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Provide lasting pipe performance

ILLINOIS' OLDEST SCHOOL GOES FROM "H" TO "HVAC" WITH PP-R

PROJECT INFORMATION

PROJECT	PRODUCTS USED	LOCATION / DATE
Peoria High School, HVAC and Domestic Water	Aquatherm Blue Pipe®	Peoria, IL Summer 2012

AQUATHERM ADVANTAGES

- The speed of fusion connections versus welding and soldering allowed the construction team to meet a very tight deadline
- Using Aquatherm for the domestic plumbing system saved the district \$22,000, plus \$28,000 related to pipe insulation
- Using Aquatherm to connect the heat pump system allowed the contractor to offer \$30,000 in overall value engineering savings



THE CHALLENGE

The aging yet sturdy Peoria High School required a retrofit of the pipe system in tight spaces without the use of welding torches

THE SOLUTION

Aquatherm's polypropylene-random (PP-R) pipe provided a safe, quick installation along with significant labor and material savings

This \$6 million retrofit involving miles of PHVAC pipe had to be completed during summer break, but an experienced construction team met the tight deadline using Aquatherm's heat-fused polypropylene-random pipe and other cutting edge technologies.

With a rich history dating to the mid 19th century, Peoria High School is commonly referred to as "Central" due to its location and to distinguish it from two other Peoria high schools. As the oldest continually running high school in Illinois, the four-story, nearly 300,000-sq-ft building was built in 1916, with additions in 1961.

In winter 2011, district officials began planning an ambitious project that would add a new science wing and gymnasium/locker room to the nearly century-old facility. The scope of work also included replacing the entire steam heating system and adding ventilation and air conditioning.

"GOOD BONES"

According to Peoria Central Building Engineer Rick Powers, the investment in the building made sense since its "bones" are solid, it's centrally located, and with the expansion, is able to meet future needs. "We hadn't been updated since 1961 so it was time for some pretty considerable upgrades."



The Peoria Public Building Commission and Peoria School District 150 hired the Farnsworth Group, Inc. (Normal, IL) to handle the project's design work. Farnsworth, an award-winning, nationwide firm, has earned a reputation for energy efficient, reliable, durable, and successful building design.

One of the most challenging aspects of the project was that the entire job – including demolition, installation, and commissioning – needed to be completed during a school calendar summer. According to D. Edwin Lind, P.E., Engineering Manager with Farnsworth, “the old steam system, including the old gas-fired steam boilers, piping, and terminal units, needed to be removed and the new system installed during the summer – June, July and most of August. The fall semester began the last week of August.”



The project called for miles of piping and the original specifications included black steel and copper for the smaller diameter piping to be located in the chases. Lind explained that although threaded fittings could be used to eliminate the need for welding torches in the aged facility, the weight of the black steel was going to make the installation challenging in tight spaces.

“The copper tubing, albeit lighter, required an open torch for soldering joints. After the piping was installed in the chases and tested, the greatest concern was repairing or replacing leaking joints,” he added.

THE RIGHT PRODUCT AT THE RIGHT TIME

Coincidentally, The Pipco Companies, Ltd., (PIPICO) had recently become an approved installer of the German-manufactured Aquatherm polypropylene-random pipe (PP-R), and proposed using the proven, yet relatively new-to-North America option. PIPICO won the mechanical contracting bid on the job for installation of the heat pump loop water piping in the building’s existing vertical chases.

Established in 1958, PIPICO is a full service contracting firm with expertise covering M/E/P and a huge range of construction services. The 2nd generation, Peoria-based company is one of the most complete performance contractors in downstate Illinois, and is known for providing high quality, cost-effective solutions.



PIPICO Executive Vice President Greg Ciccirelli explained that Aquatherm’s local distributor, Columbia Pipe & Supply Co., had presented the PP-R pipe system to PIPICO roughly a year earlier. “We looked at the product at that time but we didn’t have anything we could use it on then. We liked it, but needed the right opportunity and Peoria was the right project for our use.”

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–D. EDWIN LIND, P.E. ENGINEERING MANAGER, THE FARNSWORTH GROUP, INC.

Despite Aquatherm not being in the specification, PIPICO was able to bring the heat-fused pipe system onto the job through value engineering. “The owner made the decision to use Aquatherm because of the value engineering cost savings that could be realized and because of the warranty associated with the product,” Ciccirelli said.

“The fusion bonding of Aquatherm eliminated potential problems with the pipe leaking once it was sealed up in the chases, and the piping itself was lightweight and generally easier to handle in confined conditions,” Lind explained.

While Lind and his associates initially had concerns about the joining process of the piping, expansion factors, pressure ratings, and temperature ratings, he recalled that all of these were adequately addressed by the manufacturer’s representative, Skip Newton with PVF Solutions, and the contractor.

Aquatherm uses heat fusion to form connections, a process often used in natural gas piping because of its reliability.



Heat fusion bonds both sides of a joint into a single, homogenous material without the use of chemicals or mechanical connections, which eliminates systematic weaknesses and fail-points in the pipe. The seamless heat fusion connections do not require an open flame or burn permit like soldering does (the heating iron, which reaches 500°F, is plugged into a standard 110V outlet).

LOSING THE FLAME

Lind explained that the safety benefit offered by heat fusion was “definitely a consideration in a building of this age and the confined spaces where the piping was being installed.” Additionally, when installed by Aquatherm-trained and certified technicians (all PIPICO plumbers and pipe fitters were certified), the pipe and fittings carry a 10-year, multi-million dollar warranty covering product liability, labor, personal injury and property damage.

Lind said the warranty, which is basically an insurance policy issued by Zurich Insurance, was a factor in Aquatherm being used on the job since the piping installed in the vertical pipe chases could not be easily repaired or replaced. Aquatherm Blue Pipe® (formerly Climatherm®) was used in diameters ranging from 10-in. mains (with 4-, 6- and 8-in. branches) in the boiler room down to ½-in. lines running to ClimateMaster® heat pumps in varying sizes.



Ciccirelli said it was tough getting into some of the tight spaces. “One challenge was with the bigger sizes of pipe and getting the welding machine up into those. We basically figured out ways of getting more access to the space and had to move stuff out of the way or had to use additional manpower and extra muscle, but it would have been challenging with metal too.”

A benefit of using the lighter weight PP-R, Ciccirelli said, was that one installer could pull or lift 3-in. or 6-in. pipe through small tunnels that were between four and five feet high. Also,

the smaller pipe could be maneuvered through small chases and around beams in walls due to its flexibility compared to metal.

Using Aquatherm pipe to connect the heat pump system allowed PIPICO to offer the school district \$30,000 in overall value engineering savings. “These savings included the additional costs associated with enclosing any exposed piping,” explained Ciccirelli.

DON’T FORGET THE DOMESTIC!

Peoria-based Tobin Brothers Mechanical, a full service plumbing company specializing in general plumbing and drain systems, irrigation, and sewage, won the bid for the domestic water system upgrade and performed the entire installation. According to Lind, using Aquatherm for the domestic plumbing system saved the district \$22,000, and another \$28,000 was saved due to reduced or unneeded pipe insulation on the domestic cold water system.

Also, since the operating temperatures of the loop system fell within Aquatherm’s recommended tolerances, insulation was unnecessary except for aesthetic reasons. These insulation labor and material savings factored heavily into the overall savings on the project.

“THE TRAINING WAS PRETTY QUICK AND EASY. THE LEARNING CURVE WAS NOT AS STEEP AS I THOUGHT IT WOULD BE. AFTER A COUPLE OF DAYS OF USING IT, THEY WERE PRETTY PROFICIENT AT IT.”

–GREG CICCIRELLI
PIPICO EXECUTIVE V.P.

TRAINING AND INSTALLATION

Columbia Pipe served as the distributor on this project, with PVF Solutions serving as a facilitator. With close to one million square feet of warehouse, Columbia Pipe has 20 mutually supporting locations in Illinois, Indiana, Michigan, Wisconsin and Minnesota, and has carried Aquatherm since 2010.

Columbia and PVF Solutions’ Newton set up an Aquatherm factory training session for the PIPICO superintendent and foremen, who were certified at the PIPICO shop prior to the start of the job. The foremen then trained and certified the journeymen under them on the jobsite. “The training was pretty quick and easy,” Ciccirelli recalled. “The learning curve was not as steep as I thought it would be. After a couple of days of using it, they were pretty proficient at it.”

At the peak of the installation, PIPICO had five foremen each overseeing a crew of between 5-10 installers. Ciccirelli said that the when the 6,000-plus linear ft of Aquatherm was pressure tested there were minimal leaks. “And those leaks


had more to do with the craftsmen not being familiar with the system than poor workmanship. They were standard problems and they were minimal," he explained.

CRUNCH TIME

The tight time frame of the job made things very interesting. According to Cicciarelli, the key aspect of the PP-R system that fit so well on this job was that this was a \$6 million retrofit that had to be completed in two and a half months.

"We felt the labor time savings with the product would help meet that schedule. And, yes, it did bear that out. Our superintendent felt the use of the system was definitely

beneficial. If we'd used copper and steel [soldered copper up to 2-in. and welded steel 2½-inch and above], we'd have gone over in labor because of overtime."

In only 63 days, the entire job was complete and the team had the systems operational for the start of the 2012 school year. "They were working two shifts and sometimes three. And they met the deadline. With this new piping system I was surprised how fast it could go versus welded iron or galvanized. It was amazing," said Peoria Central's Powers. 



The German-manufactured pipe has been one of the world's most durable and greenest piping systems for four decades and proven successful in 70-plus countries. Aquatherm piping systems offer many performance and environmental benefits, such as:

- Eliminating toxic materials, glues and resins, and open flames from the piping installation equation
- An R-value of 1.4 per inch or greater depending on pipe size and SDR
- The fusion welding process, which creates seamless connections that last a lifetime without leaking or failing
- An optional faser-composite layer in the pipe reduces linear expansion of the pipe by up to 75% compared to plastic piping

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