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This bulletin presents Hammond Valve position on dissimilar metals in piping systems, the potential for corrosion, and the need for dielectric fittings.

The subject of galvanic corrosion is a fairly complicated one. The risk and mitigation is addressed application to application. There are no broad solutions to apply in general. The consideration of galvanic effects spills into other corrosion mechanisms, and the subject becomes more, rather than less, complex. Fluid characteristics such as dissolved oxygen content, pH, temperature, velocity and others become important.

On a very basic level, any dissimilar metals that are intimately or indirectly joined (galvanically coupled) and immersed in an electrolyte can manifest some level of polarization and adverse galvanic action. Speaking to generic commercial potable water and HVAC systems – for the most part, practical experience suggests copper tubing can be readily connected to either brass or bronze, with little risk of adverse galvanic action. Furthermore, it is common for bronze valves to be installed with threaded ends on one side connected to carbon steel piping and sweat ends on the opposite side connected to copper tubing with no adverse effects. Exceptions to this can occur when electric current is directly applied or impressed onto the piping system via proximity to wiring, and/or when the water or fluid itself is more electrolytic than usual (high dissolved solids waters). Very often, sacrificial anodes take care of whatever low level problem exists.

When it comes to local water systems or ground water supplies, it is fairly well known in the area that galvanic action is to be considered (certain areas of Arizona, Texas, and Missouri for example are notorious for this, and the local contractors know it and take steps to mitigate). Softening systems or other devices that can substantially change the water chemistry need to be considered, and such systems might lead to issues where water is not otherwise considered active.

Take the same copper tubing and brass valve that worked well in the basement of a home, and now bury it in damp acidic soil, and the brass rapidly dezincifies.

The consideration of galvanic action between dissimilar metals in valves and mating piping is a systems level question and beyond our direct control and responsibility as a valve manufacturer. Therefore, Hammond Valve does not specifically publish any technical treatment of the topic beyond this bulletin, nor do we sell dielectric couplings or unions when it is determined they are required. We would point you to a dielectric coupling manufacturer for further advice, and/or to any one of several academic texts on the subject, such as the ASM Handbook on Corrosion Volume 13, or Uhlig's Corrosion and Corrosion Control, Wiley.

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