



CHIEF ENGINEER™

JULY 2023

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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.

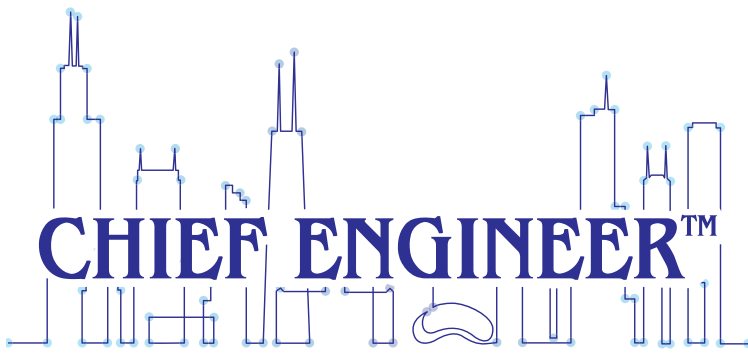
While many believe that the intention of Congress was to make Qualified Improvement Property 15-year property, which would have made this property eligible for bonus depreciation, the TCJA left the life of this property at 39 years. So, a taxpayer who did not elect to use the Section 179 Deduction or 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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15 The Murray Family Builds an Affiliated Steam Legacy

It's all in the family for the Murray family. Patty Murray interviews her father and brother about their generational legacy with Affiliated Steam.

13 Using Leadership Skills to Strengthen Your Team

In the inaugural edition of our new Best Practices section, we explore ways in which you can shape the engineers in your charge into the best team they can be.

26 How a SCADA Master Can Be a Data “Hub” for Enterprise Software Integration

To meet the requirements of small municipal utilities and co-ops, a leading SCADA substation automation platform has evolved to serve as a communication and coordination “hub” with third-party enterprise software systems.

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Dear Members,

Welcome to your new magazine for the Chief Engineers Association of Chicagoland! This has been a long time coming, and we hope you are as excited about it as we are. We felt it was time to revisit and revise the magazine, and we've made a number of significant changes that we think you'll appreciate. The first thing you'll notice, no doubt, is the lighter weight and reduced page count. We wanted to create a magazine that was leaner and slimmer, and more directly focused on the issues affecting us as chief engineers, from updated standards and new legislation to hands-on practical information about our building systems and how we manage them.



You'll notice a number of new sections in these pages, like Best Practices and Troubleshooting, that aim to put more value into the magazine. Best Practices will focus on exactly that — best practices within the industry at every level, from cost management to personnel management, project planning issues to app integration issues. We hope to cover a wide scope that you'll find useful in your day-to-day experience as a chief engineer. Our Troubleshooting section likewise will look at common — and sometimes not-so-common — problems we encounter in our systems and how best to correct them.

There's one crucial factor we need for the new version of our association's magazine to succeed, though, and that's you. We need the participation of everyone — our Active Members as well as our Associate Members — to make the most of this communication tool we distribute every month. To provide the best value to you, our readers, we need to know what's on your mind, and how we can improve our offerings to you each month.

If you have a suggestion for any particular subject that you'd like to see addressed in the pages of the Chief Engineers Association of Chicagoland, please feel free to email me (kbotta@sbcglobal.net) and Tom Phillips (tphillips@iuvoc399.com) and we'll do our best to address it in the appropriate section of this new publication. For now, we encourage you to leaf through and have a look at our new direction. I think you'll be pleased.

I want to offer a quick thanks to everyone who attended our annual Chicago White Sox event on the Fan Deck at Guaranteed Rate Field last month. We hope you all had a great time. We are grateful to everyone who contributed to make this event happen, and to all who showed up to take part in the festivities. I would like to give a big thank you to Tom Phillips for once again setting up this great event!

One other item: If you haven't yet signed up for the 83rd Annual Golf Event at Cog Hill Sept. 8, we'll suggest you do so soon if you have a course preference — places for foursomes fill up faster the closer we get to the event date, so don't miss out! We look forward to seeing everyone at this biggest event of the year.

Lastly, please, everyone, have a safe and happy July 4th holiday. Let's keep in mind the men and women of our military, our police and fire personnel, and all first responders who keep safe our liberty and way of life.

Sincerely,



Ken Botta

Letter to America: We Need Technicians

Dear America,

I am writing to you to identify a major problem in our society. We have a country of college graduates that cannot find a job. We also have major industries that cannot find qualified skilled workers. Today's college graduates have considerable amounts of debt and they do not have a job that can realistically pay back their non-dischargeable debt. It usually takes a war, an industrial revolution, or a massive wave of retirements to get our educational system to focus on a key national issue. What happened to focusing on education that built America and improved our citizens' standard of living? It seems that we have allowed our country to follow Ancient Rome's pompous game plan in education.

Within all levels of education, an area of great concern for citizens in this country should be career guidance. We have allowed career guidance, as a country, to rest mostly in the hands of psychology-educated citizens. While psychology is fascinating, it does not give an individual a license to successfully guide our children toward our workforce. Psychology-educated citizens should be nursing the mental disorders of our school systems. At what point did the world allow people who diagnose mental disorders the ability to guide our children toward careers? Not only are they not qualified, they don't even keep a pulse on the workforce needs. The Nursing Reinvestment Act is a \$397-billion-dollar example of a workforce pulse completely missed. Today, it is skilled trades. Tomorrow, it will be something else.

I challenge America to re-evaluate how we guide students toward careers. Look at your school systems and see how polluted career guidance has become with the limited scope of psychology-educated individuals. They have somehow found a home in one of the most important areas of our educational system: career guidance.

The people that take on the roles of career guidance counselors do not understand anything more than the power words delivered to them from their superiors. They use words like "manufacturing" or "trades" and have no idea what they mean. When they speak to psychology, English, or general education they are very articulate and aware. People are mostly made up of water, which means that they will probably take the path of least resistance. The point here is that they are not qualified to give our children the proper guidance with their limited scope of career awareness and career training.

Do you wonder why trades got stripped from high schools and middle schools? Do you think that the psychologists encouraged students to pursue "trades" unless they were failing high school? They used skilled trades programs as cells for bad kids. Do you think good kids wanted to be in class with all of the bad kids? Once program enrollment tanked, it

became an easy decision to wipe skilled trades classes out of our school systems. At what point did we allow skilled trades to NOT become a general education REQUIREMENT? What built America? What maintains America's standard of living? Who can shift America into a fortress of manufacturing to supply our national defense?

This is an issue that has to be solved at the top. Career guidance should be handled by people that have a well-rounded understanding of the workforce. It should also be mandated that they are involved with the workforce needs of the community. The department of education should MANDATE that all schools require every student to take multiple skilled trade classes as an educational requirement. ALL students coming into any level of education should be exposed to Career and Technical Education programs and not just pathways to four-year degrees.

This country can start by changing the people that we allow into these positions to segregate our children into their subjective and limited scopes. It is funny that liberal education, at one time, was meant to broaden a person's general knowledge beyond technical training. Now, it seems that liberal education should mean to broaden our children's mind with something more than career-less pathways and heaping debt. What will make America great again is skilled labor. It is time to get the ivory tower's priorities aligned with our workforce so we do not repeat ancient Rome's pompous mistakes.

Bob Clark

Though his business card reads "Assistant Professor," Clark runs the entire HVACR Business & Technology program at College of DuPage. He holds an Associate Degree in Electrical and Electronic Automated Systems, Industrial Maintenance Technology and HVACR, a Bachelor's Degree in a double major of Business and Communications, an MBA in Energy and Sustainability, and a PhD in Career and Technical Education.

Something on Your Mind?

If you have something that pertains to your role as a Chief Engineer or to our association that you would like to let your fellow Chief Engineers know about, write us care of our publisher, Tom Phillips, at tphillips@chiefengineer.org.

We reserve the right to edit letters published in this space for length, grammar and punctuation. Views expressed in this forum are solely those of the individual authors writing in their individual capacities — not those of their respective employers or the CEAC.

ASHRAE Completes Draft of First-Ever Pathogen Mitigation Standard

ASHRAE recently announced the completion of the first draft of its standard for maintaining healthy indoor air quality (IAQ), with publishing anticipated in July.

ASHRAE Standard 241P, Control of Infectious Aerosols provides minimum requirements for HVAC-related measures to reduce the risk of transmission of COVID-19, influenza and other airborne viruses in homes, offices, schools and hospitals during periods of high risk. The standard offers guidance for creating healthier environments in the buildings where we work, live, and play.


“The entire world was touched by the effects of the pandemic, and we learned that an effective way to protect ourselves from the spread of pathogens is to improve the indoor air quality and ventilation in the buildings that we occupy,” 2022-23 ASHRAE President Farooq Mehboob, Fellow Life Member ASHRAE, said. “Nowhere in the world do we have a standard that universally addresses the concept of mitigating pathogen spread and IAQ, and ASHRAE is proud to lead in the development of the guidance.”

The standard will address long-range transmission of infectious aerosols and provides minimum requirements for:

- Equivalent outdoor air (combined effect of ventilation, filtration, and air cleaning) for use during Infection Risk Mitigation Mode
- Room air distribution to reduce risk
- Characterization of filter and air cleaner effectiveness and safety
- Commissioning, including development and implementation of a Building Readiness Plan
- System operation in Infection Risk Mitigation Mode during periods of high risk
- Maintenance tasks and their minimum frequency
- Residences and health care facilities

“Standard 241P is built on ASHRAE’s longstanding leadership position as a developer of consensus indoor air quality standards and the guidance developed by the ASHRAE Epidemic Task Force in response to the COVID-19 pandemic,” ASHRAE Presidential Fellow and Standard Project Committee 241P chair William Bahnfleth, Ph.D., P.E., said. “This

experience, combined with the efforts of a truly world-class international project committee, have allowed us to produce this review draft in only 10 weeks. It is a groundbreaking document that we expect to have significant impact.”

For all standards related activities including announcements, public review drafts open for comment, call for members and more, sign up for ASHRAE Standards Actions at ashrae.org/StandardsActions 



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ASHRAE Approves Groundbreaking Standard to Reduce the Risk of Disease Transmission in Indoor Spaces

ASHRAE has announced the approval for publication of its highly anticipated airborne infection risk mitigation standard for buildings, bringing numerous benefits to occupants and promoting healthier environments.

ASHRAE Standard 241, Control of Infectious Aerosols establishes minimum requirements to reduce the risk of disease transmission by exposure to infectious aerosols in new buildings, existing buildings, and major renovations. Infectious aerosols are tiny, exhaled particles that can carry disease-causing pathogens and are so small that they can remain in the air for long periods of time and be inhaled. Use of this standard would reduce exposure to SARS-COV-2 virus, which causes COVID-19, influenza viruses and other pathogens that cause major personal and economic damage every year. Standard 241 provides requirements for many aspects of air system design, installation, operation and maintenance.

Important aspects of the standard include:

- **Infection Risk Management Mode** – Requirements of Standard 241 apply during an infection risk management mode (IRMM) that applies during identified periods of elevated risk of disease transmission. AHJs (Authorities Having Jurisdiction) can determine when the enhanced protections of Standard 241 will be required, but its use can also be at the discretion of the owner/operator at other times, for example, during influenza season. This aspect of Standard 241 introduces the concept of resilience – ability to respond to extreme circumstances outside normal conditions – into the realm of indoor air quality control design and operation.
- **Requirements for Equivalent Clean Airflow Rate** – Other indoor air quality standards, including ASHRAE Standards 62.1, 62.2, specify outdoor

airflow rate and filtration requirements to control normal indoor air contaminants. Standard 241 breaks new ground by setting requirements for equivalent clean airflow rate, the flow rate of pathogen-free air flow into occupied areas of a building that would have the same effect as the total of outdoor air, filtration of indoor air, and air disinfection by technologies such as germicidal ultraviolet light. This approach allows the user of the standard flexibility to select combinations of technologies to comply with the standard that best satisfy their economic constraints and energy use goals.

- **Requirements for Use of Filtration and Air Cleaning Technology** – Dilution of indoor air contaminants by ventilation with outdoor air can be an energy intensive and expensive way to control indoor air quality. Standard 241 provides extensive requirements for use of filtration and air cleaning to effectively and safely achieve meet equivalent clean airflow requirements efficiently and cost effectively. These include testing requirements to establish performance and to demonstrate that operation does not degrade indoor air quality in other ways, for example by elevating ozone levels.
- **Planning and Commissioning** – Standard 241 provides assessment and planning requirements culminating in the development of a building readiness plan, a concept carried over from the work of the ASHRAE Epidemic Task Force. It also describes procedures for commissioning systems to determine their installed performance.

The Standard 241 committee will continue and work on improving sections of the standard adding additional requirements, clarifying requirements and developing tools to help the public use the standard. Industry and consumer-friendly resources such as courses, podcasts, factsheets and information events will be introduced in the future. 📺

Look for Standard 241 in the ASHRAE Bookstore at ashrae.org.



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ACR Restores Once Again Wins RIA® Phoenix Award for Innovation in Restorative Drying

ACR Restores recently was honored with the Restoration Industry Association's (RIA) Phoenix Award for work on a historical landmarked building restoration project. This is the second time ACR has been recognized by the RIA for its proven and innovative restorative drying process.

ACR Restores recently was recognized with the Restoration Industry Association's (RIA) Phoenix Award — an international award celebrating the best in the restoration industry. ACR Director of Operations John Schaefer, CR, WLS, accepted the award for ACR's work on a historical landmarked building project.

ACR came to the rescue when a multi-unit condo building sustained a grease fire, with five units and the common areas affected with smoke, soot and large amounts of water from activation of the sprinkler system.

"When we got the word that we were dealing with a landmarked property, we knew our team would be facing unique challenges," Schaefer said. "Our previous experience working with property managers and HOAs, and floor restoration projects allowed us to preserve this historic property with minimal disruption and a cost savings for our client."

A former school building, the residential HOA building challenged ACR with restoring a property without being able to remove or replace any flooring, chalkboards, or entry doors, which meant that a dry-in-place system was essential to the project's eventual success.

In the end, the project was completed in 9 days with minimal disruption, at a cost of \$12,214, also saving flooring material irreplaceable to the client, versus a minimum 9- to 12-month wait to replace with new material at \$45-60 per square foot.

This is the second time that ACR has received this honor, having also received the award in 2004 for its proven and innovative restorative drying process. Congratulations, ACR Restores!

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Up & Coming Engineer of the Month

As Chief Engineers, we have a responsibility not only to our tenants, property owners and the teams of engineers in our charge, but we have a responsibility to the profession to do our best, by the time we retire from the industry, to leave it in the best shape we possibly can for the next generations. Part of that goal is introducing our junior engineers to the Chief Engineers Association of Chicagoland, so we ensure that this organization that has flourished in some form or other for more than 100 years continues its rich tradition of elevating and celebrating our profession through education, social events and other opportunities.

To that end, we would like to encourage you, as Chief Engineers, to keep an eye on the talent working with you each day. If you have an engineer you feel is a rising star on your team, who makes a quantifiable difference in the day-to-day onsite routine and who really has the vision, discipline and exhibits the real sense of ownership on the job required to become a Chief Engineer, we would like to feature them in this space.

To nominate an Up & Coming Engineer for recognition in these pages, please send their name, a good-sized photo, if possible — a hi-res shot from a cellphone will do nicely — and whatever info you can about why you feel they deserve to be celebrated as an up-and-coming talent, we'll consider them for inclusion in a future issue. Send any information you have to our publisher, Tom Phillips, at tphillips@chiefengineer.org. We look forward to hearing from you!



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Best Practices: Team Strengthening & Leadership

As chief engineers, we bear accountability for a great number of decisions affecting the properties we manage, the projects we oversee, and the personnel we hire and train. As such, especially for the less-seasoned chief, the gravity of that responsibility weighs heavily, and we may be tempted to adopt something of an “if I need something done, I have to do it myself” mentality. This obviously isn’t realistic nor practical, though, so we have teams of engineers who assist us in taking care of everything that our buildings require.

As leaders of our teams, we also have a responsibility to help our team members to bond and work together as a team as best as possible, and to help each of the individual members grow to their fullest potential under our guidance. But how do we best achieve this goal? How do we take this collection of personalities, varying talents and strengths, and shape them into the most effective team possible?

There’s no single answer to such questions. In fact, there are probably as many answers as there are chief engineers. But best practices exist in every discipline of the profession, and leadership is no different. If there’s an end goal to strive for in leading your team, it’s to instill in them a culture of ownership, and to help it to grow as much as possible.

In growing a culture of ownership among your team, there are plenty of guidelines and best practices you can observe that will reinforce the mindset you need your staff to maintain. Here are a few things to keep in mind as you work with your staff to galvanize them into the team that best serves your needs:

Encourage your team members to make their own decisions. Of course you’re going to guide them and help them to understand why they need to make the right decisions, but one of the reasons that learning by doing is such a powerful technique is that it affords the opportunity to learn from one’s mistakes. They might make a decision that isn’t the best choice, but if you step in and prevent them from having that experience of making errors, it’s a lost learning opportunity, and one that can create tentativeness where there’s supposed to be confidence.

Don’t play the blame game. In tandem with allowing your team members to make mistakes, don’t shift the blame onto them when they do. Mistakes are just part of the learning curve of the job, and they should be acknowledged as such. Instead, review with the team member what went wrong, and ask what they might do instead the next time. This will help them to remember what to do the next time round, and will reinforce their confidence in the situation.

Celebrate their wins. Remember what it was like when you were new to the industry and it seemed like everyone knew

better than you did? Even if you’ve passed your exams and have a pretty solid idea of what you’re doing on the job, as a newbie, it doesn’t take much from your chief engineer to either build or erode your confidence. If they do one thing wrong and a thousand things right, but the only thing they hear about is that one mistake, even if you mean well, it can register as a blow to morale. If you can balance corrections with praise in reasonably equal measure, it should go a long way for almost anyone on your team.

Be upfront with your team. Communication and transparency are key to a fully functioning team that’s able to fire on all cylinders. Your team members need to know not only their goals, but the team’s, and where you’re leading them. If they’re pulling in a direction that’s not supporting your initiatives, then something is wrong in your lines of communication. Strive for clarity of message and purpose, and offer honest, constructive feedback to your team members when they need it. And make sure that they know you’re available for questions or support.

Remember to put focus on your stronger team members. Some team members need more guidance from us than others, but don’t neglect your star players just because it seems like they might not need your support as much. Sure, they might be doing fine, but with your support, they have a better chance to excel and move beyond your expectations. We need a next generation of chiefs, and these are the people who eventually are going to fill that role.

Keep an open mind. Even as a chief engineer with a lot of years behind you, there’s always something new to learn, and there’s no saying from where you’re going to learn it. One of the great benefits of mentorship is exposure to those who are younger and closer to their initial training, who might be able to speak to some new ideas that you might not have had the opportunity to experience just yet. By staying open to other people’s perspectives and experiences, you can have a wealth of ideas at your disposal to help make your team’s job easier while improving the lives of your tenants and possibly the owners of your properties.

Set an example with continuing education. Lastly, remember that you set the tone for your team members’ future with regard to continuing education units. As you stay on top of your CEU opportunities, encourage your team members to do likewise. There are abundant HVAC courses out there, both at the International Union of Operating Engineers Local 399 and elsewhere, in addition to abundant trade shows and seminars. Stay with it!

Source: builtingchicago.org

Troubleshooting: Ice Blockage in Your Chiller System

During the excessive heat of a Chicago summer, it's vital to keep our chiller systems running at peak efficiency, both for the purpose of cost savings and for the comfort of your tenants. With proper starting prep at installation and a consistent and regular maintenance routine, most major problems can be avoided. But gradual changes can occur in any system, and it's wise to keep on the lookout for them, and to remember what to do when they arise.

The Problem

One difficulty that can arise within your chiller system is an ice blockage that prevents refrigerant from being able to continuously circulate through the system. This usually occurs because of a gradual buildup of too much moisture in the circuit. When this water concentrates in lower temperature of the throttle outlet, it can turn to ice and start to block the refrigerant from entering the capillary tube, stopping circulation of the refrigerant altogether.

First, let's look at why and how the water gets introduced into the system in the first place. In many cases, it's residual water resulting from any number of sources. It might come from inadequately dried components or connecting pipes integrated in the system. It might be that the refrigerants and refrigerant oils in your system carry more moisture than it permits. It might derive from inside the compressor, in the motor's insulating paper. Or the system itself could have been improperly installed from the start.

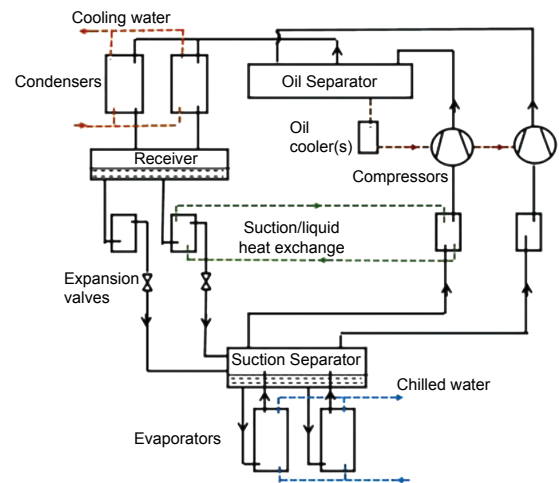
However it may occur, let's assume that moisture has found its way into the system. You'll be able to diagnose the problem in a number of ways: Over time, you'll notice depleted and even intermittent airflow. If the blockage is severe, airflow will go silent due to the refrigerant current having been interrupted, causing the condenser to cool. You may notice excess noise coming from the machine due to clogging and increased exhaust gas pressure. And as refrigerant fails to reach the evaporator, you'll find the cooling effect worsening, as the frost area gradually reduces in size. When the machine reaches the point of automatic shut-off, the ice in the system will melt, eventually enabling the refrigerant to flow once again, and for the machine to start back up, but initiating a start/stop cycle that keeps recycling, resulting in inefficient operation and possible damage to the pump and to the system as a whole.

The Solution

In the same way that an ice blockage failure in the chiller system is caused by the accumulation and freezing of moisture in the circuit, the solution lies in the removal of this moisture from the system. In other words, the entire system must be thoroughly dried out. But how can you ensure that result?

It's going to be essential to evacuate the system, using best practices from start to finish. Flush the system with nitrogen to ensure total displacement of oxygen from the circuit, along with any dirt or other potentially interfering impurities. Any filters and driers should be replaced, as well as the refrigerant oil, taking care that the oil used contains a moisture level appropriate to your chiller system. Replace the refrigerant itself, and evacuate the system until you observe the water indicator in the sight glass turn to green, denoting a thoroughly dry system ready to resume service.

Sources: lando-chillers.com, achrnews.com, hvacschool.com





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The image shows the exterior of a brick building with a large sign for 'AFFILIATED STEAM-HOT WATER CO.'. The sign features a red stylized 'A' logo on the left, followed by the word 'AFFILIATED' in large white 3D letters, and 'STEAM-HOT WATER CO.' in smaller white 3D letters below it. A light fixture is visible on the wall above the sign.

AFFILIATED STEAM-HOT WATER CO.

All in the Family: Creating an Affiliated Steam Legacy

By Patty Murray

Chicago 1986 was memorable for the residents of Chicago. The city was shuffling with our beloved Bears as they took home Super Bowl XX. Oprah Winfrey made Chicago her headquarters as she opened up Harpo Productions Inc. And in the Beverly neighborhood on the Southside of the city, Jim Murray was starting a job with Affiliated Steam & Hot Water that would be his career for the next 35 years, until his retirement.

Affiliated Steam & Hot Water Co. prides itself on providing total solutions in steam and condensate, heat transfer, hot water and humidification. Jim had had nearly five years in the business prior to taking on his job at Affiliated Steam. Already in the field of testing steam traps, Jim approached Affiliated Steam owner Richard (Rick) Lee to try to sell him a product. In a turn of events, Rick took a liking to Jim and ended up offering him a position on his sales team for Affiliated Steam. After a few days of contemplating this offer, Jim decided to take this position.

Jim had an interest in boilers and heating systems since he was a young boy. Jim grew up in a Chicago two-flat home that was heated by a one-pipe boiler system. At the time, Jim's father was a Local 399 engineer, and Jim would join him as he headed downstairs to service this heating system. He recalls always being fascinated as he watched his father work with the machine. His father noticed too, because Jim's most memorable Christmas present was a fully functioning toy steam boiler. It's safe to say that steam always piqued Jim's interests.

In those first few years on the job with Affiliated Steam, Jim's main focus and role was selling products to customers. Sounds simple enough, yet he faced his biggest challenge in learning all the product lines as a manufacturer's representative. Making sure he accurately supplied his customers with the best product for their needs was his goal. To do so, he dedicated his time and energy to learning the nuances of all the products he sold.

As his knowledge of the industry grew, his role started to shift beyond selling. His most memorable project was designing a complete boiler system for a factory of a major company. This included a full design of the boiler room and all the steam needs — steam distribution, all the control valves, trapping, safety valves and condensate return system. This factory was run by two high-pressure boilers. Jim's design and implementation of this factory was such a success that the company took his design and adapted it to four more of their future factories, including an overseas location.

Another memorable project during Jim's career involved a major Chicago hospital. This hospital experienced a water hammer incident that blew out a valve and filled a corridor with steam. Fortunately, no one was hurt, but it prompted management to make immediate changes to prevent future safety incidents. The hospital's chief of engineering worked with Jim to perform a comprehensive review of every mechanical room in the Hospital, looking for any potential problems and recommending appropriate changes. Many years in the industry provided him the knowledge and confidence to successfully provide this service.

As years went on, Jim's role evolved to include leading instructional and safety seminars both online and in person. Grossing nearly 60,000 views and counting on YouTube, Jim has several short videos demonstrating tasks such as "How to Test a Float and Thermostatic Steam Trap." He also spent time teaching hands-on seminars to others looking to further their knowledge and explore new tactics.

As mentioned earlier, Jim worked for Affiliated Steam and Hot Water for more than 35 years. During his entire working career, Jim had experience working for both a corporate company and a small-scale company. Jim found he excelled best in the smaller-scaled, family-owned business system that Affiliated Steam & Hot Water offered. He attributes his success to the personalization and effective communication that Affiliated



An Affiliated Steam legacy — the father-and-son team of Jim and Michael Murray visit an inspection site in 2018.

Steam prioritized, allowing him to transform from his role from salesman to system designer and continuing educator.

Jim’s passion for the industry had a big effect on his family life as well, ultimately influencing his youngest son to have a career in the industry. Michael Murray came on board Affiliated Steam and Hot Water in 2013, learning the business alongside his father for eight years before Jim’s official retirement date of October 2021. Like Jim, Michael was drawn to the family-owned business aspect that is Affiliated Steam. Michael started as part of their inside sales team, and as his knowledge and experience grew he transitioned to outside sales with his father.

Michael also found learning the industry, the products and the providing of his customers with the correct equipment to meet their needs among the hardest challenges of entering this field. He found that this industry requires hands-on learning and on the job training — and lucky enough for him his dad, Jim, was the perfect experienced educator. Jim stressed that there is no such thing as a stupid question, so Michael asked a lot of questions. Having his father alongside him as he learned the trade provided a comfort level that was unmatched, and Michael is forever grateful for those years spent beside him. Additionally, it also provided a certain comfort for Jim’s clients. Jim taught Michael how sales is more than selling products — it is also very much about building and fostering relationships. Michael was able to see firsthand the relationships Jim formed with his clients. Michael was left with somewhat of a legacy, and clients expressed they felt confident that Michael could uphold the values and standards Jim had set.

Putting Legacy Values and Standards Into Action

Michael also learned many valuable lessons from Jim, including just how much effective communication matters. Jim instilled in Michael that honesty is key. If you do not know the answer to something, be honest and transparent and do the proper research to provide the answer in a timely manner.

Michael learned just how important communication is when he was asked to participate in a major overnight steam trap replacement project for a multi-building detention center that was funded by People’s Gas. Michael shared with us how this project was set up and executed successfully.

Chief Engineers: Why was Affiliated Steam initially brought in?

Michael Murray: We were initially brought in to test steam traps because the property was experiencing equipment failure and spending additional money due to their system’s ineffectiveness. This facility depends on their steam system 24/7 365 days a year for the running of the kitchen, the heating and hot water system.

CE: What role did Affiliated Steam play in the coordinating of replacement traps for the overnight shutdown?

MM: The project started about 4-6 months in advance. My initial correspondence was with the power house chief to set up the steam trap survey, which is not an easy task. This required such tasks as getting proper ID cards to gain access to certain locations. Next was to coordinate with the chief of each building for scheduling. The steam trap survey took 7 days to complete. Affiliated Steam reported a total of 553 steam traps



Jim Murray stands next to a freshly inspected high-pressure boiler, September 2016.

were tested, tagged and logged — 55 Traps failed, leaving a failure rate of 20.2 percent. This came out to an estimated monetary loss of over \$132,000 per year.

CE: Were the steam traps all the same? If not, what did Affiliated Steam do to make this as organized as possible?

MM: No, they were all different kinds. During the survey, we tagged each steam trap and labeled it per building, per mechanical room and per application. The tested steam traps were tagged with stainless-steel numbered tags, and the failed ones were then labeled with red and white trouble tags to indicate failure. To make the process as organized and efficient as possible, Affiliated Steam labeled the boxes with a tag number and location.

CE: Were there any complications?

MM: Overall it was very smooth. The outside contractor was able to complete the steam trap replacement in the allotted time.

CE: What are the benefits from this replacement project?

MM: Efficiency in their steam and condensate system, which saves money and creates a safer environment.



Jim demonstrates the testing of a float and thermostatic steam trap on Affiliated Steam's YouTube channel.

CE: What did Peoples Gas have to do to verify?

MM: Since this was a funded project by People's Gas, they verified all reports that were made on the testing of the steam traps and the estimated monetary losses that were reported due to the failed traps. They also did a walkthrough, once completed, to make sure the job was done correctly.

CE: What role did the Chief Engineers play in making this a success?

MM: The Chief Engineers were a vital part from start to finish, and it was a major team effort. It was agreed by them that overnight was the best time to complete this project. The Chiefs coordinated everything including the boiler shutdown, the draining of the system, and the coordination between the outside contractor that did the actual replacement of the traps. Their knowledge of their own steam system, their communication and organization was a significant reason it was such a huge accomplishment. Many Chief Engineers were thanked and acknowledged by government officials.

Patty Murray spent nearly 10 years working in the IUOE Local 399 Membership Department. She is the daughter of Jim Murray and sister to Michael Murray.



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And in accordance with state law (225 ILCS 317/17), **building owners must utilize an inspector who is employed by a state-licensed fire sprinkler contractor and has appropriate credentials** through completion of a certified sprinkler fitter apprenticeship program approved by the U.S. Department of Labor and/or certification through NICET III, ASSE 15010, or NFPA Water-Based ITM (WBITM).



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White Sox Welcome Chiefs on the Fan Deck

Once again, the Chief Engineers closed out the year of meetings and events on the Fan Deck at Guaranteed Rate Field, watching our Chicago White Sox take on the Boston Red Sox. It's a great way to finish up before the summer break, celebrating everyone in the Chief Engineers Association of Chicagoland (CEAC) who makes it such a vital group. Our Active Members, our sponsoring vendors and all of our Associate Member organizations, as well as our Board of Directors who continue to support the mission of the CEAC.

We were glad to see everyone who came out to cheer on our White Sox, and even though they didn't emerge victorious,

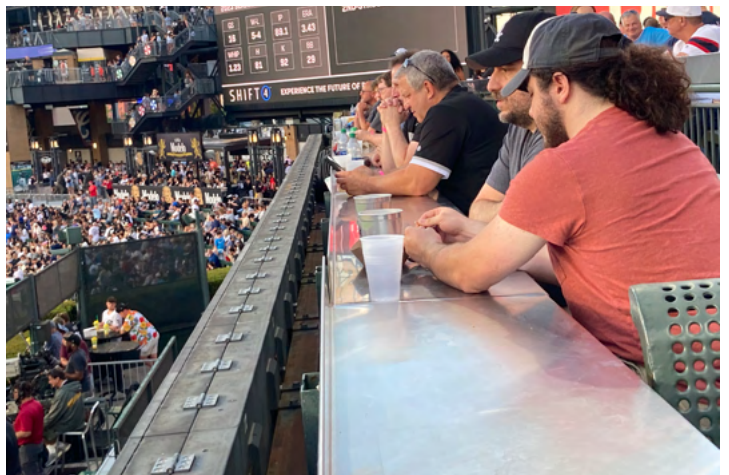
suffering a 3-1 loss to the Red Sox, we are confident that everyone still had a great time. Thanks to all for coming out, especially everyone from Christopher Glass who contributed so much to the proceedings.

We would like to remind everyone that our Chiefs events start up again with 83rd Annual Golf Event, which will be held Friday, Sept. 8, at Cog Hill. We encourage everyone to head to the chiefengineer.org website soon to register, as foursomes will fill up the courses fast. Sponsorship opportunities are available. Any questions can be directed to Kevin Kenzinger (312-296-5603) or Brendan Winters (773-457-6403).









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- \$1,600** Double course hole sponsorship (par 4 or 5)
- \$3,000** Tee Off Bloody Mary Bar (limit 2-bar at registration)
- \$3,500** Lunch sponsor at Halfway House (limit 2 per halfway house)
- \$6,000** **Dinner Sponsor**
 - Company name on banner in tent, can set up table in dinner tent
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The National Air Duct Cleaners Association (NADCA) — also known as the HVAC Inspection, Cleaning, and Restoration Association — has announced that its highly anticipated Fall Technical Conference 2023 will take place Sept. 7-9 at the Embassy Suites by Hilton Grapevine DFW Airport North in Grapevine, Texas.

NADCA's Fall Technical Conference is an annual event that is extremely popular with air duct cleaning technicians throughout every stage of their careers. It features hands-on training in every aspect of HVAC system cleaning. Plus, technicians seeking Air Systems Cleaning Specialist (ASCS) or Certified Ventilation Inspector (CVI) certifications will have the opportunity to participate in the pre-conference training course on Thursday, Sept. 7, and exams for both certifications will be offered on Friday, Sept. 8, and Saturday, Sept. 9.

The event will offer a robust educational program, with industry-expert-led sessions featuring topics like HVAC 101: Commercial Systems, Customer Service, and Safety. Technicians also have access to advanced training tracks about AHU Restoration, Combustible Dust, HVAC System Inspections & Assessments, Client Acquisition, Damage Control and more.

The conference also provides attendees with the opportunity to gain continuing education credits necessary for certification renewals.

To register or learn more about NADCA's 2023 Fall Technical Conference, including a detailed program agenda, visit nadca.com/fall-tech/2023-fall-technical-conference.



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SCADA Master Serves as Data “Hub” for Enterprise Software Integration

By Del Williams

As a SCADA Master, the platform can now also disseminate substation data into enterprise applications such as outage management software, GIS, dispatch, AMI and AMR.

For smaller municipal utilities and co-ops, it can be a challenge to upgrade and automate existing distribution substations and support infrastructure due to constraints in space, budget, labor, technical skills, and system compatibility. Many still have not installed supervisory control and data acquisition (SCADA) systems for the remote management and control of multiple substations. Others have SCADA but seek to incrementally adopt increasingly essential enterprise software solutions such as outage management systems, dispatch software, advanced metering infrastructure, geographic information systems, and automatic line sectionalizing, adding to the difficulty. These enterprise systems are typically available from multiple third-party vendors, complicating integration with the existing systems typically found in small utilities. Large, investor-owned utilities (IOUs) can avoid integration issues since they generally procure comprehensive enterprise software packages ... but these systems are too costly and complicated for smaller utilities. Co-ops and munis need affordable, scalable enterprise solutions that can access and share any of the data from the substation, seamlessly.

In response to that need, leading communication and automation platforms — which for decades have served as the substation “hub” of SCADA systems — are now serving up valuable substation status information to third-party enterprise software through the adoption of established communication protocols such as MultiSpeak. In doing so, municipal utilities and co-ops can utilize the enterprise software they need to

increase system efficiency and reliability on their own timelines and budgets.

“By incorporating an established industry protocol like MultiSpeak, the SCADA master can disseminate critical information at the substation level that can improve the effectiveness and accuracy of enterprise software. This provides small municipal utilities and co-ops with a solution that facilitates the integration of third-party software into their overall operation that is ready and able to communicate with their SCADA system,” says Ray Wright, Senior VP, Marketing for NovaTech Automation, a substation automation company that has served the power transmission and distribution market for more than 40 years.

NovaTech’s Orion Substation Automation Platform has long served the industry as a communication and automation processor that can connect to nearly any substation device in its native protocol, perform advanced math and logic, and securely present the source or calculated data to any number of clients in their own protocol. The Orion system can be integrated with any equipment, including competitors.

“The automation platform has always been an enterprise hub for in-substation data. As a SCADA Master, the platform can now also disseminate substation data into enterprise applications such as outage management software, GIS, dispatch, AMI and AMR,” says Wright.



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According to Wright, NovaTech decided to incorporate MultiSpeak into the Orion substation platform after receiving repeated requests from customers. MultiSpeak was initially developed by The National Rural Electric Cooperative Association (NRECA) in 2000 to facilitate communication between automated metering platforms and billing systems. Over the years, MultiSpeak has been refined into a common standard for integrating myriad enterprise software systems. Today, it is used by more than 800 utilities in 20-plus countries.

“We had dozens of customers that said MultiSpeak was a requirement. So, we wrote the spec, and our engineering group incorporated it. Now smaller utilities do not have to purchase a costly, ‘one-size-fits-all’ enterprise software package — only what they need and can afford,” says Wright.

NovaTech is now using MultiSpeak to share information with several leading outage management systems and will create protocol extensions to disseminate data to many other enterprise packages such as Dispatch, AMI and GIS.

For co-ops and municipal utilities, incorporating an outage management system (OMS) can expedite a response to the community’s concerns when a power outage occurs. Using MultiSpeak, Orion SCADA can provide breaker status to the OMS, simplifying configuration and implementation.

Dispatch software is another popular option and can facilitate more efficient dispatching of utility trucks and crews to make repairs during an outage or for routine maintenance tasks. This may include mapping, vehicle monitoring, routing, and real-time GPS tracking. Data from Orion SCADA can provide crews with additional indication of what needs to be repaired (i.e.-relay, switch, modem, AC supply, power supply, comm card, etc.) so they can be better prepared with needed spares and tools.

Advanced Metering Infrastructure (AMI) and Automatic Meter Reading (AMR) systems allow electric utilities to collect and harness the power of smart meters for load monitoring, load control/demand response, distributed generation, and customer engagement. When AMI is combined with historical load data from SCADA devices, algorithms can be developed to monitor and alert utility employees of large load imbalances and corresponding voltage imbalance that can damage grid and customer devices and equipment.

To enhance communication and decision making, assets such as meters, utility poles, and pole and feeder mounted monitoring equipment may be mapped and coordinated through a GIS mapping company. The sharing of data via MultiSpeak between GIS and Dispatch, OMS and SCADA facilitates more efficient dispatching and routing of utility trucks and service crews. When provided with specific outage data from the SCADA Master, crews can also bring all necessary tools and materials to service the equipment, shortening the


duration of any outage.

Fault location, isolation and service restoration (FLISR) can also be expedited with

full coordination between substation and enterprise data. FLISR technology can be used to automatically restore power to customers in the event of a permanent fault to restore service as quickly as possible. FLISR systems require exceptional coordination between technologies such as SCADA, OMS, distribution management systems, automated feeder switches and reclosers, line monitors, communication networks, as well as grid analytics, models, and data processing tools.

Despite the single-supplier attractiveness of comprehensive “one-size-fits-all” enterprise software systems, their cost and complexity have traditionally presented major obstacles to implementation by smaller munis and co-ops. Alternatively, using “best-in-class” packages — for OMS, Dispatch, AMI, GIS, FLISR, and SCADA — and knitting them together into a complete system via MultiSpeak, is more economically justified and manageable for smaller utilities.

“The combination of best-in-class enterprise packages, a modern SCADA data hub, and MultiSpeak enable coops and munis to implement systems that rival the functionality and value of the larger IOU systems,” says Wright. “These utilities can add enterprise packages as needed, maybe starting small with SCADA and OMS, then adding Dispatch and others. Add the suppliers of these smaller, purpose-designed packages can move faster, enhancing functionality quickly. For example, the Orion SCADA data hub is offering new options for data dissemination including the ICCP protocol — for transferring data between SCADA/EMS systems — and new techniques for exporting archived data to analysis and reporting packages. Stay tuned for more.”

For more information on SCADA solutions from NovaTech Automation, visit www.novatechautomation.com or call (913) 451-1880. 

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



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OSHA

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OSHA Update: US Department of Labor announces 15 members of Advisory Committee on Construction Safety, Health

The U.S. Department of Labor recently announced the appointments of 15 individuals to serve as members on the Advisory Committee on Construction Safety and Health (ACCSH).

The committee provides advice and assistance to the Secretary of Labor and the Assistant Secretary for Occupational Safety and Health on Construction Safety Act-related policy matters and the setting of construction standards.

Committee members serve two-year terms and represent the interests of the public, employers, employees, and state and federal government. The committee — which has broad experience with issues relevant to construction safety and health — generally meets two to four times a year. The appointed members include the following:

Five employee representatives:

- Christina Trahan Cain, North America's Building Trades Unions
- Liliana A. Calderon, International Union of Bricklayers and Allied Craftworkers
- Ryan Papariello, Laborers Health and Safety Fund of North America
- Kenneth G. Seal, International Union of Painters and Allied Trades
- Robert Seman, International Union of Operating Engineers

Five employer representatives:

- Kevin Cannon, Associated General Contractors of America
- Matthew Compher, Quanta Services Inc.
- Michael P. Lawler, Walsh Construction Company
- Greg Sizemore, Associated Builders and Contractors
- Mindy Uber, Skanska USA Building Inc.

Two public representatives:

- Dr. Marissa G. Baker, University of Washington
- Eric D. Fidler, Manitowoc Company Inc.

Two state government representatives:

- Christopher Scott Mabry, North Carolina Department of Labor
- Charles Stribling, Kentucky Labor Cabinet Department of Workplace Standards

One federal representative:

- Dr. G. Scott Earnest, National Institute for Occupational Safety and Health.

Christina Trahan Cain will serve as the ACCSH chair.

The Contract Work Hours and Safety Standards Act, also known as the Construction Safety Act, established the committee.

Learn more about ACCSH at www.osha.gov/advisorycommittee/accsch



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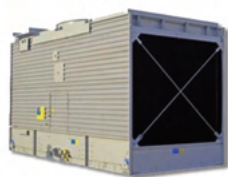


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U.S. Boiler Company Announces Citadel Commercial Boiler



U.S. Boilers' AHRI-certified Citadel and Citadel XL condensing boilers and volume water heaters can be configured for propane or natural gas.

U.S. Boiler Company recently introduced its new Citadel and Citadel XL condensing boilers and volume water heaters. Certified by the Air-Conditioning, Heating, and Refrigeration

Institute (AHRI) and rated up to 97-percent thermal efficiency — 98 percent for the volume water heaters — the new Citadel models can be configured for propane or natural gas. The Citadel is available in five capacities (399-1,000 MBH), while the Citadel XL is available in 1,250 and 1,500 MBH capacities.

In addition to standard 10:1 turndown and an impressive 300 GPM maximum flow rate, an outdoor model is also available for all but the largest models at no additional charge. Citadel XL models are available with 208/60hz/1ph and 230/60hz/1ph electrical options.

Saving time, space and simplifying design and installation, the Citadel can be stacked two-high with no need for accessory racks, though similarly stacking the Citadel XLs does require a rack system. With zero side and top clearance, the boilers optimize the available BTUs per square foot.

Because the Citadel is designed for a broad variety of applications, it arrives complete out of the box. The low water cutoff and high and low gas pressure switches are included at no extra cost, ensuring that the boilers are CSD-1-compliant. A standard, reinforced 3-in-1 vent connector facilitates the use of polypropylene, CPVC or stainless-steel venting on the Citadel. Venting of up to 300 equivalent feet — combined — of vent in AL29-4C, polypropylene or CPVC is acceptable. Modbus communication also comes standard.

For more information on U.S. Boilers' Citadel and Citadel XL condensing boilers and volume water heaters, visit www.usboiler.net.



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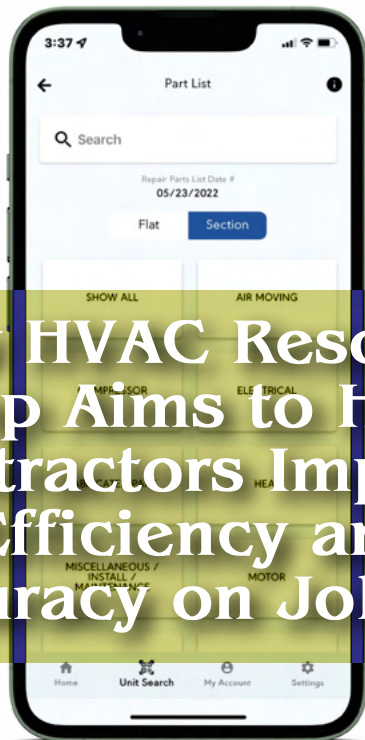
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New HVAC Resource App Aims to Help Contractors Improve Efficiency and Accuracy on Job Site

The Johnson Controls Ducted Systems (DS) Solutions App provides contractors with instant access to light commercial and residential equipment information to help streamline installation, troubleshooting and maintenance processes.

A new free app from Johnson Controls aims to help contractors to streamline their installation, troubleshooting and maintenance processes by providing instant access to commercial equipment information in the field. The Johnson Controls Ducted Systems (DS) Solutions App enables products to be searched by model number or an equipment QR code while on the job site, reducing the need for paper manuals that can be cumbersome to carry and maintain onsite.

In addition, the DS Solutions App employs mobile technology — such as camera-integration and geolocation services — to allow users to upload photos or videos that can be accessed by Johnson Controls technical support to assist with whatever troubleshooting issues contractors may be experiencing.

“The HVAC industry is in a state of rapid transformation, and for many contractors this means an increased workload burden with fewer technicians on the job,” Johnson Controls Director of Residential Product Management Charles Hurd said. “Contractors need intelligent, easy-to-access resources that can help make their processes more efficient and more accurate. The DS Solutions App is an example of how technology can be leveraged to bridge communication, reduce time and support positive outcomes.”

To access the app’s resources and functions, contractors have to first establish login info and sign in. Once in the app, though, they can expect to find abundant resources at their disposal, including:

- Unit start-up sheets
- Product registration details
- Wiring diagrams
- Parts lookup
- Sequence of operations
- BAS control points
- Fault codes
- Engineering guides
- Installation manuals
- Product training
- Warranty information

The Johnson Controls Ducted Systems Solutions App is available for Android and iOS, and can be downloaded from Google Play and the Apple App Store. For more information, visit www.johnsoncontrols.com/ds-solutions-app.

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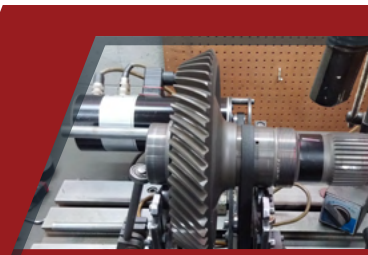
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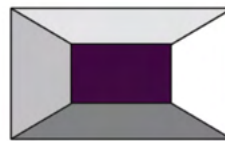


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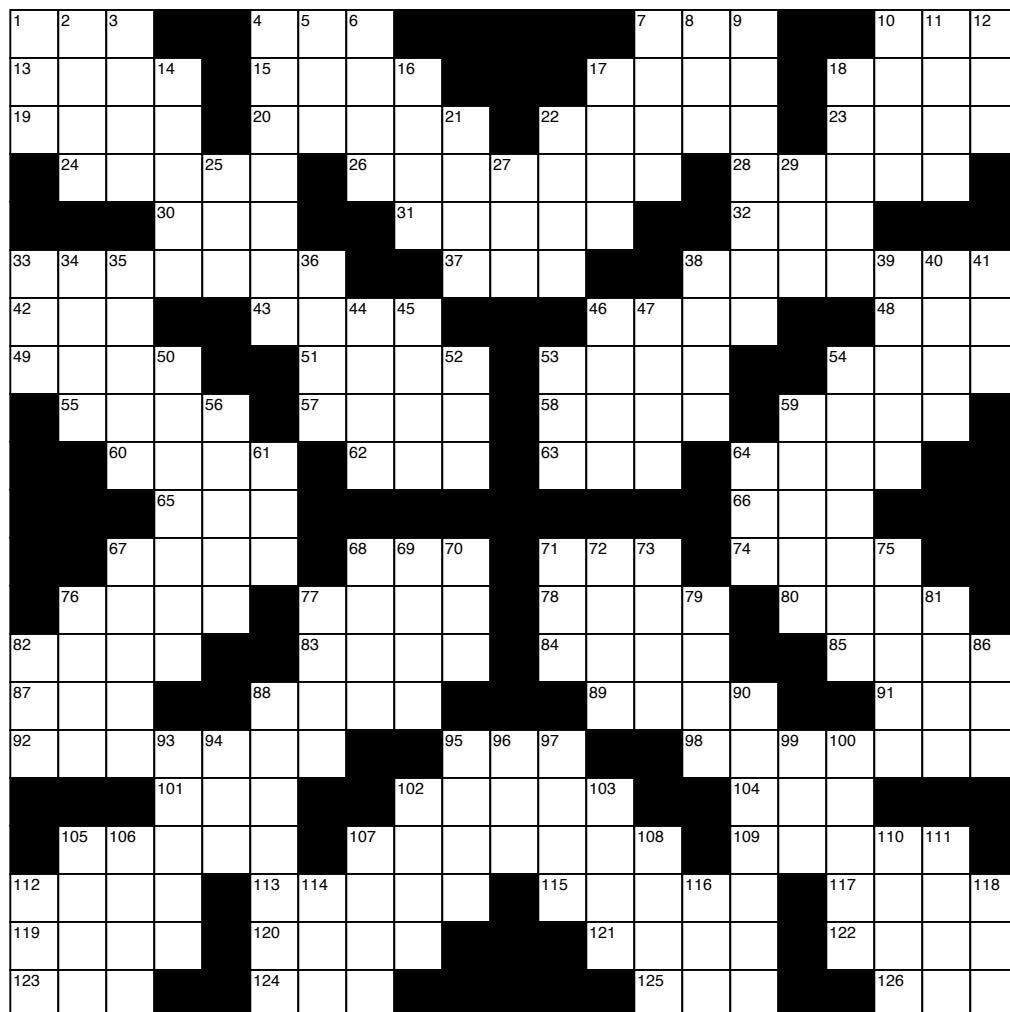


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- 12 High-school club
- 14 **Leech**
- 16 **Sailors**
- 17 **Wrench**
- 18 Snips
- 21 Repeat
- 22 **Blaze**
- 25 **ANSI - Hard Hat**
- 27 Elver
- 29 That woman
- 33 Cell stuff
- 34 Snaky fish
- 35 Respecting
- 36 Bridge
- 38 Capital of Norway
- 39 Maples
- 40 Garner
- 41 Tint
- 44 Seaweed substance
- 45 **deposits**
- 46 **Lacking in color**
- 47 Record
- 50 **Ranger**
- 52 Viper
- 53 Pouch
- 54 Savior
- 56 Tint
- 59 Debonair
- 61 Legume
- 64 Future Farmers of America (abr.)
- 67 Shouts
- 68 Mexican sandwich
- 69 Skinny
- 70 Gymnastic mat
- 71 Not many
- 72 Organization of Petroleum Exporting Countries
- 73 Baker's dozen
- 75 Harriet Beacher ___
- 76 Sock's wound
- 77 **Fence opening**
- 79 **Clawed sea life**
- 81 Debate
- 82 Barrel
- 86 Internal Revenue Service
- 88 Opening for arm
- 90 Vacations
- 93 Expect
- 94 Delivery service
- 95 **Press**
- 96 Kitten's cry
- 97 Lose attraction
- 99 IBM Competitor
- 100 **Egotism**
- 102 Did well
- 103 Flow out slowly
- 105 Leg extension
- 106 Greek stringed instrument
- 107 Poke
- 108 Painter of melting clocks
- 110 Cipher
- 111 Planted
- 112 **Heat unit**
- 114 Second month (abbr.)
- 116 Furrow
- 118 Compass point

ACROSS

- 1 Rainy mo.
- 4 Picnic pest
- 7 Attack
- 10 Head cover
- 13 Spot
- 15 Royal treasury
- 17 Winnie the ___
- 18 **of flange**
- 19 Vend
- 20 Give an angry look
- 22 Female singer ___ Apple
- 23 Grating sound
- 24 First letter in Hebrew alphabet
- 26 Chits
- 28 River
- 30 Environmental protection agency (abbr)
- 31 Journalist's question
- 32 Ruby
- 33 Desensitizes
- 37 Bullfight cheer
- 38 Electromagnetism discoverer
- 42 **Unused**
- 43 Lovers quarrel
- 46 Posttraumatic stress disorder
- 48 Shaft of light
- 49 First letter of the Arabic alphabet

- 51 Water (Spanish)
- 53 False bible god
- 54 Bare
- 55 Irritation
- 57 Nails
- 58 Dog food brand
- 59 Was looked at
- 60 Firm grasp
- 62 Representative
- 63 "To the right!"
- 64 Fret
- 65 Vane direction
- 66 Foreign Agricultural Service
- 67 Young Men's Christian Association
- 68 Cooking measurement
- 71 ___ hole (hiding place)
- 74 Car rental agency
- 76 _____ **Exchanger**
- 77 Merry
- 78 Heroic
- 80 Grub
- 82 Cologne (Gr.)
- 83 **70's drug**
- 84 River dam
- 85 N.A. Indian
- 87 Building addition
- 88 Speck
- 89 Hello!
- 91 Struggle

- 92 Beckon
- 95 Brat
- 98 Car rears
- 101 Revolutions per minute
- 102 Regions
- 104 Sticky black substance
- 105 **Turn red**
- 107 Frowned angrily
- 109 Cake topping
- 112 Young males
- 113 Many times
- 115 **Read**
- 117 Exclamation
- 119 Wrongdoing
- 120 **Heavy metal**
- 121 **Hoopla**
- 122 Eve's garden
- 123 Shoshonean
- 124 Move away
- 125 ___ A Small World...
- 126 Wonder

DOWN

- 1 Abdominal muscles (abbr.)
- 2 Guilty or not
- 3 Dinner bread
- 4 Afghanistan citizens
- 5 Nothing
- 6 Despot

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Permit No. 59



Have you upgraded your fan with a VFD but still have your old BAG Filters installed?

When the VFD dials down at night, the bag filter's pockets deflate and sag. Like a sock with sand in it. They then try to inflate when the VFD dials back up in the morning but the pockets become tangled and don't fully inflate. That restricts the airflow!

The answer? Our 4" mini pleated filter.

It fits in the same track as your bag filter and is way easier to install.

It never deflates and always remains open, never restricting airflow.

A lower pressure drop = energy money in your pocket.

Contact us to learn why AFE has been the industry leader for the last 70 years!