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During 2022 OSAP Boot Camp, it was stated that distilled water is not the optimal choice for use in patient care. However, I didn't get why and what should be used instead of distilled water if so. Reverse osmosis is unfortunately not an option for us.

Both distilled and RO water are usually acidic (pH as low as 5.5) which can cause damage to dental unit components over time (it can also erode tooth enamel!). This happens when dissolved minerals are removed, allowing more carbon dioxide to dissolve in the water which produces carbonic acid. Acidic water can also mobilize metallic ions including copper and nickel from metallic dental components that may be present in effluent water in small amounts. For this reason, some manufacturers including A-dec do not recommend distilled or RO water for use in dental units.

EPA recommends that drinking water pH be between 6.5 to 8.5 (a pH of 7 is neutral). Many municipal drinking water systems condition water to slightly alkaline which means it has less chance of mobilizing metals or corroding metallic drinking water lines. Water within this range is probably best for use in dental equipment. If you are disconnected from municipal water and using separate water reservoirs you have several source water options other than distilled or RO water. Keep in mind that the goal is to use source water that has low to non-detectable numbers of bacteria to avoid overwhelming the intermittent and/or continuous treatment method used to control biofilm.

- The gold standard from a microbiological perspective is USP sterile water for irrigation, but it is also distilled water and has a pH of 5.5 which does not meet the manufacturers recommendation. It is also relatively expensive.

- Bottled drinking waters have highly variable pH ranging from acidic to highly alkaline (as low as 5.0 and as high as 9.7). Some products are also produced using RO processes. These products are not sterile but should have low or undetectable levels of microbial contamination. If the manufacturer cannot provide information on product pH, it is relatively easy to test using simple pH test strips. Any water that meets drinking water recommendations (pH 6.5-8.5) should be acceptable. The price of these products is highly variable.

- Tap water, that has been brought to a boil for several minutes cannot be considered sterile but should have exceedingly low to undetectable numbers of viable microorganisms. One easy way to accomplish this is boil tap water using a tabletop electric teakettle like those that

are ubiquitous appliances in European homes. Water should be treated on a “just in time” basis but must cool sufficiently to be used safely. This method provides a simple and very cost effective approach for source water of acceptable microbiological quality. If you need some scientific top-cover, you can cite this abstract from the 2021 OSAP Annual Meeting published in the Journal of Dental Infection Control: <https://osapjdics.scholasticahq.com/article/28913-use-of-a-tabletop-electric-kettle-to-prepare-dental-unit-source-water>

- It may be possible to condition distilled or RO water to bring it up to a higher pH using sodium bicarbonate, but I would not attempt this without consultation with the dental unit manufacturer.

Whatever source water you select, you should periodically test it for microbiological quality, especially if large quantities are stored for extended periods of time.