

**What piping materials, black steel piping with cast iron/malleable iron fittings vs. galvanized pipe and fittings, have the lowest corrosion rate when used with softened water?**

Corrosion can occur with any type of piping depending on the application, environment and precautions taken to prevent corrosion. We at Res-Kem find that steel piping with iron fittings offers the best balance of corrosion resistance and cost.

First, softened water has not shown to cause any more internal corrosion in steel or galvanized piping than hard water. Corrosion, which does occur with unlined steel tanks, piping & fittings or galvanized tanks pipe & fittings is generally caused by other factors. Some of these are pH, temperature, dissolved gasses (oxygen and carbon dioxide) in the water, contact with air and galvanic action.

While temperature itself is not generally a problem with water softening systems, high temperatures (>150° F) with low pH and/or dissolved oxygen/carbon dioxide can be extremely corrosive. This is particularly a problem with galvanized pipe and fittings. Any imperfection in the galvanizing will accelerate the corrosion, as it will attack the imperfections with zeal.

Two of the biggest contributors to corrosion we typically see with industrial water treatment equipment (softeners, filters and dealkalizers) are galvanic action and contact with air.

Galvanic action is caused by the creation of a galvanic cell between dissimilar metals; i.e. brass or copper and steel. Galvanized, i.e. zinc coated, steel has the greatest potential for galvanic corrosion should it come in contact with copper. Think old-time batteries...copper and zinc, add a little salt solution and presto, you have a battery.

The other greatest contributor to corrosion we see with water treatment equipment is on the exterior surface of tanks, pipe and fittings. Given most water treatment is in areas where the air is warm (boiler rooms, laundries, non-air conditioned utility rooms) and the water is cold; condensation forms on everything. Uncoated or unprotected steel tanks, steel piping and cast iron valves will rust and corrode.

Over the many years manufacturing and servicing water treatment equipment, I have seen the greatest cause for corrosion to be the failure to protect the exterior surfaces of equipment. Most tanks, whether lined or unlined generally do not fail from the inside; except in the case of pinholes in the lining. By not maintaining the exterior of the tank, you can literally watch the metal flake away. This is true with steel piping if not protected with a corrosion resistant coating. The inside of the pipe is fine, while the outside is virtually disintegrated. Galvanized piping is not free from this problem. The corrosion will take place at the threads (which are not galvanized).

Having been in the water treatment industry for 36 years, by far I found the primary choice for piping for water softeners, filters and dealkalizers to be steel piping with malleable iron or cast iron fittings. When used in conjunction with the new high quality rust preventative coatings and linings, these systems will last for many, many years with a little preventative maintenance. A softener with galvanized piping and fittings is a distant second choice.

Robert Hader  
Director of Engineering  
Res-Kem Corp.  
[bob@reskem.com](mailto:bob@reskem.com)

Copyright 2006 All rights reserved

Res-Kem Corp. 2 New Road Aston, PA 19014  
800-323-1983 610-358-0717 Phone 610-358-4642 Fax [www.reskem.com](http://www.reskem.com)