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# Implementing a Water Quality Program in the CS Department

## LEARNING OBJECTIVE

1. Explain the importance of maintaining water quality and an effective water treatment program
2. Address leadership responsibility for ensuring the necessary equipment is functioning and meets current industry recommended guidelines.
3. Review specifications and criteria supporting periodic assessments of a department's water quality program

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**H**AVING THE CORRECT KNOWLEDGE TO ASK THE RIGHT questions – and also having the right equipment and test methods in place – is somewhat akin to having the strength and training to swim in the deep end of a pool or ocean. Without proper education and resources, one can only tread water for so long. Leaders in a Central Service/Sterile Processing Department (CS/SPD), have a responsibility to support resource management. This includes assuring the necessary utilities, infrastructure and supplies are available to the CS/SPD team. Quality water is one such necessity as it greatly contributes to clean and sterile medical devices for safe patient use.

It is reasonable to note that the majority of processes performed in CS are effected by water. It is, therefore, no surprise to find “water” referenced more than 200 times in the current edition of ANSI/AAMI ST79, *Comprehensive guide to steam sterilization and sterility assurance in health care facilities*.

CS leaders must educate themselves and their employees on the types, specifications and categories of water used and monitored for medical device reprocessing. They must understand the existing water quality in their department and, if necessary, determine the changes needed to introduce treated water that is required for effective medical device processing. Finally, there must be ongoing and periodic monitoring of the water treatment process, as well as the competency monitoring for supporting staff.

The primary objective is to ensure that each device is safe for patient use and does not cause an adverse event.

Implementing and monitoring a water quality program is an important part of the department's quality management system (QMS) and serves as a life preserver in the event that one finds themselves in the proverbial deep end.

## OBJECTIVE 1: EXPLAIN THE IMPORTANCE OF MAINTAINING WATER QUALITY AND AN EFFECTIVE WATER TREATMENT PROGRAM

### INDUSTRY GUIDELINES

Prior to setting out and learning about the healthcare facility's water treatment process, CS leaders should take some time to read and study various industry resources. A primary resource comes from the Association for the Advancement of Medical Instrumentation (AAMI) Technical Information Report 34, also known as AAMI TIR34, *Water for the reprocessing of medical devices*. Leaders should educate themselves and



their team on essential elements of water quality, as well as treatment systems and periodic monitoring recommendations. To order AAMI TIR34, visit [www.aami.org](http://www.aami.org).

## CATEGORIES OF WATER QUALITY FOR MEDICAL DEVICE REPROCESSING

The most common impact of water quality on cleaning involves water hardness, ions, alkalinity and endotoxins.<sup>1,4</sup> The quality needed for the various stages of medical device reprocessing is determined by the type of medical device being reprocessed, as well as the disinfection or sterilization process used. Using the highest quality of water for all stages of medical device reprocessing might be unnecessary and costly and, therefore, requires leadership to assess and manage the necessary resources.

There are two categories of water quality identified in AAMI TIR34 to support medical device reprocessing and the level of treatment needed: utility water and critical water.

- Utility water is mainly used for flushing, washing and rinsing. This water is found at the tap and may require further treatment to meet specifications.
- Critical water is used as the final rinse, as well as for steam generation. This water is extensively treated to remove microorganisms, as well as inorganic and organic material, from the water. It is also possible that final submicron filtration could be part of the treatment process.<sup>2</sup>

The CS department will use both categories of water identified in AAMI TIR34. As such, leaders will need to confirm/assure they have the best quality for both.

## UNDERSTAND EXISTING WATER QUALITY

The next step is to identify the name,

title and contact information of the professional responsible for delivering quality water for the hospital and, ultimately, the CS department (usually, someone in the facility engineering and/or maintenance department). CS leaders should add this individual or individuals' contact information to their phone and mark as "Favorite" because it will be necessary to remain in close contact. CS leaders should introduce themselves to the contact and explain how the two professionals can work together to support patient safety. CS leaders may also wish to request a field trip with their facility engineering/maintenance colleague to identify the hospital's water source and "walk the lines" from the point of incoming supply to the CS department's distribution. Along the way, CS leaders can take notes and photos to share with their team members (this is especially effective if a staff field trip is unrealistic).

It will be important to identify the hospital's water source. Does the hospital receive water from the city, local municipality, or a ground well? Is the water treated by the hospital once received? CS leaders should identify if there is a storage tank or tanks holding treated water. Does their department have a dedicated tank to support processing needs? Is the current water capacity of the tank allowing the CS department to meet customer expectations? Leaders should also be able to identify the maintenance of their water treatment system and have a basic understanding of the schedule, as well as the steps taken by those who care for the system.

Identifying any alarms associated with the water treatment system is also prudent, specifically alarms that support the CS department (e.g., a low-level water alarm that identifies when the water treatment system defaults over to potable water when the holding tank dips below a certain level).

CS leaders should know which pieces of equipment are fed by these water lines. Creating a schematic or drawing of the CS department to identify the location of equipment and isolate various water feed lines can be helpful. Over the course of many years, the CS department may undergo a number of renovations, relocations and/or repairs; in some cases, new supply lines may have been introduced. Having greater understanding of the location of water feed lines can prove invaluable in case of an emergency, and can prevent the need to scramble to identify what lies overhead or behind a wall.

Lastly, it is important that CS leaders can identify any water testing performed by facility engineers, industrial hygienists or infection control professionals. Testing could be as simple as monitoring water temperature, hardness and mineral content, or more advanced to include bacterial count testing. In either case, having access to results and knowing who to contact is essential.

## OBJECTIVE 2: ADDRESS LEADERSHIP RESPONSIBILITY FOR ENSURING THE NECESSARY EQUIPMENT IS FUNCTIONING AND MEETS CURRENT INDUSTRY RECOMMENDED GUIDELINES

In a QMS environment, leadership must ensure the necessary resources are available to support the quality system as well as the products and services provided to their customers.<sup>3</sup> Accountability to implement a policy and procedure, and various work instructions, is paramount to establishing a department's water quality program.

## DETERMINE ANY NECESSARY CHANGES

CS leaders should identify and review the manufacturer's Instruction for Use (IFU) of the medical devices currently processed in their department. They should also identify any special needs.



It may be helpful for leaders to create a tool, such as a spreadsheet, to record and categorize this information (see above).

From there, it will be important to review the spreadsheet to determine if the current operation supports the devices processed. If further water treatment equipment is required, leaders should devise a business plan, capital request or other documentation, and submit them to administration. Sharing the findings with a boss or facility executives, including any specific devices the CS department is unable to process correctly due to improper water treatment, will help support the case for further action and improvements.

As CS leadership skills are developed it will be important to recognize that an identified problem should never be overlooked or ignored. Working toward a collaborative solution with facility leaders is critical, and this advice applies to any situation involving patient care devices and equipment.

### **INTRODUCE WATER TREATMENT PROCESSES**

CS leaders should educate, train and check the competency of departmental staff, and part of that education should include orienting team members to AAMI TIR34, as it pertains to water for reprocessing of medical devices. This document addresses how to determine the water quality needs for reprocessing various categories of medical devices at various stages of reprocessing, as well as how to assess, generate, monitor and maintain water meeting those requirements.<sup>2</sup> There are several dozen definitions and abbreviations listed in the document as well, so this offers a great opportunity to create a crossword puzzle or word search game to bring these terms to life with staff members. A leader could begin by selecting terms that apply to their department's current processing needs, and then expand from there.

Leaders are responsible, in part, for ensuring their staff's development and professional growth always exceeds the minimum and serves to advance learning potential. They should educate their staff on the two categories of water identified for use in the processing of medical devices, as well as the importance of having both. They should also test for competency of knowledge, as well as their staff members' ability to critically think through scenarios of what to do when loss of supply is identified.

Specifically, staff should be trained on the following:

- Identifying the type of water treatment performed at their healthcare facility;
- Understanding which devices and/or equipment are supported by the various types of water used; and
- Recognizing signs of equipment or device damage due to loss of treated water. Staff should be able to identify staining, spotting, scaling, and decreased cleaning capacity because these are signals that water quality has changed or has not been optimized.<sup>1</sup>

### **DEVICE MALFUNCTION**

Device malfunction that occurs during a patient procedure can be catastrophic, regardless of how seemingly minor the nonconformity to specifications may be. Toxic effects and tissue irritation can result from residuals on a device that was processed using water of poor quality. Patient infection can result from the use of contaminated devices caused by contaminated water that prevented detergents from dispersing soils. Monitoring water quality is a process meant to confirm control strategies are in place and properly working.<sup>2</sup>

### **OBJECTIVE 3: REVIEW SPECIFICATIONS AND CRITERIA SUPPORTING PERIODIC ASSESSMENTS OF A DEPARTMENT'S WATER**

## **QUALITY PROGRAM**

### **GOALS OF WATER QUALITY MONITORING**

If water quality is not monitored, the water treatment system could become heavily contaminated with microorganisms or other contaminants and could contribute to corrosion, staining and increased microbial levels after reprocessing. The results of water quality monitoring should be reviewed on a facility-wide basis, and necessary remedial action should be taken if the parameters being monitored are outside of acceptable limits. Water maintenance personnel should communicate with device reprocessing personnel and patient care personnel to ensure they are aware that patient risk may be elevated during times when water quality is inadequate. Although the bulk of water quality monitoring is performed by water maintenance personnel, it is important that the test results be made available to device reprocessing personnel.

### **ONGOING PERIODIC MONITORING**

It is important to identify testing and monitoring requirements in accordance with AAMI TIR34. CS leaders will find useful tables throughout the document that identify the following:

- Categories and levels of water quality for medical device processing
- Water quality for reprocessing devices to be sterilized by steam or low-temperature gas
- Water quality for reprocessing devices to be high-level disinfected
- Water quality for reprocessing device to receive liquid chemical sterilization
- Overview of water quality monitoring
- Quality monitoring of cleaning, disinfection and sterilization equipment
- Summary of water treatment methods
- Monitoring water treatment equipment

### **MONITORING WATER QUALITY**

Monitoring water quality is primarily the responsibility of the facility's water



maintenance personnel; however, it is necessary that CS staff understand the implications of the results of water quality monitoring. Staff should be aware that quality water can vary significantly within the same facility. Various water quality monitoring duties should be performed in CS to ensure the department is receiving the proper type and quality of water.

It is wise to develop a schedule for periodic monitoring, based on the recommendations of AAMI TIR34 and the water treatment equipment manufacturer. Leaders should provide and review follow-up reports to assure measurements are within tolerance and identified specifications, per departmental policies and recommended industry standards. This will support the department's QMS, as a part of ISO 9001, Section 8, *Measurement, analysis and improvement*.

## PERSONNEL CONSIDERATIONS

Device reprocessing personnel should receive education, training and competency verification in the importance of water quality; patient risks associated with improper water system characteristics; and water quality monitoring that should be performed in reprocessing areas. Water maintenance personnel should receive education, training and competency verification in the maintenance and monitoring of water treatment equipment. All personnel training should be specific to the functions performed. Periodic audits of personnel compliance with policies and procedures should be performed.

## QUALITY PROCESS

Procedures for ensuring water quality should be based on a documented quality process that measures objective performance criteria, such as pH, hardness, purity and temperature, that have a direct effect on the outcome.<sup>4</sup> This


quality process should be developed in conjunction with personnel from other areas, such as facility engineering, reprocessing, and infection prevention and control; this process should be integrated into the overall quality process in the healthcare facility. Variables in the system can be controlled to achieve assurance of product quality and process efficacy. Monitoring frequency will vary depending on the quality improvement goals, the healthcare facility's policies and procedures for the handling of unfavorable or unplanned events, and the type of process variable.<sup>2</sup>

A problem analysis should be completed for any problem relating to any aspect of water quality reprocessing that could pose a risk to personnel or patients. The problem analysis should define and resolve the problem, and the system should be monitored to ensure that the problem has been corrected. There should be a planned, systematic and ongoing process for verifying compliance with procedures. Quality processes can be enhanced by audits that are conducted on a regular basis. The information from these activities should then be summarized and made available to individuals, groups or teams, as needed.

## CONCLUSION

CS leaders who have earned the Certified Healthcare Leadership designation or are aiming to do so have made a commitment to advance their knowledge and skill sets, and also share that knowledge with others to promote quality in the CS department. Their understanding of water quality and its role in safe, effective device reprocessing is essential.

Water quality plays a significant role in various processing steps used in reprocessing medical devices. CS leaders and reprocessing professionals must remain vigilant to ensure that any sign of water damage or poor water quality is quickly and appropriately brought to the

attention of a supervisor, manager and/or director. Doing so will help ensure that the problem is resolved quickly and that proper contingency plans are activated if water quality issues prevent safe, effective device reprocessing. 

## REFERENCES

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