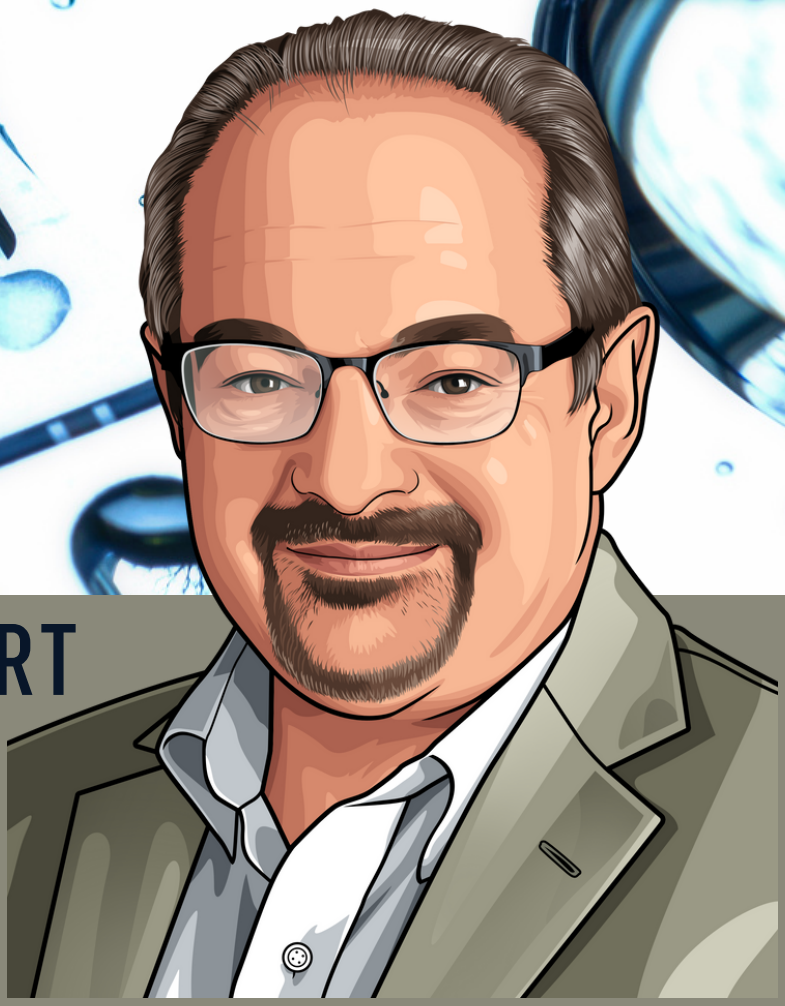
AGGRESSIVENESS WHEN WATER ATTACKS



WATER QUALITY EXPERT

BEYOND CLEAN

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Beyond Clean Water Quality Expert:

AGGRESSIVENESS: WHEN WATER ATTACKS

Jonathan Wilder, Ph.D. | Quality Processing Resource Group, LLC

I had a water quality case some years ago in the southern Midwest. The issue was that the sinks, instruments, sterilizer chambers, and pretty much everything else was turning a deep green color. The water supply for the boiler, sinks, and washers was the same supply, generated in an anteroom for use in these devices.

Water was "generated"? Yes. The water was taken from the municipal supply to the building and softened, then run through copper plumbing to its points of use.

So, aside from algae, what is green or could become green in this system? Copper.

"But we use copper plumbing because it is easy to work with, bactericidal, reasonably inexpensive, and lasts a long time." Yes, but...

There is a "figure of merit" from the HVAC industry called "aggressiveness index". The aggressiveness index measures how aggressive water is toward copper plumbing. Copper plumbing is used for commercial cooling applications by circulating cooled water through it and blowing air over the copper plumbing. It is also used for baseboard heating applications. So, what is the aggressiveness index?

Aggressiveness index = pH + log10(total hardness in ppm) + log10(alkalinity in ppm)

If the aggressiveness index is > 12, the copper will likely last forever. In this case, the parameters in the aggressiveness index were:

·pH: 7.7
·hardness: 0.33
·alkalinity: 80

Plugging these value into the calculation, the result was:

Aggressiveness index = pH + log10(0.33) + log10(80)
= 7.7 + (-0.48) + 1.9
= 9.1

This is fairly aggressive water. The cure was plastic piping. The only issue there is to make sure it meets code.

Enough chemistry for this month. See you next month!

Have more water quality questions? Contact Jonathan at: jwilder@qprgllc.com

Beyond Clean Water Quality Expert Biography:

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Dr. Wilder joined MDT Corporation in 1990 as Staff R&D Scientist, tasked with executing process and product development in sterilization, disinfection and cleaning of reusable medical devices. He started H & W Technology in 1997 and allied with SMP Laboratories from Tübingen, Germany to form Quality Processing Resource Group (QPRG) in 2016. QPRG provides clients with operational, regulatory, and technical consulting in the area of sterile processing. Its services include accreditation readiness audits, technical deep dives into the issues causing wet loads and staining, and 510(k) filing support for manufacturers. He has a Ph.D. in physical chemistry from NYU and an MBA from Rochester Institute of Technology. He is a New Yorker by birth but escaped in 1986 to a postdoctoral fellowship at the Max Planck Institute for Surface Physics, the Fritz Haber Institute, in West Berlin, Germany. He is currently happily living near his children in Philadelphia, PA.

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