aquatherm

New Piping Option Offers Big Material Cost Savings

Project Information

Project	Products Used	Location / Date
Carr Residence, HVAC	aquatherm blue pipe®	Bexley, OH September – November 2012

Aquatherm Advantages

- The heat fusion connections made the piping system installation quick and simple
- Aquatherm's PP-R is a heat-stabilized thermoplastic, so it holds dimensions under high heat and pressure
- An estimated 70% savings in material and labor compared to conventional materials and installation

The Challenge

The aging heating system in the Dan Carr residence had become inefficient and required replacement

The Solution

A new boiler was installed along with several hundred feet of Aquatherm's PP-R piping, reducing labor times and eliminating lost energy due to corroded metal piping

An outdated boiler and home heating system resulted in wasted energy and money for an Ohio family.

Built in 1928, Dan Carr's 3,112-sq-ft home, which is located in the Bexley suburb of Columbus, OH, was in dire need of a renovation. Carr had given contractors the lofty task of removing part of the original first floor to lower its elevation and create a new kitchen and family room that would share the same floor level.

The contractors were challenged to brace and maintain structural support of the second floor, and yet allow enough working space for the new radiator piping to be hidden within the structure. Jeff Persons, president, Geo Source One, Inc. and his Columbus-based team were put to task for this repiping project and selected Aquatherm Blue Pipe® (formerly Climatherm) for the job because its flexibility allows it to be used through captive soffits and confined floor joists, where rigid pipe could not be easily fit and hung.

The original heating system in the home was a coal-fired boiler, which changed to oil and then finally to natural gas in the early 1960s. The boiler served over 3,000 sq. ft. of the home with a gravity distribution system on double 3-in. mains, and cast iron radiators. A simple central power-pile thermostat

controlled the aging gas valve, telling the massive boiler when to fire.

The latest boiler, installed in the 1960s, was a natural draft boiler with a 10-in. flue venting into a 30-ft. chimney. The boiler was rated for 380,000 Btuh output and 480,000 Btuh input. The draft was calculated on the 10-in. flue at 711 cfm,

made up by infiltration air to the structure. After accounting for stand-by losses, Carr was fortunate if 52% of the annual gas bill actually provided usable heat for the home.

The challenge for the repiping conversion was brought on by a major remodeling project that called for lowering the floor above the main basement and boiler area by 16 in. This required removal of the boiler supply and return mains, and connected radiator run-outs to both the main and second floor of the dwelling. A total of 14 out of 20 radiator run-outs were directly affected and repiped as a result of the renovation.

Plastic Piping— A Better Solution

The old boiler was removed in sections and replaced with a 240,000 Btuh Prestige Tri-max Triangle Tube boiler. The new sealed combustion boiler eliminated the excessive infiltration air requirement of the old boiler and is set to modulate its temperature based on an outdoor reset curve. A 60-gal Smart Tank indirect domestic hot water heater couples with the Prestige boiler and ensures the customer will never run out of hot water.

Persons explained how the materials for the project were chosen: "For replacement of the old piping and radiator run-outs, we priced conventional black iron, copper, and Aquatherm Blue Pipe. The Aquatherm materials priced at about one third of the cost of black iron. Copper was so costly that it was no longer a consideration for anything but near-boiler piping."

> "For replacement of the old piping and radiator run-outs, we priced conventional black iron, copper, and Aquatherm Blue Pipe. The Aquatherm materials priced at about one third of the cost of black iron. Copper was so costly that it was no longer a consideration for anything but near-boiler piping."
>
> - Jeff Persons, President, Geo Source One, Inc., Columbus, OH

The Climatherm product was approved for Ohio commercial code hydronic use and was approved for the residential application with the local building department. "Blue Pipe holds dimension with temperature changes. It was temperature- and pressure-rated for the application and was easily joined using the socket fusion method. We're very familiar with that method through our work with fusion welding high density polyethylene pipe (HDPE) as geothermal system contractors," Persons explained.

> "We have no complaints with the termperatures in our home now. I'm impressed with this application of the non-traditional Aquatherm Blue Pipe. It's helped solve our heating issues and it's aesthetically pleasing as well."
>
> – Dan Carr, Homeowner

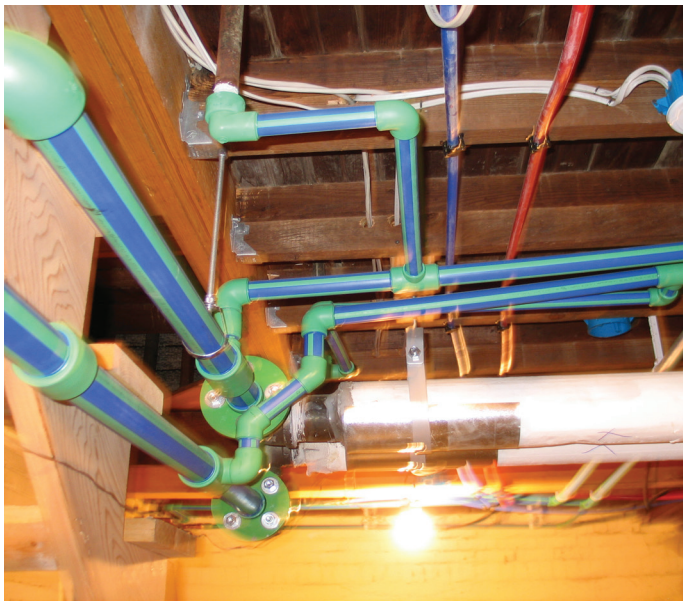
"We found the Aquatherm much easier and faster to work with than HDPE that we're familiar with," Persons added.

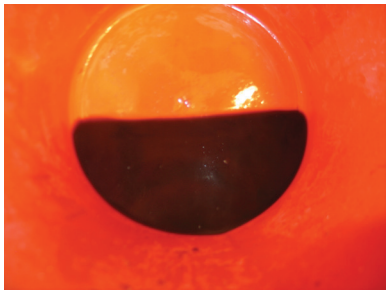
Say Goodbye to Heavy Metal

The near-boiler piping was constructed from copper tube with Viega Pro-Press fittings to allow for the many boiler accessories — pumps, valves, sediment separators, and a special magnetic/cyclonic separator provided for the project from Fernox, a major European boiler treatment and water filtration company.

Over eight decades' worth of iron sediment had accumulated in the old radiators and lines. The near-boiler piping was designed to allow for isolation of pumps and boilers so that the old radiators could be power flushed. This was paramount to the success of the project and helped ensure the reliability of the new high-efficiency boiler and wetrotor Grundfos pumps.

The system was power flushed using a 1.5 hp centrifugal pump with 25-micron bag filters and 1 ¼-in. hose connections. Fernox F-3 was used as a system cleaning solution additive. Due to the heavy iron sediment in the old radiators, the bag filters would fill within five to 10 minutes of circulation and required frequent replacement. Once the system was running reasonably clear and had circulated for several hours, the boiler valves were opened up to allow circulation through the boiler and the Fernox Total Filter (TF-1) magnetic separator.





"After 16 hours of circulation with the magnetic separator in operation, we checked for debris in the total system sediment separator and found it to be clear," Persons said. "The magnetic separator, however, had collected a full pint of inky black sediment from the system; an excellent testament to the capability of this type of device when there are ferrous materials present, compared to traditional sediment removal methods."

Work on the project started in late September 2012 and was completed in early November 2012. About 200 ft of 1.5-in., 200-ft of 1-in., and 200 ft of ¾-in. Aquatherm Blue Pipe was used for the project. Persons estimated that using Blue Pipe resulted in a 70% savings in material and labor compared to using conventional methods.

Although it's too early to report exact savings for an entire heating season, Carr reported better heat in all areas of the home. "We have no complaints with the temperatures in our home now. I'm impressed with this application of the non-traditional Aquatherm Blue Pipe. It's helped solve our heating issues and it's aesthetically pleasing as well."

About Aquatherm

The German-manufactured pipe has been one of the world's most durable and greenest piping systems for nearly 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 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

Contact:

aquatherm
500 S 500 W • Lindon, UT 84042 • 801-805-6657

MCAA BOMA