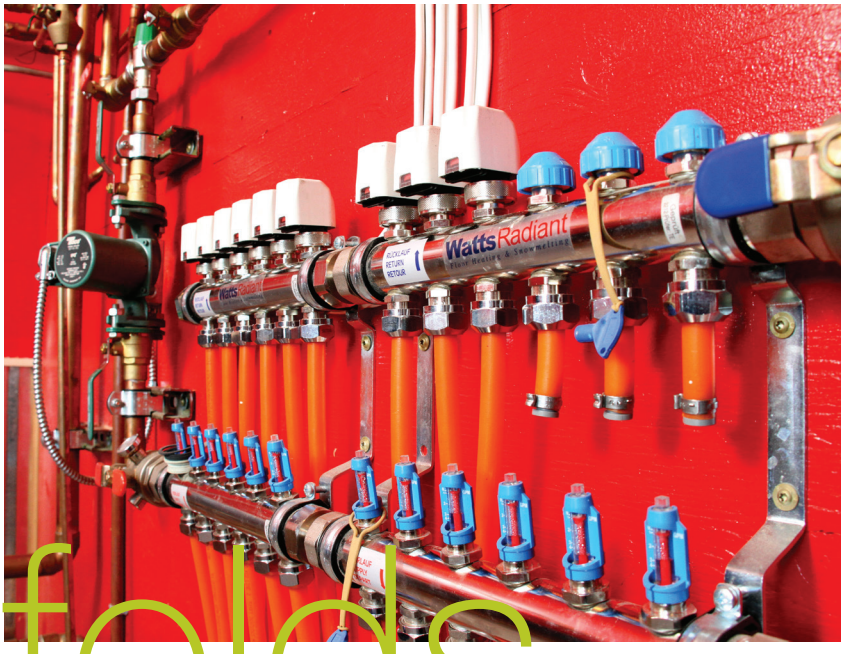
By Simon Bowden

Staying in the loop: making the most of manifolds



In simple terms, a manifold is the hub for central supply and return of fluids to and from a hydronic system.

Regardless of whether that system is moving energy to heat or cool a building, deliver snowmelt outside the building, or even warm up the water in a pool, the manifold puts flow control in one spot where it can be worked on without having to break into walls or ceilings.

Over the years, manufacturers have experimented with sizes and materials and have also added extra technology, such as mixing valves, to make the technician's job easier.

With so many types, sizes, materials and applications, it can be a challenge to wade through the options, but making the right choice is important to ensure the long-term performance of the overall system.

For applications beyond radiant

Manifolds are commonly used in hydronic heating, cooling and snowmelt applications, and it's the versatility of the product that can make it a viable choice for a range of applications.

Bob "Hot Rod" Rohr, technical trainer at Caleffi and a *Mechanical Business* columnist, says, "Pretty much every radiant job you have needs a manifold, unless you have something like a small loop going to a bathroom, but certainly the smarter guys realize there is value there whatever type of system they're doing, whether it's air handlers, panel radiators or old cast iron radiators.

"You can use a manifold on any of those systems, but it really comes down to the personal preference of the installer. Once people embrace the manifold concept it makes all the sense in the world."

Having chosen to use a manifold, a technician must then correctly size it so the system operates at the optimum level.

"Manifolds are sized based on flow requirements and design velocities. Higher flow and/or lower velocities mean larger manifolds," says Randall Quon, communications coordinator with HeatLink.

"Hydronic manifolds typically have valves or flow meters to shut off or balance flow. The pressure drop across the valves is also taken into consideration. Snow melting applications typically have the highest flow requirements, resulting in large manifold sizes."

MATERIAL CONCERNS

Manifolds come in multiple styles and sizes, but also in an array of materials. The reasons for this are based on the application the manifold will be used in, cost and even aesthetics.

"Distribution manifolds have reasonable physical requirements that can be met by a variety of materials," says HeatLink's Quon. "It mainly depends on application and cost. Metal manifolds can have a higher operating temperature and higher flow rate than plastic manifolds. Copper is more susceptible to erosion and corrosion than other materials.

"In plumbing, plastic and copper are the most common. Copper is more expensive and subject to temperature-based flow velocity restrictions to prevent erosion."

Caleffi's Rohr says that picking the material for your manifold often comes down to what individual technicians prefer.

"A brand and material that has performed well in the installer's area would be one thing to consider when choosing a material," he says.

Where, in a building, a tech installs the manifold also has an impact on cost and system performance.

"In theory, the more centrally located the manifold is, the more optimized installers can make the circuits," says Kolyn Marshall, system engineering manager at Watts. "By optimized, I mean meeting a specific need with fewer circuits to cover the same amount of area."

He also recommends that installers select a location which keeps the manifold hidden, yet accessible.

"This allows installers to purge and balance a system after installation," he says. "A few good locations for manifolds are backs of closets and under sinks. If the manifolds are installed in a public area, a locking manifold enclosure is recommended."

Getting it right from the start

Whether a system is straightforward or more complicated, there are common problems technicians must watch for when installing a manifold.

"Hydronic manifolds must be filled one loop at a time to ensure that air is purged from the loop," says Quon of HeatLink. "Once installed, manifolds should be protected from damage during construction. During assembly any O rings should be kept clean."

Regular system maintenance is also required to prolong the life of systems. "This involves regularly checking water quality, including glycol and corrosion inhibitor levels, and removing sediment from filters."

Caleffi's Rohr warns that what flows through a manifold has a direct impact on how it performs and how long it will last.

"Whatever water or fluid you put in the system on day one is directly related to the life you're going to get out of it. If you had a lot of grit, sand, or limescale-forming minerals in the water when it goes in, that's what wears on those little seals and O rings," he says.

"Seals can deteriorate from aggressive fluid or scaling on the moving parts. The good guys will check the water quality going into a boiler."

Watts' Marshall says it is also important that the technician who installs the manifold leaves enough room for future techs to service it.

"Providing a large enough access opening to allow for tools to be easily inserted or used with the manifold is vital," he says. "If using manifolds with internal balancing valves or thermal actuators, it's important to leave enough vertical space above the manifold to allow items to be either adjusted or replaced.

"Also, if a zone needs to be filled and purged after installation, it may be necessary to connect fill and drain hoses to the manifold. This may require additional space for these connections, as well as room to collect any discharged water."

Leave behind a road map

With lots of piping servicing many zones, keeping track of it all is vital, so "Hot Rod" has a request to make: Please label your work!

"My experience from doing this for over 35 years is that the majority of the systems out there don't have proper documentation with them," Rohr says. Even a simple diagram would be of benefit to a tech tasked with servicing or troubleshooting a radiant system.

"If nothing else, handwrite them on the sheet metal or front of the boiler so that the next guy that goes there doesn't have to start over from zero not knowing what the previous guy did," he says.

"I've been on jobs where I couldn't even find the manifolds because they've been buried in a wall or up in the ceiling – and then you find none of the loops are labelled.

"You then have to turn them all off and turn one on at a time and go around to feel the different heat emitters. You could spend a day just trying to figure it out."