

Water Quality Types Used in the Medical Device Reprocessing Areas (MDRA)

Practice Support Recommendation

Purpose

To define the water types used in Medical Device Reprocessing Areas (MDRA). This guidance supports the safe and effective cleaning, rinsing, and sterilization of medical devices by outlining when and how each type of water and steam should be used.

Application

This guidance applies to all staff and departments responsible for reprocessing medical devices. It provides direction on selecting appropriate water types within MDRA at each stage of the reprocessing cycle.

This document is part of a suite of water quality support recommendations for MDRA and is intended to be used alongside the associated documents. The full suite of documents can be found here: [Medical Device Reprocessing | Alberta Health Services](#)

Recommendations

Utility water

Water used for non-critical applications like flushing, washing, and the initial stages of equipment cleaning. It does not meet the purity standards required for final rinses or sterilization but must still be potable and free from harmful contaminants.

Types of Utility Water	Definition	Use in Sterile Processing	Notes
Potable Water (Drinking Water)	Water that meets national drinking water standards. It is safe for consumption but may contain microorganisms that are not suitable for introduction into sterile body sites https://www.canada.ca/en/health-canada/services/environmental-workplace-health/water-quality/drinking-water.html	Initial rinsing, equipment pre-cleaning, flushing washer-disinfectors	Must be free of harmful microorganisms; may contain dissolved minerals and organic matter.
Softened Water	Potable water treated to remove hardness (calcium, magnesium) via ion exchange.	Prevents scale buildup in washers and boilers; used in pre-cleaning.	Not pure enough for final rinsing.
Filtered Water	Water passed through mechanical filters to remove particulates.	Pre-treatment before higher purification processes	May still contain microorganisms or dissolved minerals, depending on filter type.

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Critical water

Water that meets stringent microbiological and chemical purity criteria, produced to contain no detectable microorganisms and no detectable endotoxins within validated testing limits. It also maintains extremely low levels of minerals and organic compounds. This water quality is required for applications such as the final rinse of surgical instruments where any microbial contamination poses a risk and strict contamination control is essential.

Types of Critical Water	Definition	Use in Sterile Processing	Notes
Reverse Osmosis (RO) Water	Water purified by forcing it through a semi-permeable membrane that removes up to 99% of dissolved salts, particles, and microbes.	Final rinse before sterilization	Often combined with deionization or UV for higher purity.
Deionized (DI) Water	Water that has had its dissolved ions and minerals removed, typically through a process called ion exchange. This process removes charged particles, including salts, minerals, and other contaminants, leaving behind a highly pure form of water	Final rinse or cleaning of delicate instruments	Prevents spotting or deposits due to low mineral content.
Type II Water	Purified water with low levels of dissolved minerals, ions, and organic compounds, typically produced through distillation or deionization	For critical reprocessing steps, such as lumen flushing and endoscope cleaning	Often used with UV or filtration.

Steam in hospital sterilization

In MDRA, steam is primarily used in steam sterilizers (autoclaves) to sterilize surgical instruments, trays, textiles, and other heat tolerable medical equipment.

Steam is the gaseous phase of water, produced when water reaches its boiling point (100°C). It is essential in hospital sterilization because of its rapid heat transfer and its ability to effectively destroy microorganisms, including spores.

Application in sterilization

Steam sterilization is performed in autoclaves within MDRA to process:

- Surgical instruments
- Rigid and peel pack trays
- Textiles

Key aspects of steam sterilization

- High Temperature & Pressure: Typically performed at 121°C or 132–135°C under pressure.
- Time-Temperature Relationship: Sterilization cycles are carefully calibrated to ensure that the correct temperature is maintained for a specific period (e.g., 4 minutes at 132°C).
- Penetration: Steam must penetrate instrument packaging and lumens to ensure effective sterilization.
- Condensation & Heat Transfer: As steam condenses on a cooler surface, it releases latent heat, rapidly raising the temperature of the item and destroying microbes.

Types of steam used

Clean steam is produced in a pure steam generator that uses Water for Injection (WFI) as its feedwater. This type of steam is used when the highest level of purity is required.

Process steam in healthcare settings is commonly generated in stainless steel boilers that use Critical Water. Some carbon steel systems may use softened water instead. The correct feedwater quality should always follow the equipment manufacturer’s instructions for use (MIFU).

Plant (house) steam is created through standard boiler systems found in healthcare facilities. These typically use utility water as the feedwater, which may or may not undergo chemical treatment depending on system requirements.

Definitions

None (as applicable)

Sources/References

- External standards and guidance documents
 - Canadian Medical Device Reprocessing in all Health Care Settings. (Canadian Standards Association) (CAN/CSA Z314:23)
 - Water for the Processing of Medical Devices (ANSI/AAMI ST108:2023)

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