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Facility Management

Condenser Water Piping at NJ College Links Chillers, Coolers

Campus-wide HVACR upgrades had been underway for years, but the final piece finally came online last spring.

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The aging chiller/boiler physical plant at a New Jersey community college had received some upgrades in recent years, but it was still missing a few crucial pieces to help it operate up to its full potential.

In 2012, the college had made improvements that included new Harsco 4.3 million Btuh gas condensing hot water boilers and Trane CenTraVac R-123 low-pressure chillers. However, equipment wasn't coming on when it should have, or was operating continuously,

or wasn't modulating properly. In 2015, the college's facility manager improved the plant's efficiency via a Carrier i-Vu BACnet-enabled building automation system, and now proper control is saving the college energy and money.

WATER SUPPLY



But one last big project remained — replacement of condenser water piping between the chillers and the cooling towers. The system's existing piping was black steel that was severely corroded and scaled.

Replacing large diameter black steel pipe in sizes up to 24 in. is a major undertaking because of the weight of the pipe and how long it takes to weld joints. Eighteen-inch Schedule 40 black steel pipe, for example, weighs nearly 105 lbs. per ft. Welding large diameter black steel pipe can take more than a day per connection, noted mechanical contractor **Joe Estock**, Estock Piping Co. LLC, Chesterfield, N.J.

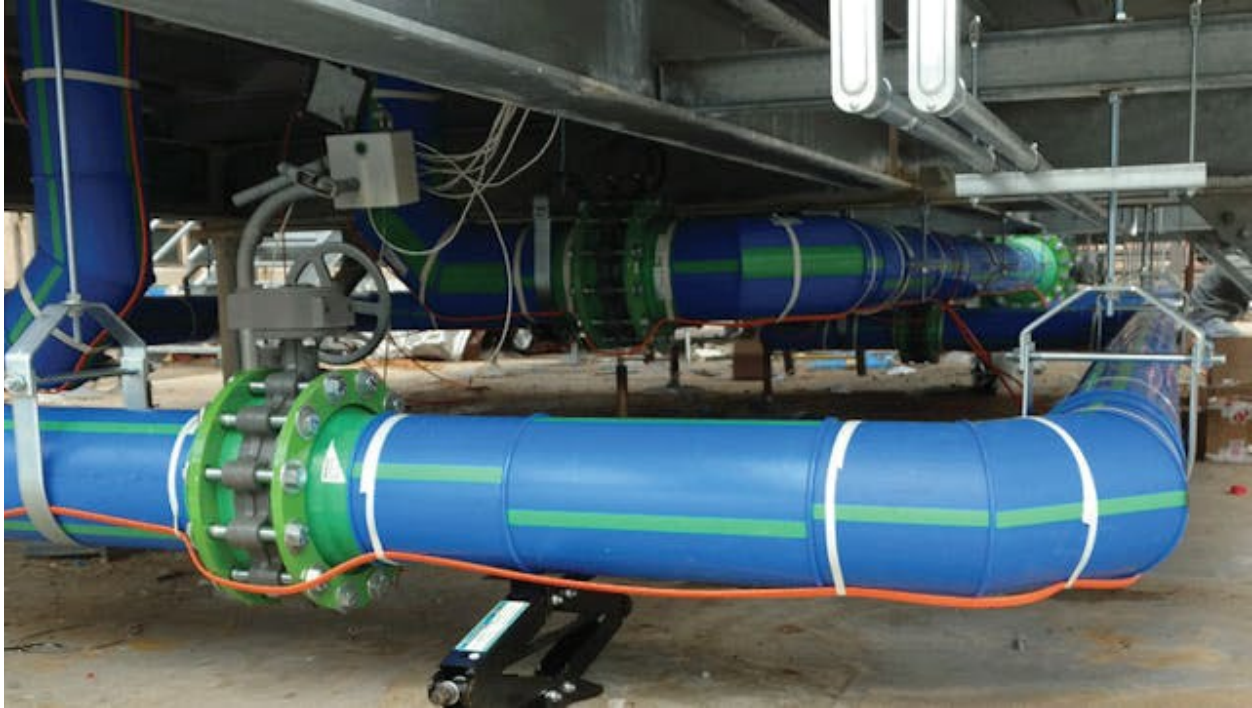
Four-Month Window

The material handling challenges, plus the length of time it takes to weld black steel, bumped up against the college's time constraints: the issue being that the chillers kick on whenever the outdoor temperature goes above 60°F. That meant the college had a four-month window in the winter of 2017-2018 to get the piping changed out. The project included installation of two new Baltimore Air Coil four-cell cooling towers.

In addition, chunks falling off the corroded black steel pipe were clogging the strainers and potentially damaging the pumps and chillers. When the college asked for a solution, the project's consulting engineer knew that Aquatherm Blue Pipe® had been used successfully in the U.S. for several years. The consulting engineer designed the retrofit with both black steel and with Aquatherm Blue Pipe. The design with Aquatherm pipe turned out to be less expensive because of the projected labor savings.

The Hidden Costs of Steel

Corrosion of black steel or cast iron, especially when installed outdoors, is a significant problem. Pipe scale results in reduced inside diameter of the pipes and premature pump failure, noted manufacturers' representative **Lou Garavito**, Wallace Eannace Associates Inc., Plainview, NY.



“The cost of using steel is not just the installation,” Garavito said. “It’s the hidden costs that have to be recognized by the facility manager and the owner about a metallic piping system.”

Even treated pipe will rust and scale over time in condenser piping applications, Garavito pointed out, especially if the pipe is exposed to chemicals. That makes Aquatherm polypropylene-random (PP-R) pipe, which is hydrophobic and will not scale or corrode, an ideal alternative for projects like the one at this college. Garavito noted that a similar condenser water re-piping project was recently completed at Rutgers University, where Aquatherm pipe also was the solution. That project used Aquatherm pipe in sizes 6-in. through 12-in.

Additionally, polypropylene’s total installed cost is becoming even more attractive in light of volatile steel prices caused by tariffs.

Eliminates Welding Hazards

Use of Aquatherm PP-R pipe also solves several other problems for a mechanical contractor, Garavito said. The contractor doesn’t have to store acetylene. No fire watch is required. It offers significant material handling problems over steel pipe. And it eliminates the risk of eye injuries that can be caused by grinding steel pipe.

Since there's no welding, there are no welding fumes, Estock noted. He explained that he performs a lot of work at schools, and school administrators don't want students exposed to welding fumes. That forces the contractor to work at odd hours.

Estock, who has been piping boiler rooms since 1988, won the project against 10 other bidders. The Aquatherm pipe cost more than black steel, he said, but the labor savings more than made up for it. However, after he won the job, he became worried. He had zero experience with Aquatherm pipe and admits he didn't know what he had "gotten himself into." He turned to Ferguson, the largest wholesale distributor of residential and commercial plumbing supplies and pipe, valves and fittings in the U.S., for help.

How-To Advice Available

Ferguson product specialists help contractors install Aquatherm pipe across the county, with teams of product specialists located close to all major markets. Product specialists make sure installing contractors are comfortable with the product and have everything they need to do the job. Ferguson has a national rental center that moves millions of dollars' worth of equipment, including McElroy Manufacturing Inc. pipe fusion tools, to wherever contractors need them.



Ferguson trained Estock and his pipefitters on how to use the tools, spending three to four days total onsite. The Ferguson product specialists noted that Estock's fitters are highly skilled and quickly got the hang of the fusing Aquatherm.

Estock's crew needed some scissor lifts and a couple of forklifts to move the Aquatherm Blue Pipe around the jobsite, but it was light enough that they could easily make fusion joints with the pipe in the air. The Aquatherm 18-in. Blue Pipe SDR 17.6 used on this job weighs 22.9 lbs. per foot and comes in 5.8-meter lengths, or about 19 ft.

"Put yourself in my shoes," Estock said. "I'm a contractor who had never used this product before, plus the job itself had difficulties like 18-inch pipe going over top of new boilers. That made me very nervous at the beginning, honestly."

He was more nervous when he was told he would be performing the largest Aquatherm job in New Jersey. He didn't have to worry for long, though, because his men caught on quickly.

Fabricating Assemblies Onsite

Estock's crew did all the fabrication themselves for assemblies such as manifolds inside the college's large mechanical room. All told, the crew installed approximately 40 ft of 24-in. pipe, nearly 100 ft of 18-in. pipe, 20 ft of 16-in. pipe, 60 ft of 10-in. pipe, and 157 ft of 12-in. pipe.

The main advantage of the Aquatherm Blue Pipe was the weight, Estock said. His crew could carry 10-in. and 12-in. pipe sections without using material handling equipment. A standard 21-ft length of 18-in. steel pipe weighs 2,200 lbs. Installing 18-in. pipe over the boilers as Estock had to do would have been extremely difficult with black steel.



The second big advantage was the speed of making heat-fused joints in PP-R pipe. Estock said he could heat fuse 18-in. Aquatherm pipe in one hour, compared with more than a day to weld an 18-in. joint in black steel.

“With the time constraints, God knows what would have happened if this were black pipe,” the college’s facility manager said. “We might still be welding down there.”

All-Around Winner

“[This was] is a phenomenal way to go,” the facility manager concluded. “The dollars are neck and neck, but with the durability and no scaling and the ‘green’ element it brings, it’s leaps and bounds ahead of black steel now. Of course, we’ll find out in five to 10 years from now how it goes, but if you maintain it, it should be years and years and years of success. I see no issues with it. We’re glad that the school invested in this. It’s a great installation for all the parties involved. Everybody’s a winner in this.”

Based in Cleveland OH, the author is VP of marketing for Aquatherm, a 45-year-old manufacturer of polypropylene (PP-R) pipe. The product is used in pressurized plumbing and mechanical systems of all sizes.

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