

Ozone Disinfection for Hemodialysis

*An AmeriWater White Paper Authored By
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THE NEED FOR BETTER DISINFECTION

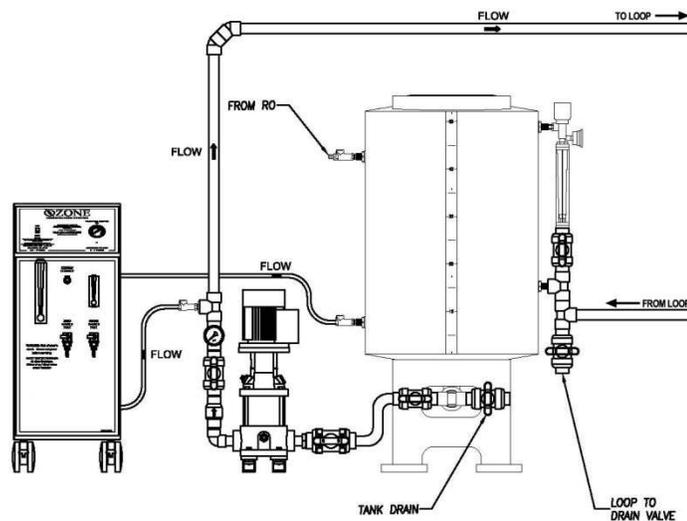
In order for a dialysis facility to meet and exceed the AAMI 23500 Standard, disinfection will have to be performed on a more frequent basis than once per month. In fact, weekly disinfection will probably become the norm. Weekly disinfection will place an additional burden on the staff and finances of a facility. This additional burden will create the need to find a disinfection system that requires less staff time.

Heat disinfection of the distribution loop has become the go to method of answering this need. This is partly a logical result of the heat disinfection used by dialysis machines. Retrofitting an existing water treatment system can be a very cost prohibitive endeavor. The new heat system is expensive. It requires much more power and a new loop and new wall boxes have to be installed.

Ozone disinfection systems offer an alternative method of disinfection replacing chemicals in an existing water treatment system.

OZONE DISINFECTION

Weekly ozone disinfection, after dialysis treatments have been discontinued, will maintain a typical dialysis water treatment system and meet the requirements of AAMI 23500. The ozone disinfection process requires a 0.5 ppm ozone level in the distribution loop for a period of 30 minutes.



The use of ozone for disinfection of high purity water systems used in dialysis has been well documented in water quality literature, and has gained widespread acceptance by high purity water users in the pharmaceutical, cosmetic and semiconductor industries.

than 90%. The oxygen passes between charged electrodes causing some oxygen molecules to disassociate and combine with O_2 to become O_3 or the ozone molecule.

Once the ozone gas is manufactured it must be intimately mixed with the high purity water. In a typical dialysis water system this is usually accomplished with one or more venturi eductors discharging into the bottom of the storage tank.

Note: Not all of the ozone gas will be dissolved in the water so excess ozone gas must be vented from the system and destroyed, usually by a heated catalyst of manganese dioxide chamber, which converts the ozone back to oxygen.

When excess ozone gas is removed the ozonated water is no more aggressive to most materials of construction used in high purity water systems than typical chlorine disinfectants.

SAFETY

Health and safety are always important with any process. In the USA OSHA, ANSI/ASTM and ACGIH state that an individual must not be exposed to a concentration of ozone higher than:

- a) 0.1 ppm by volume, determined as a time-weighted average (TWA) over a period corresponding to a full working day (maximum 8 hours).
- b) 0.2 ppm by volume as a ceiling limit for an exposure time of 10 minutes.

It should be noted that the human nose can detect ozone as low as 0.02 ppm. It is recommended that you follow the instructions for use by the manufacturer of the FDA 510K cleared ozone system for monitoring.

Not all dialysis facilities will be able to afford a heat disinfection water treatment system. An ozone disinfection system may be an excellent alternative.

References:

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