



Provide lasting pipe performance

**aquatherm**

# COOL SOLUTION AT BYU-IDAHO COLLEGE UPDATES ITS SMALL BUT ESSENTIAL DATA CENTER

PROJECT INFORMATION

PROJECT	PRODUCTS USED	LOCATION / DATE
Campus Data Centers (Renovation)	Climatherm®	Rexburg, ID March 2008

### AQUATHERM ADVANTAGES

- Pipe Eliminated need for water treatment, reducing maintenance costs
- Lightweight PP-R was easier to work with than steel
- Natural R-value reduced insulation requirements



### THE CHALLENGE

Upgrading data centers to a chilled water cooling system while keeping them operational

### THE SOLUTION

Aquatherm's heat fusion delivered long-lasting pipe connections without an open flame

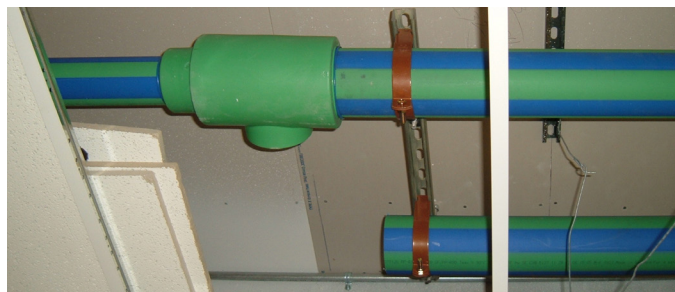
Situated in Rexburg, ID, the Brigham Young University-Idaho campus is home to roughly 12,000 students and includes about 40 buildings on 400 acres. The university's administrators had long sought to upgrade its data centers from traditional UPS and single module/non-scalable air conditioning products. In winter 2008, they decided to significantly upgrade the school's IT infrastructure. However, they also needed to upgrade the cooling centers at its two data centers. Salt Lake City-based Advanced Power & Cooling was brought in to provide the university with a total solution.

"BYU-I was experiencing hot spots and also was very concerned about 'high density' racks/equipment and their inability to handle this concern," said Howard Wageman, with Advanced Power & Cooling.

After several on-site visits and a trip to the Schneider Electric Technical Center (SETC) in O'Fallon, MO, BYU-I staffers were convinced the APC InRow RC product was perfect for handling and displacing these high kilowatt loads.

The campus data center, which staffers refer to as the computing center, is split between two buildings, the two-story Kimball Administration Building, built in 1999, and the four-story Smith Building, which houses classrooms and was built in 1967. Kimball's data center measured 918 sq ft and Smith's center was actually an 804 sq ft telephone relay room in the basement.

The design and construction staff decided to remove some walls and expand the centers—Kimball by 407 sq ft and Smith by 415 sq ft. While the project was spread across two buildings, each with a separate mechanical system, it was treated as a single project and tackled simultaneously.



The Climatherm piping installed in the ceiling of one of the BYU-I data centers was installed without open flame or smoke.

### PIPELINE

In March 2008, BYU-I design and construction staff also began considering its piping options. BYU-I needed to bring chilled water into the data centers from newly constructed mechanical equipment enclosures—including new ArctiChill chillers—adjacent to each building. While welded steel pipe was fine for the exterior portions of the system, welding inside the data centers wasn't an option, as they didn't want to risk setting off the fire alarms and sprinkler system.

The University decided that a "band aid" solution of moving a few racks around, installing some perforated floor tiles, and adding a return plenum on the top of the CRAC didn't allow much room for future growth and quickly dismissed the idea. Wageman and staff introduced the APC by Schneider Electric in-row product line as a more comprehensive solution.

Colvin Engineering Associates, Inc., the project's mechanical engineer, presented Aquatherm Climatherm to BYU-I. Aquatherm, a German-based pipe manufacturer, produces fusible polypropylene pipe specifically for heating and cooling applications. While only recently available in North America,

Climatherm and its sister-system Aquatherm Greenpipe (for potable water applications) have enjoyed decades of success in over 70 countries around the world.

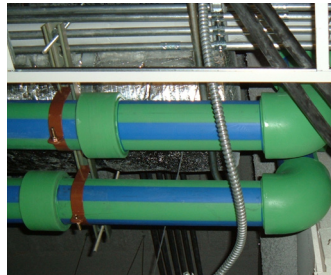
Climatherm uses heat-fusion to form connections, a process often used in natural gas piping because of its exceptional reliability. Heat fusion bonds both sides of a joint into a single, homogenous material, without the use of chemicals or mechanical connections. This tends to eliminate systematic weaknesses and fail-points in the pipe. The heat fusion connections, combined with polypropylene's resistance to corrosion and abrasion, eliminated the concerns of pipe leaking.

Avoiding welding and the risk of flames, combined with the system's durable heat fusion connections made sense for the project, said Jon Burrows, LEED AP, project manager with Colvin. "Welded steel was too messy for installation near the server equipment while it was operating," Burrows said, adding, that grooved steel fittings had a greater potential for leaking.

"Aquatherm was a good alternative. We didn't want to risk having any leaks at all, and we knew we'd get a weld that would keep the product together without any failures – forever," added Jedd Walker, BYU-I campus architect.

Construction began in July, and the project took about two and a half months. Marlin Hill, president of Mountain West, which served as the mechanical contractor on the project, said the project was made easier by the lighter weight of the polypropylene piping. He added that since his installers were already versed in heat fusion welding, the connections were performed with relative ease. However, he did note, that the fusion connection process definitely requires the installer to think ahead in his installation.

For instance, university safety staff insisted that Mountain West fill out paperwork each day for a hot work permit, or fire watch, indicating that they were using the welding device.



These chilled water lines had to go up and over existing piping/conduit and back down under the existing false ceiling.

This resulted in some additional daily paperwork, but nothing more.

## WRAPPING UP


The engineering firm recommended insulating the pipe, so Aquatherm Advanced, a proprietary integrated insulation wrap was added to the four-inch Climatherm piping. Since the pipe has a natural insulation value of approximately R-2 and Aquatherm Advanced has a value of roughly R-4.2, the pipe ended up with an insulation of roughly R-6.2 and still had smaller outside diameters than other piping alternatives with similar insulation values.

The university required a no downtime integration of its existing equipment. Wageman said the lay out of the system accommodated this with no problem. "This is always a nice add-on feature if the customer has adequate footprint to do so. We were able to roll out the new solution and get in ramped up prior to taking down any existing loads."

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-- JEDD WALKER, BYU-I CAMPUS ARCHITECT

The computing center is now up and running. The hot and cold aisle concept with the in-row cooling units is very efficient in cooling the equipment, and some of the in-row units actually have to be shut down in order to comfortably work in the space.

BYU-I Design and Construction is pleased with the way the project turned out, and is considering using Aquatherm on other applications on campus. "This isn't a spectacular project, in terms of the data center not being some large powerful center, but it's what helps keep this university running," concluded Walker. 

*Case study originally published in the June 2009 issue of Mission Critical magazine. Reprinted with permission.*

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 fiber-composite layer in the pipe reduces linear expansion of the pipe by up to 75% compared to plastic piping

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