

# SMART SOLUTIONS

SUMMER 2010

Helping contractors save money and enhance productivity

## Olson Plumbing and Heating Installs 21 Miles of Pipe Weeks Ahead of Schedule Using Viega ProPress Stainless Fittings

Wind Tower Construction a Breeze

When Vestas Wind Systems began construction on the world's largest wind tower manufacturing plant, Olson Plumbing and Heating wanted to make sure the materials used for the project were as innovative and high quality as the product the plant would produce. Michael Trapp, president of Olson Plumbing and Heating, insisted that if his company were going to do the job, they would use Viega's ProPress Stainless fittings.

**Investing in the Future of Wind Power**  
Vestas Wind Systems has been a pioneer in the race to produce renewable energy sources. Vestas sold and installed its first wind turbine in 1979 and, since then, has become a world leader in producing power through the strength of the wind. In January 2009, Vestas sought to help the wind energy market move forward

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## Accord and Anvil Help Turn Philanthropist's Dream into Reality with Salvation Army Ray and Joan Kroc Community Center

Despite Record Snowfalls, Project Funded by McDonald's Founder's Widow Set to Open on Time

Accord Mechanical had a problem: The snowiest winter in Philadelphia history was causing building delays on its biggest project—so they turned to Anvil International for the best piping solution to keep construction on track. The Norristown, PA-based contractor had to move quickly to keep the

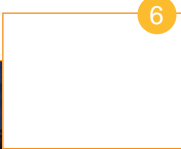
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"The prefabricated piping lines had to be trucked to the Pueblo facility from the Olson Plumbing and Heating headquarters in Colorado Springs ... on 40-foot racks," said John Hill, superintendent of Olson Plumbing and Heating. "We worked in two teams of three and installed 21 miles of stainless pipe."



Accord Mechanical used Anvil's Gruklok model 7700 grooved butterfly valves extensively for the Salvation Army Ray and Joan Kroc Corps Community Center in Philadelphia, providing an exceptional 300-psi dead-end service and a higher CV flow rating.

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Manufacturer/Supplier Council  
**MCAA**

*Adding Value to  
Your Supply Chain*

## SMART SOLUTIONS

Helping contractors save money  
and enhance productivity

*Smart Solutions* showcases new technologies and promotes cost-saving and productivity-enhancing applications available from members of MCAA's Manufacturer/Supplier Council. *Smart Solutions* is published biannually for contractor members of MCAA and its subsidiaries.

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Manufacturer/Supplier Council  
**MCAA**

*Adding Value to  
Your Supply Chain*



In this issue, you'll see how MCAA contractors and suppliers apply their knowledge and internal resources to gain a competitive edge. Read on to learn how you can bring added value that helps owners meet their construction deadlines, stay within budget, and achieve energy-efficiency goals:

### Cut installation time and save on materials with suppliers' design services.

For example, when SSM Industries, Inc. chose GRINNELL Products (a brand of Tyco Fire Suppression & Building

Products) for a substantial building project, GRINNELL Mechanical Services helped them meet incredibly tight timelines by designing a comprehensive drawing package that enabled installation of the entire piping system while waiting for the pumps to arrive. Anvil's Design Services Division provided Accord Mechanical with a detailed preliminary drawing using Anvil's Gruklo® line to keep the entire project on schedule.

### Use audits to identify energy- and money-saving improvements.

Control Contractors partnered with local utilities and the Alaska Energy Authority to provide BuildingAdvice benchmarking and energy assessment services as part of a study of energy usage, generating business and contacts in the tight-knit community of Anchorage. Other contractors are using Grundfos Pumps audits to develop a detailed system profile of users' needs and identifying areas for optimization that can pay for itself in as little as one year.

### Meet green goals with cost-effective products that increase energy-efficiency.

F+F Mechanical Enterprises, Inc., collaborated with Sloan Valve Company to provide water-efficient flush valves and solar-powered faucets that helped Yale University earn LEED® Platinum certification and numerous awards for a new campus building. Eagle Harbor Mechanical used Jay R. Smith Mfg.® products to install a rainwater harvesting system for a Tacoma, WA, city building as part of efforts to achieve LEED Platinum status.

### Identify solutions that conform to tight deadlines and budgets.

West Side Mechanical used Mueller's StreamTECH adhesive joining system, to successfully install a new mechanical system in a school during the academic year—getting the job done on time and within budget. Southland Industries partnered with grooved piping manufacturer Victaulic to expedite the M Resort Spa Casino project in Las Vegas, where fast-track construction is the norm. For the world's largest wind tower manufacturing plant, Olson Plumbing and Heating used Viega's ProPress Stainless fittings to install the industrial gas and compressed air portions of the project in just five months.

### Take advantage of expert advice.

The experts at CNA explain OCIPs and CCIPs and describe how you can protect your business by addressing potential wrap-up insurance coverage gaps. The knowledgeable people at Johnson Controls help you find the right HVAC solution for you and your customer.

As always, we thank our sponsors for their continued support, and hope to highlight the partnerships that can help you and your business thrive.

**Joe Walicki**  
Chairman

# F+F Mechanical Helps Yale University's Kroon Hall Achieve LEED Platinum Status with Sloan Valve Low-Flow Plumbing Fixtures

As home to the School of Forestry and Environmental Studies, Yale University's new Kroon Hall was designed to be a model of sustainability, so contractor F+F Mechanical Enterprises, Inc. collaborated with Sloan Valve Company to provide energy- and water-efficient faucets and flush valves. To reach the ambitious green building goals, a team of architects, planners, and a sustainability consultant evaluated more than 25 different sustainable measures to determine which were most cost- and energy-efficient. During construction, F+F collaborated with the construction manager, the owner, and the design team by recommending plumbing and mechanical systems that maximized efficiency and met the design criteria while offering the best economic value to the owner.

## Sustainable Systems Exceed LEED Criteria

Kroon Hall, a 58,000-square-foot facility built in the center of New Haven, CT, was designed to use 81 percent less water and 58 percent less energy than a comparable building. F+F installed the Sloan UPPERCUT® dual-flush Flushometers, combined with a rainwater harvesting system, to meet water-efficiency goals. The UPPERCUT dual-flush Flushometers save one-half gallon of water when a user activates the reduced flush mechanism, maximizing water efficiency.

The rainwater harvesting system uses a diversion system that channels the first inch of storm water to a pond with aquatic plants that serve as biofilters to clean the water. Flows greater than an inch are carried by a separate pipe to a 20,000-gallon, fiberglass-reinforced, underground harvesting tank, which collects overflow from the pond and rainwater from the Kroon Hall roof. That mix is then circulated through the pond for



Photo courtesy of Yale University/Michael Marsland

Yale University's Kroon Hall earned LEED Platinum status thanks, in part, to Sloan Valve's water-efficient UPPERCUT® dual-flush Flushometers and SOLIS solar-powered faucets installed by F+F Mechanical.

additional cleansing. Water stored is used for landscape irrigation or diverted to a 940-gallon day tank located in the basement, where it is filtered and disinfected for use in toilets. The combination of Sloan's highly efficient plumbing fixtures and rainwater harvesting is expected to save the University more than 500,000 gallons of potable city water per year. It is estimated that the savings from using less potable water will result in the rainwater harvesting system paying for itself within the first 10 years.

The design team also wanted to use solar power, so F+F installed 0.5 gallon-per-minute Sloan SOLIS® solar-powered electronic faucets. These faucets transform natural or artificial light into electrical power while delivering water efficiency. In addition, F+F put four solar panels on the building's south elevation to generate energy to provide hot water for the restrooms.

F+F Mechanical also used advanced HVAC technology to heat and cool the

facility. Highly efficient European air handling units which use an adiabatic cooling process were installed to ensure a cool and comfortable climate on warm days. Ground-source heat pumps further maximize energy efficiency by extracting heating and cooling from four 1,500-foot geothermal wells instead of from a less-efficient central campus boiler or chiller plants. The system is so efficient that Kroon Hall essentially functions off of the central utility plants.

Kroon Hall was awarded LEED Platinum certification by the U.S. Green Building Council in February 2010. To achieve Platinum status, a building must meet standards in categories such as water efficiency, indoor environmental quality, materials and resources, and sustainable sites. Kroon Hall was awarded 59 points—seven more than required for the Platinum rating. The building earned all five LEED points for water efficiency thanks to the innovative water-saving and water-re-use features

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# SSM Industries Employs GRINNELL Products to Gain Competitive Edge over Non-Union Shops

Mechanical Design Services from GRINNELL Help Contractor Minimize Installation Time and Materials Costs

To win the bid for a state-of-the-art medical device maker's new building project in Central Pennsylvania—a market predominantly composed of non-union shops—mechanical contractor SSM Industries, Inc. (SSMI) needed a competitive edge. They proposed using a grooved system from GRINNELL Products (a brand of Tyco Fire Suppression & Building Products), because grooved couplings, fittings, and valves can be installed two to three times more quickly than welded systems. They also knew that GRINNELL Mechanical Services (GMS) could provide comprehensive design and analysis that would further speed installation time and cut costs. By partnering with

GRINNELL, SSMI won the contract to provide the robust piping systems needed by Unilife Corporation. Based in Lewisberry, PA, Unilife has been growing rapidly and began constructing a new facility in March 2010—with 170,000 square feet of new Unilife offices and assembly lines, equipped to produce up to 360 million units of life-saving retractable syringes each year.

## GRINNELL Mechanical Services Facilitates Rapid Installation

The prevalence of non-union mechanical contractors in Harrisburg, PA, makes it very difficult for union shops such as SSMI to compete effectively for bids. By using GRINNELL Products

and services, SSMI not only won the Unilife project but also stayed within tight project budgets and timelines.

“There are many reasons why we chose to work with GRINNELL Products as our partner,” said SSMI Project Manager Ken Lintelman. Perhaps the biggest contributing factor was the GMS team, a group of engineers and technical personnel with decades of experience in mechanical design and optimization. GMS helped SSMI meet incredibly tight timelines, including a limited number of weeks for installation, by designing a comprehensive drawing package that enabled SSMI to install the entire piping system while waiting for the system's

## SLOAN VALVE

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In addition, it achieved four out of five possible points for innovation and design, in part thanks to the potable water savings.

“From a mechanical standpoint, achieving LEED Platinum status on Kroon Hall meant not only implementing green building practices and installing state-of-the-art systems, but also selecting products that could deliver the level of energy- and water-efficiency required. Sloan's faucets and flush valves met that demand perfectly,” said John Ferrucci, vice president of Operations for F+F.

## Coordination, Collaboration, and Creativity Overcome Space, Scheduling Constraints

The nature of the advanced mechanical systems in Kroon Hall required excellent coordination, collaboration, and creativity. To meet the challenge of

integrating the mechanical systems with the electrical, plumbing, and fire protection systems, F+F Mechanical took the lead in coordinating these systems and created all of its coordination drawings in 3D to uncover any potential conflicts and resolve them in advance. In addition, it was clear at the outset of the project that the limited space allotted for construction of Kroon Hall combined with scheduling constraints were potential barriers. To address these issues and ensure timely delivery and installation of the systems, F+F strategically prefabricated certain mechanical, plumbing, and piping elements at their fabrication facility. Construction of Kroon Hall eliminated an inefficient gas-fired power plant, replacing it with a highly efficient, state-of-the-art structure that embodies the values of Yale University and the School of Forestry and Environmental Studies itself. Aesthetically appealing with a nearly neutral carbon footprint, Kroon Hall has vastly improved the Science Park area of the Yale Campus.

## Kroon Hall Earns Accolades for Efficiency and Design

Kroon Hall follows Yale's Sculpture Building as the second Yale project to earn LEED Platinum certification and is the most sustainable building on campus. The building has been named a 2010 Top Ten Green Project by the American Institute of Architects' Committee on the Environment and Building of the Year by the British weekly magazine *Architects' Journal*, among other awards:

- Honor Award for Design Excellence, American Institute of Architects: New England
- Build Connecticut Award, Associated General Contractors of Connecticut

*For more information, visit Sloan Valve at [www.sloanvalve.com](http://www.sloanvalve.com).*

*MCAA thanks Sloan Valve Company for their continued support.*



Because grooved couplings, fittings, and valves can be installed two to three times more quickly than welded systems, mechanical contractor SSMI used GRINNELL Products to meet the tight timelines for the new facility of Unilife Corporation, a medical device manufacturer. SSMI Project Manager Ken Lintelman said, "GRINNELL Products' grooved product saved us a lot of money, significantly cut labor time, and even eliminated the need for piping system extensions" for the Unilife project.

pumps to arrive, which typically have a 6–10-week lead time. When the pumps arrived, SSMI simply had to hook up the machinery, and the job was complete. GMS also conducted a thermal expansion and contraction loop analysis to enable SSMI to use GRINNELL flexible couplings to reduce the amount of pipe needed, resulting in substantial material savings. "GRINNELL Mechanical Services' drawings were delivered at an exceptional pace and with industry-leading precision," Lintelman noted.

### Grooved Products Save Money and Time

"GRINNELL Products' grooved product saved us a lot of money, significantly cut labor time, and even eliminated the need for piping system extensions," said Lintelman. Using grooved products provided SSMI with other benefits. They did not need to obtain burn permits for welding, and they eliminated on-site fumes and flames. Secondly, the grooved product provided flexibility for SSMI installers, allowing them to navigate pipe around complex problems and obstacles. Thirdly, noise levels in a functioning grooved piping system are lower than in a welded one, because each joint is made with a cut pipe and grooved product, dampening sound waves throughout

the system. All of these factors ultimately led SSMI to choose a grooved system over a welded one for this important installation.

Lintelman also cited Tyco/GRINNELL Products' superior service as a major driving force behind his decision to go with the company. "Salespeople responded quickly to any and all calls, while working rapidly and professionally to get the product onto the jobsite." He also appreciated GRINNELL Products' 10-year limited warranty. "The warranty was very important. It really distinguished

GRINNELL Products in our menu of bidders." Offering the only 10-year warranty in the industry, GRINNELL Products sends the message that it stands behind the quality of its products. Working together, GRINNELL Products and SSMI designed and built a cost-effective, on-time mechanical systems solution for Unilife Corporation.

*For more information about GRINNELL Products, visit [www.grinnell.com](http://www.grinnell.com).*

*MCAA thanks GRINNELL Products for their continued support.*



SSMI relied on GRINNELL Products to stay on schedule and within budget while providing the robust piping systems needed to accommodate 170,000 square feet of new Unilife offices and assembly lines.

# West Side Mechanical Uses Mueller's StreamTECH Adhesive Joining System to Perform Major Work at School While Classes Remain in Session

Installing a new mechanical system in a school during the academic year is not easy—but that's what Martin Warren Elementary required this spring. West Side Mechanical of Kansas City, KS, found that Mueller's StreamTECH adhesive joining system allowed them to provide a clean system, get the job done on time, and still make the margins expected.

Martin Warren Elementary in Warrensburg, MO, originally built in 1923, had resorted to external modular classrooms to address a growing student population. With a building expansion already scheduled for this summer, planners couldn't wait for the short summer break to tackle both the expansion and the comfort systems in the existing structure. The mechanical system had to be overhauled after school hours, and most of the piping work was completed before classes let out for the summer.

The school's ground source heat pump system uses copper fittings for the 4" piping and required a good dose of ingenuity to fit into the minimal space provided. Trevor Standish, vice president of West Side, had been considering the StreamTECH system for some recent projects and knew this project would go smoother if a flameless copper joining system were used. When students and teachers left at the end of the day, the West Side crew moved in to run piping right over their desks and through the library, with no concern for a fire watch or flame permits. Following some on-site training by Mueller Industries, the veteran crew quickly found a rhythm for making the adhesive connections.

Most of the copper fittings for this job were Mueller's new Dual-Seal adhesive



Thanks to Mueller's StreamTECH adhesive joining system, West Side Mechanical was able to overhaul Martin Warren Elementary's mechanical system after school hours—using small, affordable applicators that were easy for installers to get into tight spots to make connections and did not require fire watch or flame permits.

fittings, StreamTECH DS. This design incorporates two engineered seals in each cup that create the boundaries for a solid ring of adhesive to fill. The Dual-Seal fittings allowed the team to dry-fit joints as desired and make the final connection when ready. To make the final connections, installers simply pumped the two-part epoxy into the joint via opposing fill and bleeder holes. "The small, affordable applicators were easy to use and could get into the tightest spots to make connections," noted Standish.

Efficiencies gained by using StreamTECH allowed West Side to stay on schedule, despite the many hurdles posed by working on an 87-year-old building. Crews frequently had to find creative ways to fit the primary 3 and 4" piping in very low ceilings and tight chases that were already packed with communication

wires and cables. According to Standish, "We found that StreamTECH was the perfect system to give us the speed, flexibility, safety, and overall savings."

The new ground source system means the school can eliminate its dated boiler and chiller systems entirely. Warrensburg School District officials anticipate saving fuel and electricity when the new system becomes operational for the 2010–2011 school year. The new system is also expected to provide much greater control and consistency of heating and cooling throughout the building.

*For more information visit [www.streamtechsystem.com](http://www.streamtechsystem.com).*

*MCAA thanks Mueller Industries for their continued support.*

# Southland Industries Employs Victaulic's Grooved Piping System to Complete Ambitious Timeline of Las Vegas Resort

Victaulic Grooved Systems Easy to Install and Maintain, Bag-and-Tag Delivery Speeds Process

Fast-track construction is the norm in Las Vegas, NV, so Southland Industries chose grooved piping manufacture Victaulic as a partner to expedite construction of the M Resort Spa Casino. According to Armando Najarro, general superintendent for Southland Industries, "In Vegas, the owner tells you when he or she wants to open the facility, and you plan your construction schedule based on that opening date. It is typically the reverse [process for determining construction schedules] in other regions, but in Vegas, this creates a unique challenge for contractors to constantly meet those tight deadlines."



Situated on 90 acres at the southern end of the Las Vegas Strip, the M Resort Spa Casino opened in March 2009 and offers 390 resort rooms and suites with floor-to-ceiling windows; 100,000 square feet of pool and entertainment terraces;

92,000 square feet of gaming; nine dining outlets; five bars and lounges; a 23,000-square-foot spa, salon, and exercise area; and 60,000 square feet of meeting and conference space. Yet the M, owned by Marnell Corporation, went from concept to completion in just 22 months.



Southland Industries used Victaulic grooved piping systems—such as QuickVie® installation-ready couplings and Advanced Groove System (AGS) couplings—to expedite construction of the M Resort Spa Casino. "I would say we gained at least 10–20 percent productivity on our site by using installation-ready couplings versus the standard coupling," said Armando Najarro, Southland general superintendent.

set for the M, Najarro knew that to keep the project on track he needed flawless coordination and communication during all construction phases—and partners and vendors who could support the rapid construction schedule.

Southland recognized the benefits of grooved systems, including quick, easy, and safe no-flame installation, and partnered with Victaulic to expedite construction of the 3,900-ton central plant and installation of the HVAC and plumbing systems for the M. Southland had previously worked with Victaulic on several Las Vegas projects, such as the Wynn Resort, the Ritz Carlton, South Point, and the Marriott Grand Chateau. In addition, Najarro had worked with Victaulic Territory Sales Manager Tim Burnette extensively and knew that their great working relationship and trust would support the project goals.

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# Eagle Harbor Mechanical Uses Jay R. Smith Roof Drains for Rainwater Harvesting, Green Roof

The City of Tacoma, WA, was looking for different ways to help their Center for Urban Waters building be more environmentally-friendly, so Eagle Harbor Mechanical of Poulsbo, WA, installed a rainwater harvesting system, relying on Jay R. Smith Mfg. Co.® products to do the job. The building is the city's centerpiece for urban water quality and sustainability, so achieving LEED® certification was a priority—and planners looked at every source of water usage and consumption for potential conservation efforts. With more than 51,000 square feet of working space, the roof was large enough to use a rainwater harvesting system for most of the building's water needs. Not only could the rainwater harvesting system handle all of the urinal and toilet water demands, it could also be used to irrigate the green roof installed on the building.

Mark Bratonia of Eagle Harbor Mechanical knew that Jay R. Smith Mfg. Co. could provide him with a package of products that would meet

his requirements. Greg Skaggs with Braley-Gray Washington, the local Jay R. Smith Mfg. Co. representative, worked closely with Bratonia on previous projects. "Braley-Gray really does a good job of servicing their customers," said Bratonia. "Good factory reps are important, and it's the service behind the product that separates them from others. This rainwater harvesting project was different, and I knew that Jay R. Smith Mfg. Co. would be there until we got it right."

The Center for Urban Waters project has several roof drains manufactured by Jay R. Smith Mfg. Co. installed in the green roof. The roof drains convey all of the rainwater collected from the rooftop to the vortex filters. Two RH9520-06 medium-capacity vortex filters are installed directly under the green roof, which feed two 36,000-gallon, above-ground, corrugated, galvanized steel, rainwater storage tanks. The visibility of the two storage tanks, which are easily seen from the front of the building,

helps draw attention to rainwater harvesting and the overall sustainability of the Urban Waters building.

The concept of harvesting rainwater is simple; rainwater is collected from a rooftop. The harvested rainwater is conveyed through the piping to a filter that removes the debris from the rainwater. From the filter, the collected rainwater

enters the storage tank through a smoothing inlet. The smoothing inlet prevents the agitation of sediment at the rainwater inlet into the storage tank, and it aerates the water to keep it from becoming foul-smelling. The stored rainwater is now ready for use. Harvested rainwater is extracted from the cleanest part of the tank, just below the surface of the water, using a floating filter and pump. The end result is filtered rainwater that is ready to use for any indoor water applications, such as flushing toilets and urinals, or for outdoor applications, such as irrigation.

Rainwater harvesting also helps eliminate water runoff problems. Large commercial buildings have asphalt parking lots that can create problems during large rain events. Pollutants can be carried down to storm gutters and out to streams and rivers. Some local municipalities have started levying fines on businesses with excessive runoff problems. Bratonia noted, "Here in Washington, everything runs to the rivers and out to the bays and then to the ocean, so rainwater harvesting really helped us avoid any potential risks."

The re-use of rainwater and the prevention of rainwater runoff that result from using the rainwater harvesting products are part of the city of Tacoma's efforts to achieve LEED Platinum certification, the highest possible LEED rating.

*For more information on rainwater harvesting products and green roof drains or to contact your local Jay R. Smith Mfg. Co. representative visit [www.jrsmith.com](http://www.jrsmith.com).*

*MCAA thanks Jay R. Smith Mfg. Co. for their continued support.*



Eagle Harbor Mechanical installed a rainwater harvesting system in Tacoma, WA's Center for Urban Waters building, relying on Jay R. Smith Mfg. Co. products to do the job. The visible stainless steel water storage tanks draw attention to rainwater harvesting and the city's efforts to promote sustainability.



# Control Contractors Breaks Legacy Agreement Barriers with Energy Assessments Using BuildingAdvice Technology

Kevin Smith of Control Contractors has broken new ground in partnering with Anchorage, AK-area local utilities and the Alaska Energy Authority (AEA) to provide BuildingAdvice benchmarking and energy assessment services to businesses as part of a study of energy usage. As a result, Smith's BuildingAdvice unit has been booked from mid-February to August.

"We don't have energy rebate programs in Anchorage," Smith explained, so he came up with an alternate solu-

tion: he became part of a successful grant proposal to AEA for a study of energy in the Anchorage area, and BuildingAdvice became the commercial assessment vehicle.

Traditional marketing doesn't work in Anchorage, and Smith has tried e-mail, direct marketing and advertising without palpable result. "It's a very small community in Anchorage," he said. "They would be very suspicious of you for making outlandish claims. I had to get more creative with my marketing."

Control Contractors, a 24-year-old company with six regional locations throughout the West Coast and Texas, had been providing HVAC service for Chugach Electrical Association, a member-owned utility, for several years. When Control Contractors became a BuildingAdvice channel partner in 2009, Smith decided to take the potential of BuildingAdvice further.

The AEA has had a longtime interest in studying energy usage in commercial continued on following page

## VICTAULIC

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### Victaulic Couplings, Delivery Method Speed Installation Time

For the M, Najarro selected the QuickVic® line of installation-ready couplings, including the Style 107 and Style 177, which have no loose parts and do not require disassembly prior to installation—making installation even faster than a standard grooved coupling and up to 10 times faster than welding or flanging. "I would say we gained at least 10–20 percent productivity on our site by using installation-ready couplings versus the standard coupling," said Najarro.

In addition, Victaulic Advanced Groove System (AGS) couplings were used for large-diameter pipe (14 to 24) connections. Even at that size, AGS couplings have a two-piece housing that expedites installation and have twice the end-load capabilities of standard large-diameter couplings.

Victaulic's bag-and-tag delivery method got products to the jobsite where and when they were needed, clearly grouped and marked, which

reduced materials handling on the jobsite. Najarro also used Southland's fabrication shop to further reduce materials handling, gaining more efficiency.

### Grooved Couplings Allow for Easy Maintenance and Modification

Because Southland Industries incorporates service into their "design-build-maintain" business model, it was also important to Najarro that after the job was complete, maintenance and future expansion would be easy, safe, and cost-effective. "Any time we design a system, we want it to be user-friendly for the owner," said Najarro. By using Victaulic couplings and fittings in the mechanical room and Style 761 ¾" 300 Masterseal™ butterfly valves, Southland ensured quick and safe maintenance. All that is required to get into the system is to loosen the nuts and bolts of the coupling or valve, remove the fitting, and then reassemble when maintenance is complete. "The difference in maintenance on a 14 joint with a coupling versus a flange can be as significant as two hours versus an entire day," said Najarro. Plus, reducing the downtime of the system

ultimately supports the profitability of the resort and casino for the owner.

For future expansions initiated by the owner, the benefits of the grooved system (fast assembly and design flexibility) equal easy and safe modification of and additions to the HVAC and plumbing systems. Najarro noted that in the central plant, using the deflection properties of Victaulic couplings to accommodate thermal movement eliminated the need for large welded expansion loops, leaving plenty of space for future expansion of the systems.

Ultimately, Victaulic grooved systems provided the support that Southland and Najarro needed to get the M Resort Spa Casino done on time while ensuring the ease and safety of future maintenance and expansion. "We're happy, and more importantly, the owner is happy," said Najarro.

*For more information about Victaulic, visit [www.victaulic.com](http://www.victaulic.com).*

*MCAA thanks Victaulic for their continued support.*

## BUILDINGADVICE

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facilities and issued a formal grant proposal process to identify the right contracting company to execute such a study. “Nobody could really compete with the capabilities of BuildingAdvice,” said Smith of the proposal process. Many competitors’ assessment costs ranged from \$5,000 to \$10,000 plus, per facility. Because BuildingAdvice is automated and fully integrated with Energy Star, Smith was able to keep assessment costs reasonable for both parties, winning Control Contractors the role of contractor partner for the commercial portion of the grant.

As a result, Control Contractors now has relationships with all five of the utility companies involved in the study, which include government facilities, nonprofit organizations, and member-owned cooperatives. Energy assessments will be performed on approximately one percent of the Anchorage area’s 4,000 commercial facilities, including office, retail, and warehouse facilities of various of types and sizes.

### BuildingAdvice Opens Doors in Tight-Knit Community

Partnering with utilities allowed Control Contractors an entry point into Alaska’s tight-knit community that they otherwise wouldn’t have had. Representatives from the utilities contacted approximately 60 building owners and managers to request participation in the study by undergoing energy benchmarking and assessment reports. “With the utility calling first, we’ve only had one person say ‘no,’” Smith reported. “I’m getting my foot in the door with people who otherwise would be happy to stay with their current building controls or maintenance providers. They wouldn’t have answered the phone before.”

Since starting in March, Smith has per-



BuildingAdvice energy monitor systems helped Control Contractors get their foot in the door of many Anchorage, AK, businesses through a state-funded energy assessment study. By partnering with five utilities for the study, Control Contractors gained an entry point into Alaska’s tight-knit business community.

formed assessment and benchmarking for about half of the buildings in the survey. With each of those 15 buildings, Smith has reviewed BuildingAdvice report findings with facility managers, who find the BuildingAdvice reports to be easy to read and interpret.

After the benchmarking process is complete, the utilities will submit their findings to the AEA. Results on how a sample of Anchorage area buildings rate in energy efficiency will be published at the end of August. To measure the energy and money saved, Control Contractors will again benchmark the buildings after any improvements have been made as result of the study.

### Initial Study Will Lead to More Opportunities for Assessment and Improvements

After the results of the study are published, the AEA will fund energy assessments to additional buildings at a discounted price. Control Contractors will contact buildings they’ve already benchmarked to discuss potential low- and no-cost adjustments resulting from BuildingAdvice assessments. Smith estimated having a direct relationship with approximately one third of the buildings they’ll work with on the study. The other two thirds have existing maintenance programs—and in a town like Anchorage, longstanding, loyal relation-

ships with those contractors. However, Smith anticipated being able to identify a pattern of sub-par building performance from the results of the study. “There are only five main mechanical contracting companies here,” Smith said. “Once we’re able to analyze a mass of data, we’ll be able to pursue opportunities with the low-performing 50 percent of buildings.

“We may not get an entire maintenance program at first,” Smith elaborated. “But in referencing the low- and no-cost adjustments from BuildingAdvice reports, we’ll be able to recommend that owners ask their mechanical contractors about performing the adjustments, resulting in increased revenue for the existing contractors. Alternately, those owners can consider engaging Control Contractors for monitoring and verification in more of a consultative capacity,” Smith pointed out.

“In either case, we build client trust with new prospects by providing them with the intelligence they need to take action,” said Smith.

The AEA hopes the government-funded program will help create awareness that will stimulate other businesses to take advantage of the discounted prices on energy assessments following the study. “We’ve proposed a couple of projects to the buildings we’ve assessed already,” said Smith. “And in those cases the existing provider came in to match the price, in order to keep the client. But it’s still a win-win, because the BuildingAdvice reports provided by Control Contractors were the catalyst.” Smith has the client testimonials to prove it.

“The relationship with the utilities is where it all starts,” Smith concluded.

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

# Seven Tips for Choosing an Easy-to-Install, Integrated HVAC System

Contractors and Customers Save Time and Money with Innovative, Efficient Equipment

High-efficiency HVAC equipment combined with intuitive controls and accessories—such as a Commercial Comfort System (CCS) from Johnson Controls—can be installed quickly and easily, saving you time and money, and providing customers with an efficient, easy-to-operate building solution. When searching for the right HVAC solution for your customer, consider the following seven questions. The ideal system will offer ease of installation, quick start-up, a compact footprint, design flexibility, energy efficiency, and other environmental benefits.

## 1. Does the customer need new heating and cooling units? Would they also benefit from the additional advantages controls provide?

Units that combine intuitive controls and accessories offer a holistic solution to comfort—a complete, factory-assembled package of HVAC equipment, controllers, sensors, and terminal units that are integrated and designed to work seamlessly together and can include damper assemblies and zone sensors. More sophisticated control systems support single-zone units, pressure-dependent zone dampers, and pressure-independent systems for easy, efficient operation.

## 2. Is the solution easy to install?

Saving installation time means additional money in your pocket. Commercial comfort systems that feature factory-installed controls and factory-configured components specially designed for commercial and light commercial users can be designed to “arrive alive” for ease of installation. In some cases, this means that the complete HVAC damper assembly is factory-mounted and wired and factory-configured; there’s no need to



The ideal HVAC system will offer ease of installation, quick start-up, a compact footprint, design flexibility, energy efficiency, and other environmental benefits. The family of Johnson Controls Commercial Comfort Systems includes the Series 10 single-packaged unit, which combines superior efficiency ratings and ease of installation for a cost-effective solution.

program the system manager; and the system can control multiple constant volume single-packaged units, zone coordinators for zoning systems, and input/output modules. For example, a CCS from Johnson Controls also features a factory-configured zone coordinator that manages up to 24 changeover/bypass zones or 32 variable air volume boxes and includes a factory-mounted/wired and factory-configured zone damper. No programming (and no laptop) is required. The only set-up involves configuration, such as changes to set-up schedules or set points. As a result, there is no need for a high-level control technician, resulting in reduced installation costs.

## 3. Is the system easy to set up and use?

Ease of set-up and use are not only considerations for you during the installation process but also for the user of the system. The integrated system of equipment, HVAC controls, and accessories should enable non-technical building staff to navigate, monitor, and control functions from a single, intuitive, user interface. A

system that includes factory-packaged controls with self-tuning algorithms makes set-up and programming easy and eliminates the need for programming or other specialized knowledge to operate the system. With a Johnson Controls CCS, the system manager features an integrated, browser-based interface for remote monitoring, accessible by its own color touch-screen display.

## 4. Does the system provide design flexibility?

Based on the customer’s heating and cooling needs and the unit you select, consider the location in which the system will be installed. How large is the space? What is the floor surface underneath the unit? Some units, such as the Johnson Controls Series 10, feature a single cabinet size and compact footprint, making it easy to install on a curb, slab, or structural steel. A rigid, full perimeter base rail allows three-way forklift access, and overhead rigging simplifies the installation process. In addition, each unit comes completely wired, piped, charged, and tested.

## 5. Is the system easy to service?

When considering a system, look for one with a convertible air-flow feature, which will reduce the amount of sheet metal cutting in the field. Gas and electric knockouts at the bottom and side of the unit provide easy access. Additional service-friendly features to look for include easy access to the control compartment, compressors, filters, and heating section and a single assembly that moves the motor and blower out for inspections and servicing. The Johnson Controls Series 10 unit features two compressors and independent refrigeration circuits to ensure reliability and foil-faced insulation that improves indoor air quality.

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## ANVIL

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\$30-million Salvation Army Ray and Joan Kroc Corps Community Center in Philadelphia on schedule for an October 2010 grand opening.

Generous Bequest Will Provide Vital Services to Neighborhood  
Joan Kroc—widow of McDonald's founder Ray Kroc—dreamed of using her family's good fortune to provide for the well-being and care of others. Funded in part by her \$1-billion bequest, the Salvation Army Community Center in the city's Tioga/Nicetown section will include a huge aquatics area, gymnasium, chapel, daycare facilities, and family health offices. It will also provide vital services to the neighborhood. But with more than 70 inches of snow falling on Philadelphia by the end of February 2010, work stoppages and supply delays threatened to push back the opening of the new center.

Founded in 1995, Accord Mechanical is no stranger to major projects with tight budgets and tight deadlines. They have worked on such notable projects as the Philadelphia International



To save installation time and stay on budget, Accord Mechanical installed Anvil's Gruvlok model GBV-G grooved balancing valves, which send precisely balanced hot water to each circuit from the boilers in the mechanical room. The multi-turn, Y-style globe valves are rated to 300 psi with the added feature of a convertible design that enables contractors to switch from a straight pattern to a 90-degree angle in the field.

Airport, Lansdale Center for the Performing Arts, and the Pennsylvania Convention Center. For the Salvation Army Community Center, the combination of weather-related delays, budget constraints, and massive piping and plumbing requirements meant that Accord needed a high-quality, highly efficient installation plan to keep the project on schedule and within budget. Thanks to their strong professional history with New Hampshire-based Anvil International, Accord was able to turn to Anvil for assistance.

### Grooved System Saves Time and Money

John Dannaker, mechanical specialist with Anvil, knew that Accord used primarily welded fittings but immediately recognized a better solution for this project. Working with Dave Campbell of Anvil's Design Services Division, Dannaker created a detailed preliminary drawing using Anvil's Gruvlok® line of grooved couplings, flanges, and pipe protection components. Dannaker felt that a grooved solution provided the flexibility and durability required, along with fast and easy installation to keep the entire construction project on schedule.

Dannaker and Campbell created plans that showed how a grooved solution would indeed save Accord both time and money compared with a welded approach. The drawings also allowed Dannaker to give Accord highly accurate pricing upfront, making it easy for the contractor to budget. "We chose a grooved system because of installation speed," said Mike Gordy, site foreman for Accord. "Grooved is much faster to install than welded and would help keep the project on schedule. That in turn lowered labor costs. It was a win-win for us."

Accord used Gruvlok 1/2"-10" rigid couplings and fittings and 1/2"-8" butterfly valves with lever and gear operators, along with Gruvlok Wye strainers, suction diffusers, balancing and tri-service valves, and grooved flex connectors. Gruvlok products

were also used for the mechanical side of the project, which included two hot water boilers, seven circulating pumps, 11 rooftop units, 80 VAV boxes, nine split systems, and 10,000 square feet of radiant floor heat piping. "Once we decided to go with grooved, we chose Gruvlok because they offer a complete line of fittings and specialty valves at a very competitive price," said Gordy. "Nobody else was able to match their product range, pricing, and service."

The supplier worked closely with Accord and Anvil to ensure all specified products were stocked and ready to go. They were able to ensure "just-in-time" delivery of tagged components directly to the jobsite. The project resided well within the supplier's daily delivery range, making it easy for Accord to get the parts they needed, when and where they needed them.

### Partners Work Together to Overcome Obstacles

Mrs. Kroc's bequest helped fund not only the new facility in Pennsylvania but also a similar community center in San Diego, CA. Thanks in large part to her efforts, the Salvation Army Community Center will stand as an example of how committed individuals can work together as a team to overcome obstacles. Accord and Anvil are further examples of a team that understands how to deliver quality and service to turn dreams into realities. Their combined efforts to find the best solutions for constructing the facility added significantly to the success of the project. "The entire process of installing a Gruvlok piping system made this project move quickly and smoothly, making it an efficient and reliable installation," remarked Accord's owner, Andy Smolcynki. "I feel the project moved along quickly and the schedule was met easily."

*For more information on Anvil International, please visit [www.anvilintl.com](http://www.anvilintl.com).*

*MCAA thanks Anvil International for their continued support.*

## VIEGA

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in the United States by building a new plant in Pueblo, CO. It is the largest single investment the company has ever made.

With such an enormous financial investment, Vestas needed a team of qualified contractors and engineers. Vestas chose Olson Plumbing and Heating to install the industrial gas and compressed air portions of the massive project. Family-owned Olson Plumbing and Heating has been meeting and exceeding the needs of their customers in Colorado Springs since 1917, seeking to be an industry leader in quality craftsmanship and expertise, technological performance, and dependable workmanship.

Trapp knew Viega's ProPress Stainless fittings would be perfect for the job. For example, ProPress features Viega's patented Smart Connect<sup>®</sup>, which provides an easy and efficient way to spot unpressed connections. However, "The engineer was leery of using ProPress Stainless because it was new to him," Trapp said. But Trapp insisted on ProPress, and the engineer came around.

"It was that easy," Trapp said. "We started placing orders for 2" to 4" ProPress Stainless fittings and pipe immediately."

ProPress Keeps Installation Schedule On Time for Massive Job With 50 Olson Plumbing and Heating employees and the fast, efficient use of Viega ProPress Stainless, the project stayed on schedule. By prefabricating all of the ProPress Stainless connections, Trapp's team piped the 500,000-square-foot production area and 50,000-square-foot internal area of the Vestas Pueblo facility in merely five months, from January to June 2009.

John Hill, superintendent of Olson Plumbing and Heating, oversaw the



When Vestas Wind Systems began building the world's largest wind tower manufacturing plant, Olson Plumbing and Heating used Viega's ProPress Stainless fittings to ensure that installation of the industrial gas and compressed air portions of the massive project was completed in just five months.

installation of ProPress Stainless at the Vestas facility. "The prefabricated piping lines had to be trucked to the Pueblo facility from the Olson Plumbing and Heating headquarters

in Colorado Springs," he said. "We had to truck the pipe on 40-foot racks. It was a sight to see."

Hill reported that the actual installation of the prefabricated piping runs was just as impressive as the process it took to get the materials there. "We worked in two teams of three and installed 21 miles of stainless pipe," Hill said. "Our crew had to be hoisted up as they were making the connections."

The Vestas project may have been monstrous in size, but Trapp's team approached the project with the same perspective they have for every project—total owner satisfaction. "We complete our projects on time and within budget," Trapp said. "Without question, ProPress saved us a lot of time."

"We finished ahead of schedule by three or four weeks," Hill said. "We wouldn't have been able to achieve that if it wasn't for ProPress."

*For more information about Viega, visit [www.viega.net](http://www.viega.net).*

*MCAA thanks Viega for their continued support.*



Olson Heating and Plumbing knew Viega ProPress Stainless fittings—with their patented Smart Connect feature that makes it easy to spot unpressed connections—would be ideal for the new Vestas wind tower manufacturing plant.

# Understanding OCIPs and CCIPs to Address Potential Coverage Gaps

## Wrap-Ups Can Benefit All Parties, Including Subcontractors

By Mike Ahern, Assistant Vice President of Construction Underwriting, CNA

As one of the industry's largest insurers of subcontractors, CNA has followed the ongoing debate on the merits of controlled insurance programs with a high level of interest. Also referred to as wrap-ups, these alternatives to a traditional insurance approach are often designed to provide a single source of coverage to multiple interests who have been brought together for a single project. The program typically covers the project owner, project manager, contractors, and subcontractors.

Before the recession, we saw the use of wrap-ups steadily increase over time. We expect that trend will continue under two general approaches as the economy continues to recover. The most common will remain the Owner or Contractor-Controlled Insurance Program (OCIP or CCIP) centered on the Workers Compensation (WC) line of business. In states that allow the wrap-up approach for WC coverage, the WC can be combined under a single premium program. The General Liability (GL) and Excess Liability policies are usually combined as well. While you might encounter wrap-ups on smaller projects, this approach makes the most sense economically for projects in excess of \$100 million or for a series of projects by the same owner or contractor that are generally in excess of \$100 million when combined. The latter are referred to as "rolling wraps."

The second approach—the GL-only wrap—has gained momentum in recent years. You might see these in states that prohibit the combination of WC policies under a wrap-up approach or for higher-exposure projects in states where adequate GL coverage is diffi-

cult to obtain. An example of the latter is new construction or renovation on a residential project for which adequate completed operations coverage is problematic because of construction defect concerns. The GL-only wrap approach can sometimes be used for smaller projects, sometimes for projects as low as \$5 million.

### Consider the Pros and Cons of Wrap-Ups

Sponsors of the wrap-up approach extol the advantages of these programs. These perceived benefits can be debatable, however, and have often been questioned from the subcontractors' perspective. Under a program that is executed professionally by knowledgeable sponsors and program administrators, the wrap-up approach might benefit all parties, even the interests of a subcontractor, in the following ways:

- **Cost savings**, due to the scale of most projects, and ability to **more effectively manage insurance costs**. Typically, these advantages are achieved via a large deductible or other loss-sensitive programs. Even though these savings usually inure directly to the benefit of the owner or general contractor, they could be a general benefit to all participants, as insurance costs are factored for the overall primary program.
- **Coordinated risk control** to ensure the highest level of safety standards on a project for all contractors, as well as **more effective claim management** to reduce litigation among the participants.
- The ability to **obtain GL coverage** that might not be readily available in the traditional insured market. An example would be projects that

are at higher risk for construction defect litigation.

- Finally, an effective program administrator will work to provide as **comprehensive a coverage program as available in the market**, with a limited number of exclusions.

All of these advantages can be valuable. On the other hand, the potential pitfalls to subcontractors can also be significant and have been well-documented by the American Subcontractors Association (ASA). One of the major areas of concern to subcontractors should be the issue of comprehensive coverage. You need to be absolutely certain that coverage is as comprehensive as is available in the market, or at least as comprehensive as your own program.

### Finding and Filling Coverage Gaps

Subcontractors should recognize that work performed by a subcontractor under a wrap-up program is usually excluded under their own insurance program. Typically, the reason for the exclusion is simply to avoid duplicating coverage and making an unnecessary charge for coverage that is already in place. However, the presence of this exclusion under the subcontractor's policy could create an unintended coverage gap if the wrap-up fails to respond to the subcontractor's exposure on a particular claim.

Identifying and closing those gaps can only take place with a thorough understanding of how wrap-ups provide coverage and, to the extent it might be possible, pursuing excess coverage elsewhere. "Excess" coverage usually means that the limits under your own policy may provide coverage (if

there is no exclusion for the loss) if the wrap-up's limits prove to be inadequate. However, it also extends to what is often called "difference in conditions" (or DIC) coverage. If the coverage under the wrap-up does not turn out to be as broad as what's available under your own insurance program, a DIC endorsement will ensure that you are not penalized by the exclusion.

Sometimes this excess coverage might be available to you under your own primary insurance program. Under some programs, that is not the case, and you may need to purchase specialty coverage. The underlying message, though, is that subcontractors can ill-afford to overlook their vulnerability.

Completed Operations exposure may be the most significant gap, as it relates to those situations in which your work comes into play. Many states have enacted statutes of repose that establish time limits on contractors' liability for their work. Some of those statutes can extend up to 10 years and beyond. At one time, it was typical for a wrap-up insurance program to provide coverage for a more limited time frame, usually three to five years. Now it's more common to extend that coverage through a state's statute of repose.

However, many wrap-up programs continue to have time limitations, so a subcontractor could have exposure for future Completed Operations claims. If it turns out that your own policy in future years excludes all jobs that were once covered under a wrap-up, you may not have coverage for Completed Operations claims brought directly against you for future Completed Operations occurrences.

Depending on the type of project, it may be possible to go to your own insurance carrier for coverage in excess of what might be available to you under the wrap. Such a scenario is more likely for

jobs that were covered under commercial wrap-ups than residential wrap-ups. For residential wraps for which your own carrier is unwilling to provide the excess coverage, it is possible to purchase coverage through some specialty markets.

#### Other Potential Coverage Gaps

While Completed Operations may be the most critical potential gap in coverage, it's not the only one. Your first step should be to obtain a summary of the coverage extended under a wrap-up, if not a copy of the policy itself. Subcontractors participating on a project are actual insureds under the program and are entitled to have a complete understanding of the coverage available to them, along with all exclusions that will apply. At a minimum, professional wrap-up administrators will quickly and completely summarize both areas. The key coverage questions to ask are as follows:

- Is "your work" defined in a way that appropriately addresses all covered contractors in the project?
- Are any of your critical exposures excluded for which you have coverage under your current policy?
- Some wrap-ups will exclude high-hazard operations, such as exterior insulating finishing systems or the tower crane operations entirely. Is that the case here?
- Many construction underwriters offer a portfolio of automatic GL coverage enhancements. Is the coverage available to you under the wrap-up at least as comprehensive as what you currently have under your own policy?
- Are there any deductible obligations that extend to you under the wrap-up?
- The location of the wrap-up is usually very carefully defined. What locations are specifically excluded?

Particularly for commercial wrap-up projects, your own policy may offer you an adequate measure of protection. Some policies have automatic

enhancements that assure excess or DIC coverage over commercial wrap-ups. Some carriers will negotiate coverage in excess of what might be available under a wrap-up on a case-by-case basis. These endorsements will provide additional limits (provided there is no exclusion for the loss) under your own primary policy. If it turns out that your own coverage was broader than what was available to you under the wrap-up, these endorsements will sometimes "drop-down" to ensure you are covered.

It's impossible to put together an exhaustive list of the alternative ways to address these pitfalls, but ASA has a good starting basis with the document "30 Questions for Consolidated Insurance Programs." From a coverage perspective, however, it's important to discuss past, current, and future wrap-ups with your underwriter or broker. Make sure your carrier is notified that you are now or have been covered under a wrap-up in the past. Finally, checking to see how these projects are excluded under your current policy and will be excluded under your future policies is essential.

There can be critical coverage gaps when participating in wrap-up programs, but having the right business partners increases the likelihood that your own insurance program will effectively align with the protection offered you under the wrap.

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*MCAA thanks CNA for their continued support.*

# Pump Audits Can Lead to Improved Efficiencies, Lower Costs

Pump audits can be an effective way for contractors to generate new business. Significant energy savings and reduced life cycle costs can be realized by optimizing a pumping system. Power consumption alone can be reduced by 20–50 percent on most pumping systems. For example, optimizing a small, 50-horsepower (hp) pumping system could result in energy savings of \$5,000 to \$20,000 per year, and a higher horsepower system has the potential for saving over \$100,000 per year.

Historically, pumping systems in commercial buildings are oversized and inefficient because the primary system sizing tool used (Hunters curve/fixture unit count) produces an estimate of maximum flow, and not the application flow profile. A pump system sized for the highest estimated maximum flow rate rarely operates at the maximum flow rate and is, therefore, inefficient because it is operating far from the best efficiency point (BEP).

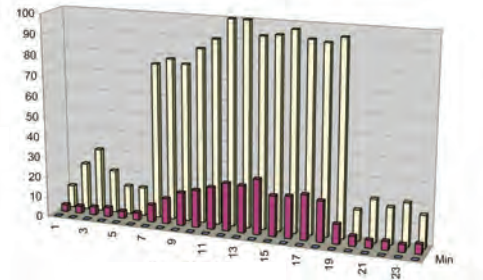
A pump audit provides a complete system profile through the use of power, flow, and pressure metering equipment. The equipment remains on the system for a period of time, then the information is logged and a system profile generated. The data are analyzed by an auditing professional who then makes recommendations for optimizing the system. An optimized pumping system costs

less to operate because it consumes less power and requires less maintenance.

**Optimize Now and Save for Years**  
Besides the return on investment with an optimized system, other benefits are realized. The electronic controls and variable frequency drive (VFD) technologies can significantly improve the efficiency of a pumping system. Many utilities offer incentives and rebates for upgrading equipment. The payback period for an optimized system can be relatively short—typically one to three years.

The savings are achieved through various mechanisms:

- The use of VFDs on each pump saves significant horse power in a varying flow application. For example, Grundfos Pumps' 4-pump BoosterpaQ Multi-E CRE 10-4 system (3 hp each pump, 12 hp connected) is equipped with a VFD on each pump. The maximum flow can be handled by three pumps, with the fourth pump serving as a backup.
- Using multiple smaller pumps in parallel allows each pump to run closer to its BEP.



This sample graph represents the type of information a pump audit might generate from flow readings that are logged every 60 seconds as measured during typical weekday work hours of 7a.m. to 7p.m. in a commercial office building. The peak flows are the result of cooling tower demands that last one to two minutes per hour. Non-workday flows are typically much lower; in this example, they average approximately 5–8 gpm.

- Eliminating pressure regulating valves reduces costs related to their inherent energy losses and maintenance costs.
- A multiple pump controller allows for precise control of the discharge pressure.

For more information about Grundfos Pumps, visit [www.grundfos.com](http://www.grundfos.com).

Percentage of Time	Flow
12%	0–9 gpm
70%	10–19 gpm
10%	20–29 gpm
8%	30–100 gpm

The table describes a sample load profile of total flow for one week.

## JOHNSON CONTROLS

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### 6. What technology and applications are needed?

Depending on your location and the application type, it may make sense to consider systems that provide cooling only, cooling with electric heat, or cooling with gas heat. Depending on the manufacturer you choose, these

systems may offer a variety of factory- and field-installed options to meet application requirements specific to your location or application.

### 7. Is the system efficient and environmentally friendly?

Look for systems that feature industry-leading efficiencies and use environmentally responsible R-410A refrigerant. By asking these seven questions, you

can find an HVAC solution that satisfies your customers' needs while maintaining your profitability.

For additional information about Commercial Comfort Systems from Johnson Controls, visit [www.johnsoncontrols.com](http://www.johnsoncontrols.com).

MCAA thanks Johnson Controls for their continued support.