharply increasing electricity use during heating and cooling seasons. Data centers, which support cloud computing and artificial intelligence, consume massive amounts of continuous power and are being built at a faster pace across many regions.

For these reasons, comprehensive lightning protection systems are critical in safeguarding facilities from structural damage, catastrophic safety incidents, unplanned downtime, and expensive process restarts.

Protecting Facilities

Daugherty says the appropriate combination of solutions can only be determined through a comprehensive evaluation of each facility's current protection measures, grounding systems, and overall risk exposure.

"Understanding a facility's past issues, vulnerabilities and protection goals helps determine whether the solution should focus on grounding enhancements, surge protection, direct strike avoidance, secondary damage from a nearby strike, or a combination of all three," says Daugherty.

By conducting a thorough site assessment, LEC helps facilities to identify vulnerabilities and to implement customized mitigation strategies, whether that means improving grounding, adding targeted surge protection, or implementing direct strike mitigation solutions.

Prevention is the Best Defense

According to Daugherty, the most effective defense is to prevent a lightning strike from occurring. This is a far superior solution than a lightning rod-based system that attracts lightning to the protected site and then attempts to manage the strike.

Lightning occurs when the difference in potential between storm clouds and the earth reaches a critical level, triggering an electrical discharge. For lightning to strike, it requires a connection between a downward leader from the cloud and an upward streamer from the ground.

The Dissipation Array System® (DAS®) from LEC is designed to prevent direct lightning strikes within its designated protection area by lowering the electric field to levels below those required for lightning to form.

DAS prevents these connections by using point discharge technology, which neutralizes the charge differential before a strike can occur. Through a system of well-grounded points, DAS facilitates the exchange of ions between the air and the ground, disrupting the conditions necessary for a lightning strike.

DAS can be integrated with a wide range of structures, including buildings, towers, tanks and stacks. Since its inception, more than 3,500 DAS installations have been deployed worldwide, accumulating more than 90,000 system-years of effective performance. Testimonials from industry leaders confirm its effectiveness, with companies reporting significant reductions in downtime, maintenance costs and improved reliability.

LEC even offers a "No-Strike" warranty for all supervised installations, ensuring complete protection when the system is properly maintained and inspected.

The effectiveness of DAS is enhanced when combined with a comprehensive lightning protection system that includes a low-impedance grounding system, transient voltage surge suppression, and modular strike prevention devices. Together, these components ensure optimal protection against both direct strikes and secondary electrical surges.

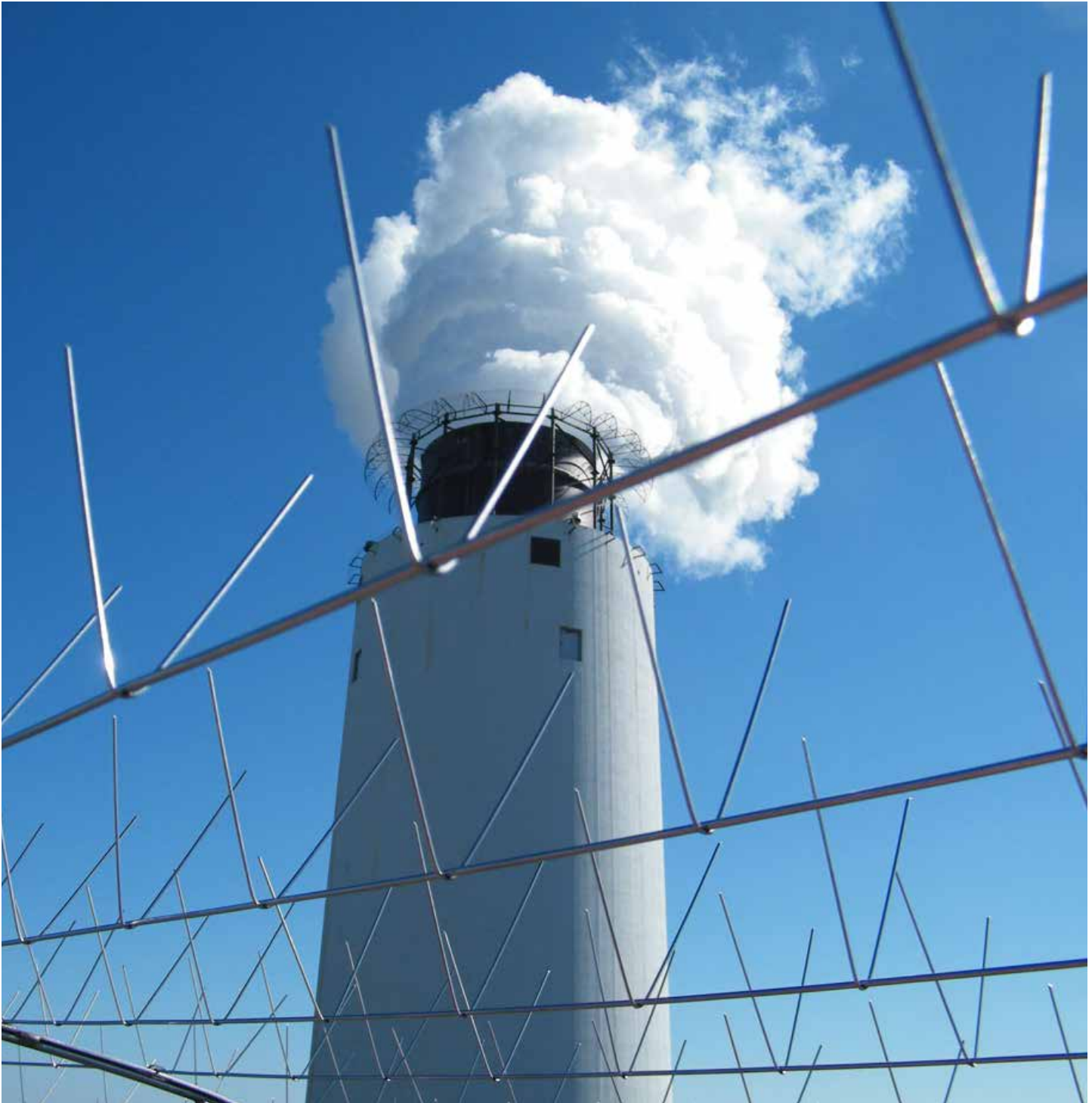
Expertise in Installation

While the proper combination of component technologies is crucial, having a single source oversee the installation of these systems can also be a key aspect of effective implementation.

Traditional lightning protection methods typically involve engaging separate vendors for system design, material procurement and installation. This fragmented approach often results in miscommunication, extended project timelines and increased costs.

"A turnkey provider that consolidates all project phases under a single expert team ensures unified accountability, accelerates execution through streamlined coordination, improves system performance through integrated component design, and lowers overall costs by reducing errors, rework, and inefficiencies caused by misaligned vendor efforts," says Daugherty.

Considering the increasing risks posed by lightning-related events, power generation facilities cannot afford to rely on outdated or piecemeal lightning protection strategies. As operations become more complex and the consequences of downtime more severe, the need for a site-specific lightning protection strategy is imperative. Technological advancements now offer a range of solutions far beyond traditional methods,




A comprehensive lightning protection system can ensure optimal protection against direct strikes and secondary electrical surges.

but selecting the right combination requires deep expertise and an understanding of each facility's unique vulnerabilities.

To ensure maximum safety, reliability and operational continuity, facilities are strongly encouraged to schedule a professional site assessment. A tailored evaluation by qualified experts can uncover hidden risks, assess the effectiveness of existing systems, and guide the implementation of integrated lightning protection strategies. This proactive step not only safeguards critical infrastructure and personnel, but also helps prevent costly disruptions and reinforces a facility's long-term resilience against lightning-related threats.

For more information, call (303) 447-2828, email info@lecglobal.com,

or complete the Free Lightning Risk Assessment for Critical Operations on the Contact page of the website at lecglobal.com. 



Del Williams is a technical writer based in Torrance, Calif.



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Danfoss's Universal TR6 Thermostatic Expansion Valve Kit is designed to reduce complexity and job time for contractors.

Danfoss Announces Universal TR6 Thermostatic Expansion Valve Kit

Forward-thinking, flexible solution designed to work seamlessly with legacy refrigerants like R-410A, as well as A2L and low-GWP alternatives — all in a single valve that helps contractors reduce truck stock and job time, while allowing wholesalers to streamline inventory and optimize shelf space.

Danfoss, a global leader in energy-efficient solutions, is proud to announce the launch of its Universal TR6 Thermostatic Expansion Valve, an innovative product designed to optimize performance across a wide range of refrigerants. Engineered for legacy R-410A systems, as well as low-GWP refrigerants like R-454B and R-32, the Universal TR6 offers HVAC wholesalers and contractors a versatile, future-proof solution that ensures efficiency, reliability, and ease of installation.


The Universal TR6 valve is perfect for a variety of applications, from residential retrofits to new light commercial installations. Its advanced design allows for seamless compatibility with multiple refrigerants, enabling contractors and service technicians to streamline inventory and simplify installations without compromising on performance.

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The Universal TR6 is designed to meet the needs of the modern HVAC industry, offering zero compromises between performance, adaptability and sustainability. As refrigerant regulations continue to evolve, this truly universal valve offers a solution that's both adaptable to legacy and current industry standards.

The Danfoss Universal TR6 is available now for order. For more information about the product or to request a demo, visit tinyurl.com/mun2vv8w 



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Taco Launches Next Generation Zone Controls

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Taco Zone Controls are designed for versatile applications, including hot water heating systems, closed cooling circuits, air conditioning, hydronic heating and cooling, solar, and geothermal systems. They are compatible with 2-, 3-, and 4-wire zone valves, ensuring seamless integration across a wide range of configurations.

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Ecolab's new cooling management technology can unlock growth for global high-tech companies by addressing water and performance demands.


Ecolab Launches New Solution to Revolutionize Data Center Performance Amidst AI Boom

Ecolab Inc., a global sustainability leader offering water, hygiene and infection prevention solutions and services, has announced the launch of a transformative technology to drive high-performance data center cooling. Ecolab's new solution, 3D TRASAR Technology for Direct-to-Chip Liquid Cooling, helps protect data center servers by monitoring coolant health indicators in real time such as temperature, pH and flow rates. With this offering, Ecolab now covers the entire data center cooling landscape and uses AI-powered proprietary technology and powerful insights to deliver growth while reducing demand on vital natural resources.

As data centers expand to support the acceleration of AI technology, so does their need for reliable water and power to cool high-performance computing systems. By 2030, AI-driven growth could demand as much power as India consumes annually, and enough water to meet the annual drinking needs of the entire United States. Data centers play a critical role in enabling industries to thrive in today's digital world, which underscores the importance of optimizing water use while driving business growth.

"There are unprecedented opportunities associated with leveraging AI to reduce, reuse and repurpose water throughout your business operations," said Josh Magnuson, executive vice president and general manager, Global Water Solutions Group. "For more than a century, across 40 industries, Ecolab has leveraged innovation to deliver positive performance for our customers the right way, and we are excited about how this will help data centers do more with less."

The new technology was developed with critical feedback from data center operators and IT equipment manufacturers to meet the unique demands of data centers. Ecolab's full portfolio of cooling management solutions now equips operators to optimize performance at every stage from cooling towers to direct-to-chip infrastructure. This integrated system supports water and energy savings and enables better performance.

"Ecolab's robust portfolio of cooling management solutions demonstrates that AI can be key to solving some of the very challenges that it creates," said Magnuson. "As the world continues to navigate the expansion of AI and data centers, we will remain focused on demonstrating for our customers how delivering business growth and resource conservation go hand in hand." 

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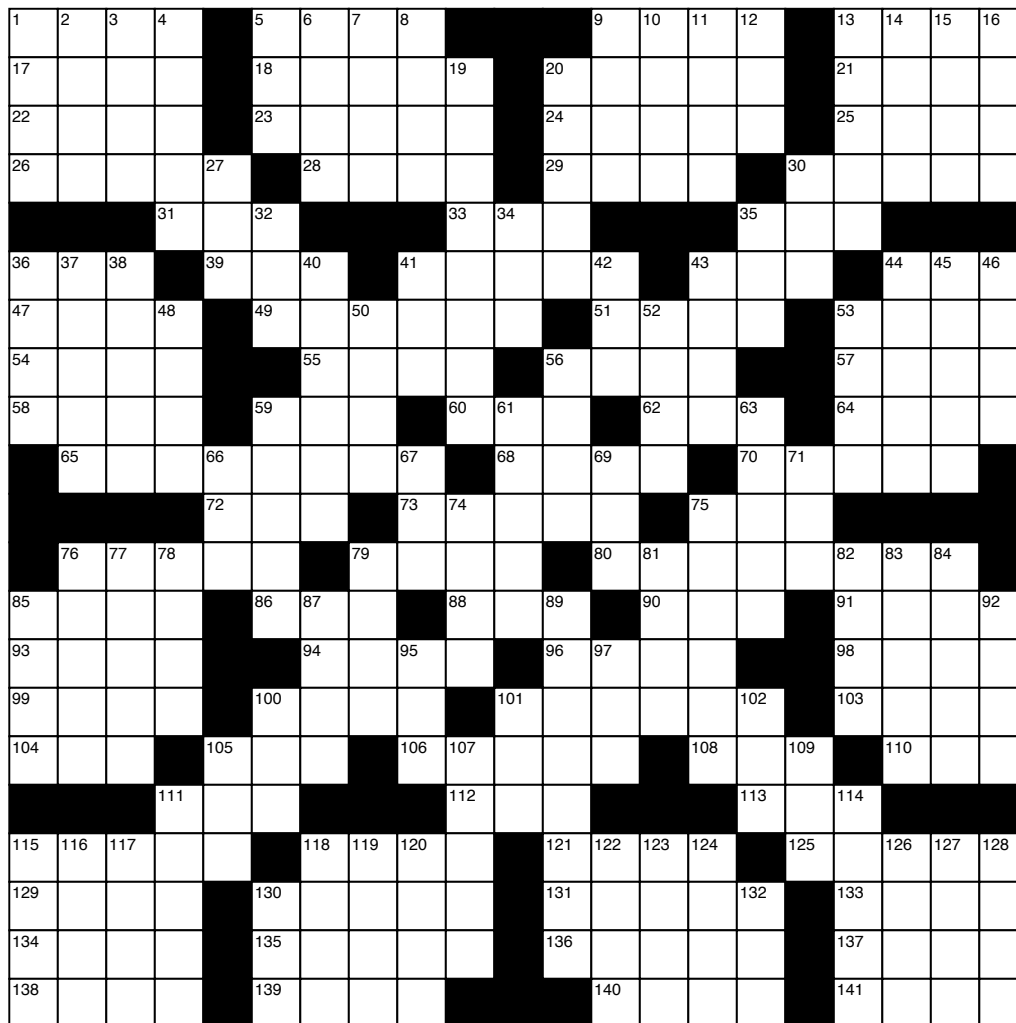
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ACROSS

- 1 Dupes
- 5 Repair
- 9 Partial
- 13 Slice
- 17 Entreaty
- 18 Thief
- 20 Small herring
- 21 Animal house
- 22 Like a wing
- 23 Chart
- 24 Arrests
- 25 Mob activity
- 26 Shiny balloon material
- 28 Popular stadium
- 29 ___ upon a time
- 30 Express disgust
- 31 She
- 33 Half-baked
- 35 Poisonous snake
- 36 Air Cushion Vehicle (abbr.)
- 39 Mink
- 41 Type of alcohol
- 43 Kilometers per hour
- 44 Unhappy
- 47 Type of dressing
- 49 Pacific Ocean discoverer
- 51 Water pitcher
- 53 Green Gables dweller
- 54 Rods
- 55 Asian humped ox
- 56 Bluish green
- 57 Gemini

- 58 Heave
- 59 Division (abbr.)
- 60 Mutilate
- 62 Hertz
- 64 Vigorous
- 65 Alcoholic drink
- 68 Pinches
- 70 Bitter herb
- 72 Waggle
- 73 Kellogg's waffles
- 75 Cut
- 76 Couch-bed
- 79 Revile
- 80 The Odyssey's partner (2 wds)
- 85 Elemental
- 86 Spots
- 88 Rock group
- 90 Yang's partner
- 91 Honey
- 93 Malaria
- 94 Malicious
- 96 Torso extensions
- 98 Giant
- 99 Standard
- 100 Dog food brand
- 101 Very large people
- 103 Fish stories
- 104 Eye infection
- 105 American sign language
- 106 Turn over
- 108 Sister for short
- 110 Concord e.g.
- 111 Raiders of the Lost ___ (Harrison Ford movie)

- 112 Peaked
- 113 Roman twelve
- 115 Festival
- 118 Round cracker brand
- 121 Opera solo
- 125 Ruble
- 129 Flightless birds
- 130 Caffeine pill brand
- 131 Present time
- 133 Canned meat
- 134 Cain killed him
- 135 Musical production
- 136 Courts
- 137 Singing voice
- 138 Traveled by car
- 139 Nifty
- 140 Thorned flower
- 141 Perceives with eye

DOWN

- 1 Canned meat brand
- 2 Member of an alliance
- 3 Ring, like bells
- 4 ___ Lee (pie brand name)
- 5 Metric weight unit
- 6 Goofs
- 7 Man who built the arc
- 8 Drug
- 9 Bridge
- 10 Little Mermaid's love
- 11 Boy
- 12 ___ A Small World...
- 13 Throw away

- 14 Den
- 15 Eager
- 16 Elizabeth's nickname
- 19 Sudan capital
- 20 Poor tv reception
- 27 Game official
- 30 Fire remains
- 32 Grate
- 34 Expression of surprise
- 35 Rainy mo.
- 36 Shorten (abbr.)
- 37 Ask for legally
- 38 Vice ___
- 40 Leveling
- 41 Move away
- 42 Downwind
- 43 Seaweed
- 44 Trims
- 45 Enraged
- 46 Renounce
- 48 Consumer
- 50 Israel's son
- 52 Western Athletic Conferences
- 53 Association (abbr.)
- 56 Triad
- 59 Goddess
- 61 Slant
- 63 Mug
- 66 Duo
- 67 Ocean
- 69 Pacific Standard Time
- 71 Hand tool
- 74 Lass
- 75 Robberies
- 76 Bundle of twigs
- 77 Excessive interest
- 78 Seethe
- 79 Please respond
- 81 Anthem
- 82 Teen hero
- 83 Protection
- 84 Risks
- 85 Prohibits
- 87 Valley
- 89 Continental US
- 92 Perch
- 95 Note of debt
- 97 Radiation dose
- 100 Request
- 101 Harden
- 102 Half a dozen
- 105 Extremity
- 107 Popular food
- 109 Mr.
- 111 Store passageway
- 114 Tiny amounts
- 115 Fruit
- 116 Convex shape
- 117 Feared
- 118 Twined fibers
- 119 Thought
- 120 Wrongdoing
- 122 Laugh
- 123 Towards
- 124 Experts
- 126 Christmas
- 127 Parlay
- 128 Country in SE Asia
- 130 Not (refix)
- 132 Compass point

July 2025 SOLUTION

Solution:

P	I	P	S		S	T	E	P		S	C	U	D		A	R	A	B				
A	R	E	A		R	O	D	E	O		S	T	O	N	E		L	O	C	O		
W	A	R	P		I	N	D	E	X		C	Y	N	I	C		L	O	N	G		
S	Q	U	I	B		S	Y	L	I		R	E	S	T		Y	O	K	E	S		
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A	F	C		A	P	E		H	I	N	D	U		C	I	A		D	A	H		
F	O	U	R		A	B	R	A	Z	O		S	U	I	T		A	E	R	Y		
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W	R	I	T		K	I	N		S	E	A		B	O	B		T	H	E	E		
				H	A	C	I	E	N	D	A		N	O	N	O		A	E	G	I	S
					R	A	G		P	A	N	S		Y		A	R	M				
				B	E	S	E	T		F	R	A	U		C	L	I	Q	U	I	S	H
P	O	L	K		S	E	E		R	I	P		A	D	S		C	L	U	B		
T	U	B	E		B	L	I	P		L	E	V	I			E	A	S	E			
S	L	O	W		K	O	L	N		P	A	G	A	N	S		D	Y	K	E		
D	E	W		S	I	N		C	I	S	C	O		G	A	P		S	S	T		
				N	I	X			V	I	A			P	E	A						
A	S	T	I	R		M	A	U	I		B	R	E	W		T	E	E	N	S		
T	E	E	N		F	O	R	G	E		L	U	R	E	D		R	A	I	L		
O	M	A	N		F	O	I	L	S		E	M	I	L	Y		I	S	L	E		
M	I	R	Y		A	N	D	Y			P	E	T	E		E	Y	E	D			

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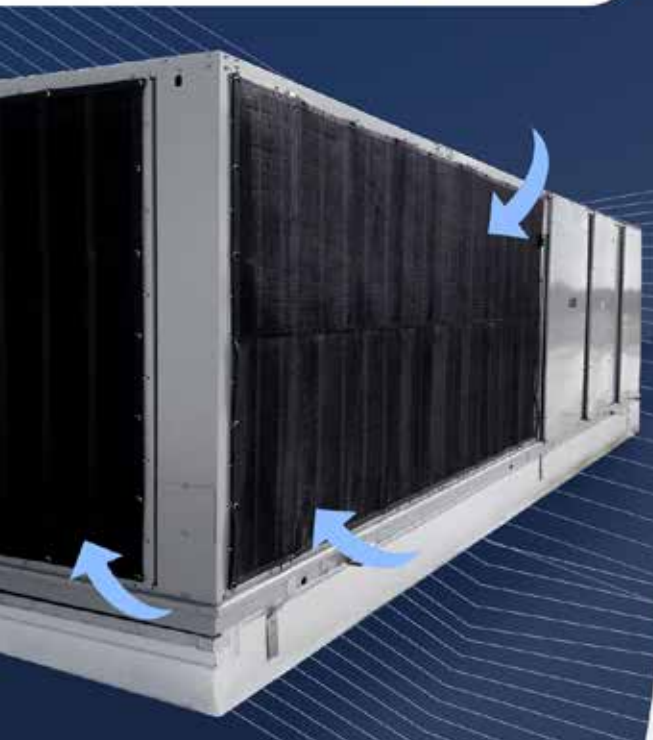
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