References

Colorado State

Uponor involvement

Project highlights

- Energy-efficient research facility
- Uses only 25% energy of comparative facilities
- LEED® Platinum building
- Features Uponor radiant heating and cooling, plumbing and hydronic distribution piping

Products used

- 65,000 square feet of research space
- 157,000 feet of Uponor AquaPEX ® pipe
- ½"-2" ProPEX® fittings
- Engineered polymer (EP) fittings, multi-port tees

Research facility features multiple Uponor solutions

A Colorado State University research facility features Uponor PEX plumbing, radiant heating and cooling and...
Jeff Makepeace, owner of Lind's Plumbing and Heating in Fort Collins, Colo., has been in the plumbing and heating business since he was 12 when he first started his apprenticeship and worked alongside his uncle on commercial and residential jobs. As a quick learner, he soon became a seasoned copper and threaded pipe installer.

But in 1995 he was introduced to PEX for the first time while at a local job site, and he has never looked back. "Once I started working with PEX, I never wanted to deal with the complications of copper. I rarely use those products anymore, and whenever I can, I work with other plumbers to educate them on the benefits of PEX. Over time, I've installed PEX in every application and have become a local expert on the product, and my peers come to me for advice if they encounter issues and questions," Makepeace said.

Project Facts:

Location US - Pacific mountain, Colorado	Completion 2014
Vertical markets Higher education	Application categories Plumbing, Hydronic Heating & Cooling, Radiant
Project Type New building	

Colorado State University features Uponor PEX plumbing, radiant heating and cooling and hydronic piping.

PEX, according to Makepeace, is easier and faster to install than copper and it's a tougher, longer-lasting system. "And the fittings are a huge part of why I prefer PEX on my projects. As a business owner, I sleep at night knowing that the fittings are strong and reliable, and that I won't be called back to job sites to fix leaks and blowouts."

So it was no surprise that when Lind's Plumbing and Heating had a chance to bid a large new building at the Colorado State University campus in Fort Collins, Makepeace and his design engineers pushed for PEX. "This was a large undertaking," Makepeace said, "and it included a large area for plumbing, radiant heating and cooling as well as hydronic distribution piping. In my opinion, PEX was the only choice that made any real sense."

The building, named the Power House for its focus on energy research, was a unique opportunity for Lind's to showcase the advantages of PEX in several different applications. To add to the complexity, the radiant heating and cooling component was to function without a chiller. "Colorado, with its dry air, gives us a perfect opportunity to install a cooling tower instead of a chiller. It is typical for a cooling tower to be on a site to cool down a chiller, but in this case there is no chiller," Makepeace explained.

Basically the system takes advantage of the constant evaporating water which comes from the city water tap and is metered. This water gets pushed up through a cooling tower. The leftover water that does not evaporate cools the floors via the cooling tower at 60°F, yet the air temperatures outside can be as warm as 100°F.

"In Colorado we have such low humidity," Makepeace explained, "and we use a cooling tower to produce 55°F water just by having it evaporate, and this takes a lot less energy than any other cooling system."

Energy savings and efficiency were top-of-mind to everyone involved in this project, and according to Makepeace, 20 amps of electrical energy can move all the water needed to heat the 65,000-square-foot-building; half the power of a residential range top. They supplement with natural gas for the boilers, but the energy savings is still enormous with the building using only 25 percent energy of a comparatively sized building that does not take advantage of the radiant heating and cooling system.

What makes this system so efficient is that it is water-based, and there is no air used for heating or cooling. You can use air or water to move BTUs, but it takes more energy to move BTUs with air since water is 832 times denser than air, according to Makepeace. That means water can capture and channel more energy per unit volume than air, and the only air used in this system was to provide fresh air and ventilation. "CPVC or copper could not be utilized for a system like this, and PEX was the perfect application, and it was fast and easy to install," Makepeace said.

The 65,000-square-foot-building is LEED® Platinum and uses 157,000 feet of Uponor AquaPEX® pipe ranging in size from 3" down to ½". The pipe is used for the radiant heating and cooling, the plumbing and the hydronic distribution piping systems.

“We used AquaPEX for all the systems since we needed massive amounts of tubing and it was more economical to use AquaPEX along with stainless-steel components to alleviate any rust concerns,” Makepeace said.

Uponor makes AquaPEX for domestic water and Wirsbo hePEX™ for heating and cooling applications. The main difference is the oxygen barrier on the Wirsbo hePEX pipe, but, as with this project, this oxygen barrier is not needed if all the components in the system are non-ferrous.

Most condensing boilers and pumps are stainless steel and by adding stainless-steel mains and Uponor’s non-ferrous Engineered Polymer (EP) fittings, there was no longer a need to use Wirsbo hePEX. “We have close to 8,000 pipe- to-fitting connections on this job and that is another reason to be using Uponor PEX instead of other connection systems,” Makepeace said.

The installation took, at times, as many as 10 of Lind’s Plumbing and Heating’s installers and almost a full year on site working the various installations. Completed in early 2014, the new building replaced the old Power House and will continue to be globally recognized as an energy research and educational facility.

Colorado State

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