

Case Histories

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Brass or bronze: Minimize life cycle cost by selecting the correct valve

When a plumbing contractor or system designer has the option to install brass valves or to use more expensive bronze, and the decision is based on cost, the decision will swing to brass.

But, while it's true brass products will, in most cases, give good service and perform nearly as well as bronze, it is equally correct that in some small percentage of installations brass can degrade earlier than expected, causing a host of problems and additional costs for the property owner.

The challenge for the plumbing contractor or system designer is to better understand the conditions where brass valves may not perform, and to specify and install bronze valves to eliminate the potential problems in these riskier environments.

What problems are we describing? In a word, dezincification. Dezincification is a corrosion mechanism whereby zinc preferentially corrodes or dissolves out of a copper alloy, leaving the remaining substrate like Swiss cheese with voids where the zinc once was. Clearly, that's not acceptable for a device meant to contain pressurized fluid. Dezincification can result in early valve failure, cause flooding and damage the rest of the plumbing system by introduction of corrosion byproducts. These byproducts can choke narrow flow passages and otherwise create system havoc.

Some companies state that when zinc content of a zinc-bearing copper alloy is above



15%, there is risk for dezincification, and when it is below 15%, you are safe. Actually, dezincification can occur in *any* zinc-bearing copper alloy, depending on the circumstances, and when it happens it can be destructive even when the starting concentration of zinc is fairly low.

Beyond that, the alloy is only one piece of the puzzle. It's just as important to consider the makeup of water passing through the valve, because when it comes to dezincification all water is not the same. Many potable water supplies (TDS below 500 ppm) are still very corrosive to brass. Levels of corrosive potential can greatly be affected by other factors in the water chemistry, such as temperature.

For example, identical valves in hot and cold water systems might experience corrosion only in the cold system. A comprehensive water analysis is the best starting point in understanding the risk for corrosion problems. In evaluating alternatives, it is best to err on the side of caution.

If there is a single factor present for dezincification, such as a known history in the geographical area, a water analysis at the location showing a negative Langelier Saturation Index, or a salt-based softening system present, to name a few examples, the contractor or system designer should specify bronze valves to mitigate the risk. The overall project cost will not increase significantly even though the cost of the individual valve might be substantially higher when moving from brass to bronze.

It's important to realize that each valve and material combination has a reason for being, and not every valve or valve material can do everything. Given the wide variety of configurations and materials available, some applications need a little extra attention to ensure the correct valve and material selections are made. When deciding between brass and bronze for water valves, consider the slight increase in cost for the bronze valve might be well worth the security of eliminating the potential of a serious problem, albeit in a fairly small percentage of cases.

Seek out capable, US-based manufacturers who can properly support your requirements before and after the sale. With more than 110 years of experience, look to Milwaukee Valve for expertise in making sure your system needs are properly satisfied. We have reliable valves backed with responsive innovation and knowledgeable product support.