

Operational Guideline for Manitoba Water Suppliers

Disinfection Requirements

PURPOSE

This guideline has been established to ensure that public and semi-public drinking water suppliers throughout the Province of Manitoba meet their regulatory requirements with regard to disinfection.

Disinfection of drinking water is the single process that has the greatest impact on drinking water safety.

Legislation

[The Drinking Water Safety Act \(DWSA\)](#) Section 20 states that every public water supplier and semi-public who is required to disinfect must do so in accordance with the regulations.

Section 20 (2,3) requires water suppliers that are required to disinfect, measure and record disinfectant residuals prior to the water entering the distribution system after 20 minutes of contact time and periodically in the distribution system.

[The Drinking Water Safety Regulation](#) (MR 40/2007) Section 19 states all water suppliers, that are required to disinfect, must maintain all equipment and machinery used for disinfection in effective working order and to have spare parts as necessary to ensure continuous disinfection.

Operating Licence

All water system licenses provide standards and monitoring requirements specific to each water system.

Water Treatment Standards

Primary Disinfection

Primary disinfection refers to the first dose of a disinfectant the water receives immediately after treatment to ensure removal or inactivation of human pathogens such as bacteria, viruses and protozoa in water.

Secondary Disinfection

Secondary disinfection is required to maintain and protect the water quality within the distribution system, for the purposes of:

- protecting water from microbiological re-contamination
- reducing bacterial re-growth
- controlling biofilm formation; and
- serving as an indicator of distribution system integrity

The following forms of disinfection are considered acceptable pursuant to Section 17(1) the MR 40/2007):

- Chlorine disinfection with 20 minutes of contact time under peak water demand conditions
- An alternative method (ex: ultraviolet (UV) light disinfection), or combination of methods of disinfection approved by the Office of Drinking Water

Section 21(1) of the Drinking Water Safety Regulation states that the minimum allowable disinfectant residual at the point where the water enters the water distribution system is

- 0.5 mg/L of free chlorine for water systems using chlorine; or
- 1.0 mg/L of monochloramine for water systems approved to use chloramines

Section 22 of the Drinking Water Safety Regulation states that the minimum allowable disinfectant residual at any point within a water distribution system is

- 0.1 mg/L of free chlorine for water systems using chlorine as the disinfectant; or
- 0.3 mg/L of monochloramine for water systems approved to use chloramines as the disinfectant

The [Drinking Water Safety Regulation Schedule A](#) states the minimum frequency of testing for disinfectant residuals. The frequency is based on the type of system ([ODW-OG-08 Types of Water Systems](#)), source water and population.

Monitoring and reporting requirements

All public water systems must test daily as water enters the distribution system (e.g., water leaving the treated water reservoir).

For water systems that report disinfectant residuals through continuous monitoring; confirmatory handheld measurements must be taken at the water treatment facility where the water enters the distribution system (e.g. water leaving the treated water reservoir) or at other locations directed by the regional drinking water officer.

Water suppliers are required to record disinfectant residuals on an approved [form](#) and, at the end of each month, submit the completed form to the regional drinking water officer.

Distribution system disinfectant residual testing is required periodically at the same times and locations as bacteriological samples are collected from the distribution system.

Water suppliers are to record distribution residuals on the bacterial sample submission form and on the monthly report form if applicable.

Monitoring and reporting requirements for approved alternative disinfectants are specified in the operating licenses of the specific water systems.

Approved alternate disinfectants

Pursuant to Section 17(1) of the Drinking Water Safety Regulation (MR 40/2007) the following alternative primary disinfectants have been approved:

- Ultraviolet light (UV)
Minimum dosage is specified in the operating licences along with monitoring requirements. Most newer UV systems display a UV dosage that can be recorded. UV units must be NSF or EPA certified. UV is typically used as an Additional Primary Disinfection Barrier,

- Chlorine Dioxide
Chlorine dioxide is a chemical disinfectant that is generated at the water treatment plant. Operating licences will indicate chlorine dioxide residual and monitoring requirements. Operating licences will also indicate limits for dosing chlorine dioxide that are designed to reduce the formation of disinfection by products. Maximum dosing level cannot exceed 1.2 mg/L.
- Ozone
Ozone is typically used as a pre-oxidant and is generated at the water treatment plant. Operating licences will indicate ozone residual and monitoring requirements. Ozone dosages may be limited if bromide is present in the source water to control the formation of bromate. .

Equipment Maintenance and Spare Parts

For all disinfectants, equipment and controls must be maintained in effective working order. Water systems reporting on a continuous bases require redundant chlorine analyzers to be in place to ensure continuous disinfection. All water systems must ensure spare parts including chemical pumps and UV bulbs etc. are on hand.

Office of Drinking Water

[Regional Drinking Water Officers](#) are available for operational and monitoring advice and to provide technical assistance.

After hours, please call the Environmental Emergency Response line at 204-944-4888 and ask for the on-call drinking water officer

For more information related to Manitoba's drinking water and how it is regulated visit: www.manitoba.ca/drinkingwater.