



aquatherm GmbH, Germany
Technical Information for USA/Canada

Intermixing Copper Tube and aquatherm - fusiotherm/Green Pipe in DHW Systems

In DHW (Domestic Hot Water) recirculation systems, care must be taken to follow recommended practices for designing and installing copper tubing upstream of aquatherm pipe. In a few isolated regions of the world with highly aggressive water, an unfortunate combination of water chemistry, entrained air, temperature and water velocity can result in erosion-corrosion of the copper tube wall and the release of highly aggressive copper ions in the water. Besides their negative effect on the potable water quality, these ions will attack any surfaces downstream, including normally inert materials like PP and PEX. Due to these issues, aquatherm recommends avoiding using copper tube in DHW recirculation applications if there is any history of aggressive water attacking copper tube in the region. If intermixing aquatherm and copper tube in a DHW system is unavoidable in a region of concern, carefully adhere to the requirements set forth by the Copper Development Association* in sizing the copper tube.

Chlorine Dioxide

Beside the traditional chlorine, the chemically more aggressive chlorine dioxide is increasingly used for the disinfection of potable water. Metal and polymeric pipe materials are affected the same way by the strong oxidant. The above mentioned mechanism of degradation on copper and PP-R pipes will be accelerated by chlorine dioxide.

Therefore, it should basically be refrained from disinfecting PP-R pipes with chlorine dioxide.

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From The Copper Tube Handbook by Copper Development Association, page 11

“Water Velocity Limitations— To avoid excessive system noise and the possibility of erosion-corrosion, the designer should not exceed flow velocities of 8 feet per second for cold water and 5 feet per second in hot water up to approximately 140°F. In systems where water temperatures routinely exceed 140°F, lower flow velocities such as 2 to 3 feet per second should not be exceeded. In addition, where 1/2-inch and smaller tube sizes are used, to guard against localized high velocity turbulence due to possibly faulty workmanship (e.g. burrs at tube ends which were not properly reamed/deburred) or unusually numerous, abrupt changes in flow direction, lower velocities should be considered. Locally aggressive water conditions can combine with these two considerations to cause erosion-corrosion if system velocities are too high. Due to constant circulation and elevated water temperatures, particular attention should be paid to water velocities in circulating hot water systems. Both the supply and return piping should be sized so that the maximum velocity does not exceed the above recommendations. Care should be taken to ensure that the circulating pump is not oversized, and that the return piping is not undersized; both are common occurrences in installed piping systems.”

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