



Best Management Practices *for* Plumbers & Plumbing Design

Water Quality Concerns for Plumbers

Corrosion of copper pipes sends copper into the wastewater stream. Wastewater treatment plants can remove some of this copper, but some passes through the treatment process and into creeks and rivers where it is harmful to fish and other aquatic life. Most of the copper in wastewater is the result of copper pipe corrosion, and this is a copper source that can be easily reduced by following the Best Management Practices outlined below.

Questions?

If you have any questions, please contact a Napa San Inspector by calling 707-258-6000. These BMPs are also available on our website at www.napas.com.

The following Best Management Practices are RECOMMENDED:

Design

Plumbers can significantly reduce pipe corrosion by making simple design adjustments. To minimize corrosion, plumbing systems should be designed to:

- Minimize water velocity
- Minimize hot water temperature
- Specify low-corrosivity water flushable fluxes
- Avoid stagnant sections
- Minimize pipe direction and size changes

Flux

- **Use B813 Flux:** The ASTM flux standards limits flux corrosivity and require that the flux is water flushable. While these standards are voluntary, architects, engineers, contractors and building officials are encouraged to specify and require the use of B813 fluxes. All manufacturers make a B813 flux.
- Emphasize correct use of ASTM B813 fluxes. Using excess flux or a corrosive flux causes early pipe failures.

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NapaSan

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Practices

Minimize Water Velocity in Pipes

- Use larger diameter piping to keep velocities low. Cold line velocity should be < 8 ft/second; hot lines < 4-5 ft./second. Online calculators can help determine the correct pipe size/velocity.
- Make sure return lines in a circulating hot water system have the same diameter as the supply lines.

Materials

- Use compatible materials. When multiple materials do need to be joined, specify insulating unions. Specify copper or brass straps for supporting copper pipe.
- Consider non-copper pipe (e.g. PE X or stainless steel) when its use is permitted.
- Specify non- or low-lead faucets, valves and appurtenances.
- Use stainless steel piping and components for industrial process water supplies, heat exchangers, chillers, and condensers when operating temperatures exceed 140°F.

Additional Measures to Reduce Corrosion

- Avoid stagnant sections, and minimize pipe direction and size changes.
- Prevent electrical currents by grounding directly to a copper rod driven into the earth. Do not attach a grounding wire to water pipes. Route wires away from water pipes and don't use galvanized nails that touch copper piping.
- Avoid induced stress – provide enough pipe support and allow for thermal expansion.
- Specify that copper tube and fittings be installed according to ASTM B828-92.
- Emphasize careful reaming of cut ends in order to reduce turbulence. Unreamed tubing corrodes and fails much more quickly than tubing which is properly reamed.
- Incorporate coupons or easy-access inspection points into long stretches of pipe to simplify corrosion monitoring.
- Provide flanged fittings or unions for pumps and other devices that must be removed for maintenance. This reduces soldering to aged pipe.