A guide for owners and operators of non-municipal year-round residential drinking water systems

Use this guide if you are an owner or operator of a privately owned drinking water system that supplies water to certain non-municipal year-round residential developments.

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A: Introduction

This guide outlines the responsibilities of owners and operators of drinking water systems that have their own source of raw water and that supply water to certain non-municipal year-round residential developments. These developments include apartment buildings, condominiums or townhouse complexes, private subdivisions, mobile homes and trailer parks with six or more private residences.

B: Does this guide apply to my drinking water system?

Answer these two questions.

1. Do you own or operate a non-municipal year-round residential drinking water system?

A non-municipal year-round residential system is a drinking water system that supplies water on a year-round basis to:

- a residential development with six or more private residences (e.g., apartment buildings, private subdivisions, condominiums, townhouse complexes, mobile home parks) or
- a trailer park or campground that supplies water year-round to six or more sites with water service hookup.

If you answered yes to question 1, go to question 2. If you answered no to question1, this guide does not apply to you.

2. Is your system excluded?

This guide **does not** apply if:

- you operate a seasonal drinking water system which does not operate for at least 60 consecutive days per year, or
- your drinking water system is connected to and obtains all of its water from a municipal residential drinking water system or another system that meets the testing and treatment requirements of *O. Reg. 170/03*. See *Section 5 of O. Reg. 170/03* for more details.

If you are still unsure if this guide applies to you, consult *O. Reg. 170/03* or call the Registration Help Desk at 1-866-793-2588 or email waterforms@ontario.ca.

C: Summary of requirements

Check that you have completed each of the steps in Table 1 to meet your drinking water system's requirements.

Table 1: Your drinking water system requirements

Requirement	Details
Registration	I have registered with the Ministry of the Environment and Climate Change. I provide any changes to the system's registration information to the ministry within 10 days.
Microbiological sampling/testing of raw water	I collect samples every month from each well in the system prior to any form of treatment, and submit them to a licensed laboratory for testing (*E. coli* and total coliforms only). These are only required for systems with a source that is ground water or GUDI.
Microbiological sampling/testing of the drinking water in the distribution system or plumbing	I collect and submit samples once every two weeks to a licensed laboratory for testing (unless I have an exemption from treatment, in which case, weekly sampling is required). • Testing for *E. coli* and total coliforms is required for all systems. • Heterotrophic plate count (HPC) must also be tested if the distribution system is required to have secondary disinfection (chlorine residual).
Chemical sampling/testing	I collect the following samples from the point where treated water enters the distribution system (treated water sampling location – see Figures 2 and 3): • At least once every 60 months for all organic and inorganic parameters listed in Schedules 23 and 24 of *O. Reg. 170/03* • At least once every 60 months for sodium and fluoride

Requirement	Details
	treatment equipment that includes a: • maintenance schedule and • statement confirming all equipment is being installed in accordance with the regulation. If alterations are made to the system, I ensure a new engineering evaluation report is prepared.
Record-keeping	For every required sample and operational test, I keep a record of the: • date • time • location • name of the person conducting the test • result of the test
Annual reports	I prepare an annual report every year. The report includes treatment chemicals used, any reports made to the ministry, test results, corrective actions, and major expenses. I send a copy to each designated facility my system serves and the interested authority for each system (if applicable).
Retaining reports and records	I make the documents below available free-of-charge during normal business hours at a location accessible to the public: • test results • any approvals and orders for my system • Engineering evaluation report • a copy of *O. Reg. 170/03* I keep these documents available for a minimum of two years. I keep other required documents regarding chemical

Requirement	Details
	sampling and corrective actions for a minimum of two, six or 15 years, depending on the type of document, as per the regulation.
Adverse test results and other problems	I report immediately adverse test results (e.g., low chlorine residual, UV issues and other problems related to improper disinfection) to authorities and take corrective action.

D: Getting started

Determine your drinking water source

It is important to know the sources of your water so you can apply the correct requirements. Sources of drinking water are:

1. Ground water - from secure wells
2. Ground water under direct influence of surface water (or GUDI) - refers to a well which may be subject to surface water contamination
3. Surface water such as lakes, rivers and streams
4. Transported water - treated water brought in from other regulated systems and stored on-site, e.g., cisterns

Figure 1 shows different types of drinking water sources.

Figure 1: Drinking water sources

Register your drinking water system

- Register your drinking water system with the ministry within 30 days of beginning operations. To register, complete the Drinking Water System Profile Information form.
- Email it to waterforms@ontario.ca or fax it to 416-314-8716.
- You will be sent a letter with your drinking water system number (DWS#) and category. Use this DWS# when filing out ministry and laboratory forms. Use your category to confirm what you are required to do.

Important!

- If you make any changes to your drinking water system or contact information, you must submit an updated Drinking Water System Profile Information form within 10 days of the change.
- Questions about registration? Call the Registration Help Desk at 1-866-793-2588 or send an email to waterforms@ontario.ca.

Select a licensed laboratory

- Regulated drinking water systems must have their water tested on a routine basis.
- Contact a licensed laboratory directly to arrange for testing of your drinking water samples.

Important!

- Be sure to ask the laboratory if they are appropriately licensed by the ministry for the specific testing you need. Some larger laboratories may be licensed for all of the required tests while others may be licensed to test for specific parameters.
- Before sending your samples to a licensed laboratory for the first time, you must submit the Laboratory Services Notification form to the ministry. This form lets the ministry know which licensed laboratory(ies) you have hired and the specific testing they do.
- If you change which laboratory you use, you must let the ministry know by submitting an updated Laboratory Services Notification form. If you don't, the ministry will not consider your test results and it may appear you are not meeting your legal requirements.

Tip:

- Provide the name of a back-up licensed microbiological laboratory on your Laboratory Services Notification form in case the primary laboratory encounters equipment or testing problems. By doing so, you save yourself some time by not having to fill out an updated Laboratory Services Notification form should you need to use your back-up laboratory.

Install treatment equipment for your system

You must ensure all treatment equipment is installed in accordance with *O. Reg 170/03* prior to operating. Treatment processes must also be in accordance with the ministry's Procedure for Disinfection of Drinking Water in Ontario.

You need to consult with a licensed engineering practitioner about the different types of treatment technologies available to meet your specific requirements. Your licensed engineering practitioner will advise you on the most appropriate technology for your system and prepare an Engineering Evaluation Report (EER).

Treatment basics

Appendix 1 has a basic summary of treatment processes that will reduce or eliminate the potential for the presence of pathogens (organisms that can cause illness) in your drinking water. Different water sources necessitate different levels of treatment.

Storage of transported water

If your system receives transported water, you must ensure the storage container (e.g., a cistern) is constructed and maintained in a manner that prevents surface water and other foreign materials from coming into contact with the treated water.

Have an Engineering Evaluation Report (EER) prepared for your system

To have an EER prepared for your system, you must retain a licensed engineering practitioner with experience in sanitary engineering related to drinking water systems.

1. **Find a licensed engineering practitioner**

   You may search for a licensed engineering practitioner through:

   - the Professional Engineers Ontario website or at 1-800-339-3716
   - the Consulting Engineers of Ontario website or at 416-620-1400

   A licensed engineering practitioner is a person who is:

   - fully licensed to practice engineering in Ontario or
   - allowed to practice engineering within a limited scope, including writing an EER or
   - a temporary license holder who has been licensed from another jurisdiction and is in Ontario to practice engineering for a specific period of time

2. **Have the practitioner assess your system**

   The licensed engineering practitioners will assess your system to determine the proper treatment needed to comply with the law. According to the *O. Reg. 260/08 Performance Standards under the Professional Engineers Act*, engineers must consider specific requirements when preparing an EER, such as:

   - Identifying the type of drinking water system
   - identifying source water information
   - including site plan and treatment diagrams, equipment manuals and equipment maintenance and inspection schedules
   - delivering the report in a timely manner

3. Have the practitioner prepare the EER

The EER must state:

- that the practitioner, or a person under their supervision, has visited your drinking water system
- in the practitioner's opinion, all equipment needed to comply with treatment requirements and with operational checks is being provided
- reasons for the practitioner's opinion
- the specific drinking water system category
- a maintenance schedule for equipment to be inspected, tested and replaced

If you believe an EER issued on or after July 1, 2014, does not meet the performance standards you may make a complaint via the Professional Engineers Ontario website.

Systems that receive water that is already treated from another supplier are not required to obtain an EER, including those that:

- receive all their water as transported water
- are connected to another regulated system (e.g. a municipal water supply that treats water in accordance with the requirements of O. Reg. 170/03) and do not re-chlorinate

An EER must be completed and submitted to you within 30 days after a new system begins operation or an alteration is completed on an existing system.

4. Submit EER Notice

You must submit written notice to the ministry within seven days of the day the EER is required using a Notice of Completion of an Engineering Evaluation Report. You must also give notice of any changes since the previous EER.

Tip:

Do not submit the actual EER to the ministry, just the notice.

The notice can be submitted via email to waterforms@ontario.ca. Keep the EER on file and make sure it is available upon request.

If your system serves a designated facility, you must also submit the notice form to the interested authority for the designated facility. The interested authority is usually the Ontario government ministry to which the designated facility is responsible, e.g., the Ministry of Health and Long-Term Care if it is a hospital. This rule does not apply to private schools, children’s camps or seniors’ residences.

If you require assistance with EER requirements, please call 1-866-793-2588 during normal business hours.

Ensure a certified operator operates your system

Day-to-day operation of your system must be carried out by a person who holds appropriate certifications. See the table below to find the minimum requirements a person must fulfill in order to operate your system.

Table 2: Requirements to operate a system

Type of System	Minimum Requirement
Non-municipal year-round residential	Limited Systems Operator
Large non-municipal non-residential	Limited Systems Operator
Small non-municipal non-residential	Trained Person
Non-municipal seasonal residential	Trained Person

In addition, a supervised person can test for chlorine residual and turbidity for the systems listed in Table 2.

Learn more about drinking water operations: training and certification.

E. Taking care of your drinking water system

Take drinking water samples for testing

Licensed laboratories must provide you with sample containers and instructions on how to collect, transport, and store samples taken from your drinking water system. Ensure you follow the lab instructions carefully.

Pay close attention to instructions on what temperature to keep your samples. For example, some samples may need to be kept in a cooler with ice packs when transporting them, but cannot be frozen.

See Appendix 2 for more information on sampling and testing.

Ensure required maintenance and operational checks are carried out

Proper day-to-day operation of your drinking water system is vital to protecting the health of the people who use it. The owner is responsible for confirming required operational checks are completed by a certified operator, as applicable.

Required maintenance and operational checks are determined by the type of drinking water treatment installed in your system and are typically specified in:

- *O. Reg. 170/03*
- your Engineering Evaluation Report (EER)

Important!

- It is a legal requirement to complete the required maintenance and operational checks found in **both** *O. Reg. 170/03* and your EER.

Operational test basics

Table 3 provides a summary of operational tests you must carry out on your system to comply with the law.

Table 3: Operational tests

Operational test	Additional details
Monitor raw water turbidity (only required for systems that have a ground water supply)	• A turbidity sample must be taken and tested every month from each well from a location before the raw water enters the treatment system.
Monitor filter effluent turbidity	• For systems that require filtration, you must take a turbidty sample from each filter effluent line. • Not needed if your system has continuous monitoring equipment.
Test turbidity	• Use a turbidity meter that measures in Nephelometric Turbidity Units (NTUs).
Monitor primary disinfection	• When chlorination is used for primary disinfection and continuous monitoring is not used, daily chlorine residual tests are required at a minimum. • Samples must be taken from a location where the required contact time has just been completed in accordance with the ministry's Procedure for Disinfection of Drinking Water

Operational test	Additional details
	in Ontario.
Monitor secondary disinfection	• If you are required to provide secondary disinfection, you must conduct at least two samples per week for chlorine residual in the distribution system at least 48 hours apart. • Samples should be taken randomly throughout the distribution system.
Test chlorine residual	• Use an electronic direct readout colourimetric or amperometric chlorine analyzer, or another device that a licensed engineering practitioner considers equivalent. • If you are using continuous monitoring equipment, ensure that requirements of *section 6-5 of O. Reg. 170/03* have been met.

Tip:

- See the ministry fact sheet Tips for Maintenance of Small Drinking Water Systems, for more details.
- If you use a UV unit for disinfection, see Using ultraviolet (UV) disinfection on drinking water systems.
- Ensure you follow the manufacturer's instructions for properly calibrating and cleaning your chlorine and turbidity kits.

Notify authorities of adverse test results

Adverse test results other than lead in plumbing

Adverse test results may indicate that the drinking water your system supplies is unsafe. Results that exceed any of the Ontario Drinking Water Quality Standards as well as other problems identified through testing could produce an adverse test result.

You may be informed about an adverse test result from:

- your licensed laboratory or
- a test result of a sample taken on-site (e.g., low chlorine residual) or
- if you observe that your drinking water system is providing water to users that has not been disinfected according to the ministry's Procedure for Disinfection of Drinking Water in Ontario (e.g. UV failure).

What to do if you have an adverse test result (includes lead from distribution, but not plumbing)

First: Make an immediate report

Immediately report the adverse test result or other problem to all of the following:

- your local medical officer of health or a person at the local public health unit, by speaking with someone in person or on the telephone.
- the ministry's Spills Action Centre (telephone 1-800-268-6060); the Spills Action Centre is open 24 hours/day and 365 days/year.
- a responsible individual at each designated facility served by your system (if applicable) by speaking with the individual in person or on the telephone if that individual is someone other than yourself.

Important!

- You must speak to someone in person or on the phone. Leaving a voicemail does not fulfill your requirement to make an immediate report.

Tip:

- Make contact information for the ministry's Spills Action Centre and your local medical officer of health easily accessible to anyone who may need it. Use this Drinking Water Contact List template to help.

Second: Deliver written notice

- Within 24 hours of giving the verbal notice, use the Notice of Adverse Test Results and Issue Resolution form to provide written notice to all of the following:
    - the local medical officer of health by fax or in person
    - the ministry's Spills Action Centre by fax at 1-800-268-6061
    - the operator of any designated facilities served by your system (if applicable) by fax or in person if that operator is someone other than yourself and
    - the interested authority for any designated facilities (if applicable) by fax.
- The above documents may be emailed if the recipient acknowledges the email.

Third: Deliver follow-up notice of corrective action taken

- Once you resolve the issue that gave rise to the adverse test result or other problem, complete and submit Section 2(B) Notice of Issue Resolution, on the same Notice of Adverse Test Results and Issue Resolution form.
- The follow-up written notice must summarize the action taken and the results achieved.
- Send the notice to all of the following:
    - the local medical officer of health, and the ministry's Spills Action Centre within seven days of resolving the issue

- the interested authority for any designated facility (if applicable) within 30 days.

Adverse test results for lead sampling from plumbing

- When a laboratory finds an adverse test result in a sample taken from plumbing done to meet lead testing requirements, the following notifications are required:
  - The laboratory is required to provide a written report (delivered in person, by fax or email) within 24 hours to the:
    - local medical officer of health
    - ministry's Spills Action Centre
    - drinking water system owner or operating authority and
    - the interested authority in the case of a designated facility (if applicable).
  - The drinking water system owner is required to:
    - give the local medical officer of health a copy of the report received from the laboratory within 24 hours of receiving the report.
  - The drinking water system owner or operating authority is required to:
    - give the occupant of the premises where a plumbing sample was taken a copy of all test results received from the laboratory within seven days of receiving the results from the laboratory
    - include if the results exceed any of the chemical standards in *Schedule 2 to Ontario Regulation 169/03*, the Ontario Drinking-Water Quality Standards.
    - include advice given by the public health inspector to the owner/operator about what steps the occupant should take to address the problem and a telephone number for enquires about the report
    - report adverse test results to owners of multi-residential buildings (e.g. apartment buildings or condominiums) where the sample was taken from a unit in the building within seven days of receiving the results from the laboratory.

Important!

- You must report all adverse results during and outside of the winter and summer sampling periods, as long as they are part of your lead sampling and were taken in accordance with the regulation.

Take corrective action if needed

- You must follow the proper set of corrective actions for a specified adverse result or problem as required by *Schedule 18 of O. Reg. 170/03* or *Section 7 of O. Reg. 243/07*, as applicable. Corrective actions set out in O. Reg. 170/03 are summarized in Table 4.
- In all cases, you must consult with the local medical officer of health and take any additional steps that the local medical officer of health directs you to take.
- For adverse test results for lead samples from plumbing, the local medical officer of health will direct what steps must be taken by owners and operators, and what information should be provided to occupants at the location where the adverse test result occurred on how to reduce any potential health risks.
- You can also contact your local Ministry of the Environment and Climate Change office for further advice on any adverse test results.

Important!

- For systems not currently using chlorine, take the corrective actions in the ministry's Procedure for Corrective Action for Systems Not Currently Using Chlorine if you have adverse microbiological results.
- For systems providing chlorination, please refer to *O. Reg. 170/03* for further details on specific corrective actions to be taken.

Table 4 provides the steps to take if your system has an adverse test result.

Table 4: Steps to take if you have an adverse test result

Adverse test result or other problem	First step	Second step	Third step
E. coli are detected in a test result from a drinking water sample.	Immediately notify users to use an alternate source of drinking water or, if no alternate source is available, bring water to a rapid boil for at least one minute before use.	Immediately resample and test Immediately increase the chlorine dose and flush the distribution system and plumbing to ensure that: • a free chlorine residual of at least 0.2 mg/L is achieved at all points in the affected parts of	Maintain the free chlorine residual or combined chlorine concentration in affected parts of the system and continue to resample and test until *E. coli* is no longer detected in two consecutive sets of samples taken 24 to 48 hours apart, or as otherwise directed by the local

Adverse test result or other problem	First step	Second step	Third step
		the distribution system and plumbing, if the system provides chlorination and not chloramination, or • a combined chlorine residual of at least 1.0 mg/L is achieved at all points in the affected parts of the distribution and plumbing, if the system provides chloramination.	medical officer of health.
Total coliforms are detected in a test result from a drinking water sample.	Resample and test as soon as reasonably possible.	If resample confirms total coliforms, immediately increase the chlorine dose and flush the distribution system and plumbing to ensure that: • a free chlorine residual of at least 0.2 mg/L is achieved at all points in the affected parts of the distribution system and plumbing, if the system provides chlorination and not chloramination, or	Maintain the free chlorine residual concentration in affected parts of the system. Continue to resample and test until total coliforms are no longer detected in two consecutive sets of samples taken 24 to 48 hours apart, or as otherwise directed by the medical officer of health.

Adverse test result or other problem	First step	Second step	Third step
		• a combined chlorine residual of at least 1.0 mg/L is achieved at all points in the affected parts of the distribution and plumbing, if the system provides chloramination.	
If secondary disinfection is required, free chlorine residual is less than 0.05 mg/L for systems that provide chlorination, or combined chlorine residual is less than 0.25 mg/L for systems that provide chloramination.	Immediately flush the distribution system and any plumbing, and restore secondary disinfection to ensure: • free chlorine residual level of at least 0.05 mg/L is quickly achieved at all points in the affected parts of the distribution system and plumbing, if the system provides chlorination and not chloramination, or • a combined chlorine residual of at least 1.0 mg/L is achieved at all points in the affected parts of the distribution and plumbing, if the system	If 0.05 mg/L of free chlorine residual cannot be quickly achieved at all points in the affected parts, immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use.	N/a

Adverse test result or other problem	First step	Second step	Third step
	provides chloramination.		
Sodium concentration that exceeds 20 mg/L and a report of an adverse test result has not been made in the previous 57 months.	Resample and test as soon as reasonably possible.	If resample confirms exceedance, consult with the local medical officer of health on further actions.	N/a
Water not disinfected properly is provided to users.	Immediately restore the disinfection, if possible, before notifying users.	Immediately take all reasonable steps to notify all users to use an alternate source of drinking water or, if no alternate source is available, bring water to a rapid boil for at least one minute before use.	N/a
If filtration is required, the turbidity in filter effluent is more than 1.0 NTU.	Immediately check the turbidity monitoring equipment and correct any problems identified. If no problems are identified: • immediately backwash the nearest filter upstream of the sample location, or • immediately replace the filter cartridges or filter elements of the nearest filtration	Immediately after the first step, resample and test. If resample confirms exceedance, immediately take all reasonable steps to notify users to use an alternate source of drinking water or, if no alternate source is available, bring water to a rapid boil for at least one minute before use.	Follow the manufacturer's recommendations for servicing the filtration equipment upstream of the location, and flush the distribution system and plumbing.

Adverse test result or other problem	First step	Second step	Third step
	equipment upstream of that location, and • immediately review other upstream operational processes and correct any faulty processes identified.		
Exceedance of a chemical or radiological parameter listed in *Schedule 2 or 3 of the Ontario Drinking Water Quality Standards Regulation (O. Reg. 169/03*), other than trihalomethanes. Presence of a pesticide over 100 ng/L as reported by the licensed laboratory.	Resample and test as soon as reasonably possible.	Consult with the local medical officer of health and take any steps directed by them, if the resample confirms: • an exceedance of a chemical or radiological parameter based on the standard in Schedule 2 or 3 of the Ontario Drinking Water Quality Standards, or • that a pesticide over 100 ng/L has been detected.	N/a

How to resample and test

For a microbiological parameter

You must immediately collect and transport a set of at least three drinking water samples for the parameter which caused the adverse test result to your licensed laboratory for analysis.

1. One resample must be from the same location as the adverse sample.
2. One resample must be from a location that is a significant distance upstream from the location of the adverse sample, where reasonably possible.
3. One resample must be from a location that is a significant distance downstream from the adverse sample, where reasonably possible.

For a parameter that is not a microbiological parameter

- Collect and transport a water sample for the parameter that produced the adverse test result to your licensed laboratory.
- The sample must be taken from the same location as the adverse sample.

Post warning notices

You must post warning notice approved by the Ministry of the Environment and Climate Change if:

- are required to notify users to use an alternate source of drinking water or, if no alternate source is available, to bring water to a rapid boil for at least one minute before use or
- are not currently meeting your sampling requirements or
- have not yet carried out required corrective actions.

How to get approved warning notices

- Call the Registration Help Desk at 1-866-793-2588 or your local ministry district office.

Tip:

- Until your warning notices have arrived, you can post any sign that states: "Public Notice: Do not drink this water" as an interim measure.

Where to post warning notices

- Warning notices must be posted in prominent locations where they are likely to be seen by people using water from the system.
- If the system serves any designated facilities, warning notices must also be posted at every entrance to every building or structure that is part of a designated facility.
- If you do not own or operate the designated facility, you do not have to post notices in the designated facility as above, but you must ensure that the operator of the facility is provided with:
    - sufficient copies of the warning notices and

    - instructions to post the warning notices as above.
- If you fail to post a warning notice at your drinking water system, a provincial officer, public health inspector or an officer or agent of the interested authority (if applicable) may do so instead.

Important!

- **Warning notices do not provide an exemption from testing or taking corrective action!** Warning notices are a temporary requirement meant to protect users of the system in the short term. The owner must still comply with testing and corrective action requirements as soon as possible, despite posting the warning notices.

Prepare an annual report and retain records

Prepare an annual report

- You must prepare an annual report each year.
- If your system supplies a designated facility, you must give a copy of the annual report to each designated facility it serves and, if applicable, to each interested authority. You do not have to give a report to the interested authority for a designated facility that is a private school, children's camp or seniors' residence.
- The annual report must cover the period from January 1 to December 31 in a given year.
- It must be prepared by February 28 of the following year.
- The annual report must include:
    - a description of the drinking water system
    - a summary of any adverse test result notices
    - a summary of all tests and their results, including for all lead testing
    - a summary of any corrective actions undertaken
    - a description of any major expenses for the system.

Retain records and reports

Keeping good records and reports is a vital step in demonstrating you are meeting Ontario regulations. Too often, drinking water system owners are in found in violation of the law for poor record-keeping practices.

Table 5 provides a short summary of the key records and reports you must keep, where and for how long. For a complete list, review Section 12 and 13, *O. Reg. 170/03*.

Table 5: Key records and reports

Keep records and reports related to	How long to keep (minimum)
• Required tests results • Operational test results • Maintenance • Adverse microbiological test results	2 years
• Any lead, nitrate, nitrite, trihalomethane and haloacetic acid test results • Annual reports	6 years
• Inorganic, organic, sodium and fluoride test results • Any engineering evaluation reports (EERs). Keep at a location where the reports can conveniently be viewed by an inspector • Any professional engineer or hydrogeologist reports related to the source of a system's raw water supply • Any Ontario Water Resources Act approval issued after August 1, 2000	15 years

You must make a copy of these documents available free of charge to the public upon request at the facility during normal business hours:

- A copy of *O. Reg. 170/03*
- The following documents, if they are two years old or less:
    - Test results that are required under *O. Reg. 170/03* or by an approval or order,
    - All orders or approvals related to your system
    - Engineering evaluation reports
    - Annual reports

Tip:

- "Test results" include both the request for testing (your Chain of Custody forms) and the results you get back from the laboratory (your Certificate of Analysis)
- Where continuous monitoring equipment is used, only the daily minimum, maximum and mean results need to be available.
- Learn more about taking a drinking water sample for testing.

F: Inspection and enforcement

A water inspector will inspect your system to ensure you are meeting your regulatory requirements to help protect the people who are drinking from your system. In order to be ready for an inspection, keep your records, policies and procedures organized and available. This will keep the inspection time to a minimum.

Drinking water quality and enforcement results are published on Ontario's Open Data Catalogue.

Remember, this guide is not legal advice.

Nor is it a substitute for reading the legislation or regulations, which are subject to change. To be clear about your specific obligations, refer to the current version of the *Safe Drinking Water Act, 2002* and relevant regulations, including the *Drinking Water Systems Regulation (O. Reg. 170/03)*. If you are unable to access these online call our Registration Help Desk at 1-866-793-2588. If you have legal questions about the regulations or legislation, you should consult a lawyer.

G. Who can I contact for more information?

If you would like more information related to drinking water, please visit Ontario.ca or contact your local inspector or the Registration Help Desk at 1-866-793-2588 or send an email to waterforms@ontario.ca. You can also sign up for drinking water updates by sending an email to drinking.water@ontario.ca and requesting to be added to the mailing list.

Glossary

Chloramination: combined chlorine residual disinfection where the combined chlorine residual is predominately in the form of monochloramine; ("chloramination").

Chlorination: using chlorine to treat drinking water.

Chlorine residual: the amount of chlorine that can still be measured after it has reacted with impurities present in water after a certain period of time. Systems receiving chlorinated water measure free chlorine residual.

Continuous monitoring equipment/analyzer: a device that automatically tests for a specific parameter in water with at least the minimum required frequency.

Cryptosporidium oocysts: a type of parasite known to cause illness in humans.

Designated facilities: provide water to people who may be more susceptible to becoming ill, especially children, the elderly, and patients.

Distribution system: the part of a drinking water system used to circulate or store water (not part of the treatment system).

***E. coli*:** bacteria found in animal and human waste. Most *E. coli* are harmless, however, some can cause severe illness and even death.

Giardia cysts: a water-borne parasite that infects the small intestine.

GUDI: short form for "groundwater under direct influence" of surface water and refers to a well which may be subject to surface water contamination.

Heterotrophic plate count (HPC): a measure of organisms, such as bacteria in water, which gives an indication of overall water quality in drinking water systems.

Microbiological: referring to small forms of life such as viruses and bacteria.

Nephelometric Turbidity Units (NTUs): indicate the amount of turbidity through a measurement of scattered light through a water sample.

Nitrates and nitrites: chemical substances found in nature (e.g., soil and foods). Excessive concentrations in drinking water can be hazardous to health, especially for infants and pregnant women.

Parameter: a substance that is sampled and analyzed.

Raw water: source water prior to treatment.

Total coliforms: bacteria found in animal and human waste as well as plants and soil. Their presence in drinking water can possibly indicate the water was not treated properly and is unsafe to drink.

Trihalomethanes (THMs)/Haloactetic acids (HAAs): a group of chemicals that can form when chlorine is added to water. These can harm people's health if a high level is consumed over a long period of time.

Turbidity: "cloudiness" caused by particles in water such as soil. The cloudier the water, the greater the turbidity. It is measured in nephelometric turbidity units (NTUs).

Virus: an infectious agent that can only replicate inside another living being.

Appendix 1: Treatment methods

Filtration of raw water removes particles that may hide or protect pathogens such as viruses, bacteria and protozoa, and helps ensure effective primary disinfection can be carried out.

Primary disinfection inactivates/removes pathogens before water is delivered to the public. Depending on the raw water source's quality, this usually is accomplished by:

- filtration and chlorine or
- filtration and ultraviolet (UV) light
- filtration, UV light and chlorine or
- chlorine only

See the following table for treatment requirements based on your source of water.

Table 6: Treatment requirements depending on the source of your water

Water Source	Treatment Requirements
Ground water	• Treatment equipment must achieve primary disinfection at all times • Must remove or inactivate at least 99 per cent of viruses in accordance with the Procedure for Disinfection of Drinking Water in Ontario
Surface water or GUDI	• Treatment equipment must achieve primary disinfection at all times • Must remove or inactivate 99 percent of Cryptosporidium oocysts, 99.9 per cent of Giardia cysts, and 99.99 per cent of viruses in accordance with the Procedure for Disinfection of Drinking Water in Ontario

Secondary disinfection introduces and maintains a chlorine residual in your distribution system to protect the drinking water from microbiological recontamination or bacterial regrowth.

- Secondary disinfection is needed when water is transmitted to a second building through underground piping.
- An alternative to providing secondary disinfection is to install point-of-entry (POE) treatment units (e.g., UV units with cartridge filters) on the plumbing of every building or other structure that is part of a designated facility served by the system. *Schedule 3 of O. Reg. 170/03* provides a detailed explanation of POE system requirements that may allow you to be exempt from secondary disinfection.

Treatment exemptions

Treatment exemptions for ground water wells

You may be able to obtain exemptions from the treatment requirements if:

- your system uses ground water as a raw water supply, and
- does not serve a designated facility.

  To be eligible, submit a Well Technician's Notice signed by one of the following:

  - a person who holds a well technician license for well drilling
  - a licensed engineering practitioner
  - a hydrogeologist, or
  - a certified engineering technologist who has experience in ground water supply.

One of these experts must have assessed your well and confirmed that it meets the key factors listed on the form and subsection 2-12 (1) of *Schedule 2 of O. Reg. 170/03*.

The Well Technician's Notice must be accompanied by a written notice from you (the system owner) confirming that you have complied with microbiological testing requirements according to the regulation for the past 12 months, and that no raw water samples and no resamples of drinking water from the distribution system or plumbing indicated the presence of *E. coli* or total coliforms during that period.

For a new system, the Well Technician's Notice can be submitted prior to commencing operation of your system. In this case, your written notice confirming microbiological test results would not be required until the end of the month following the first anniversary of the day the system commenced operation. For example, if the system commenced operations on June 14, 2015, the notice of microbiological test results would be required on June 30, 2016. Installation of treatment equipment would not be required during that time.

Submit the notice either via email to waterforms@ontario.ca or by fax to 416-314-8716.

Reduced treatment for GUDI systems

If your drinking water system is served by a well that is GUDI, it is normally considered as surface water and you are required to provide chemically assisted filtration and disinfection or equivalent treatment. However, if your well is considered to be a secure well, you could be eligible for reduced treatment if:

- your system does not serve a designated facility and
- you have submitted a Well Technician's Notice to the ministry and a written notice confirming microbiological test results are negative as described above for ground water wells.

When a treatment exemption is no longer valid

Your exemption is no longer valid if either of the following is detected in any corrective action resamples of drinking water from the distribution system or plumbing:

- E. coli or
- Total coliforms on any two separate occasions within a 12 month period.

You will have 90 days to install the full treatment required by the regulation.

See also Treatment Options for Owners of Non-Municipal Year-Round Residential Drinking Water Systems.

Appendix 2: Sampling and testing

Whenever a sample is collected, the person taking the sample must record the following both on the Chain of Custody form supplied by your lab and for your own records: date, time, location where it was taken, sampler's name, and chlorine residual.

The laboratory's Chain of Custody form will be customized for your drinking water system and sent with the sampling containers. Once the samples are submitted to the licensed laboratory, lab staff will record details of the samples (i.e., date/time the samples were received, analysis and testing details, final test results, etc.).

Tip:

- Find more information about completing a Chain of Custody form
- Ask a local water inspector for available tools to help you keep track and record your required sampling. Customized templates are available for your use.

O. Reg. 170/03 has requirements for sampling of raw, treated, and distribution system water. Figure 2 shows the location of where you would take raw, treated and distribution samples in a single building.

Figure 2: Example of sampling locations: treatment and distribution/plumbing in one building

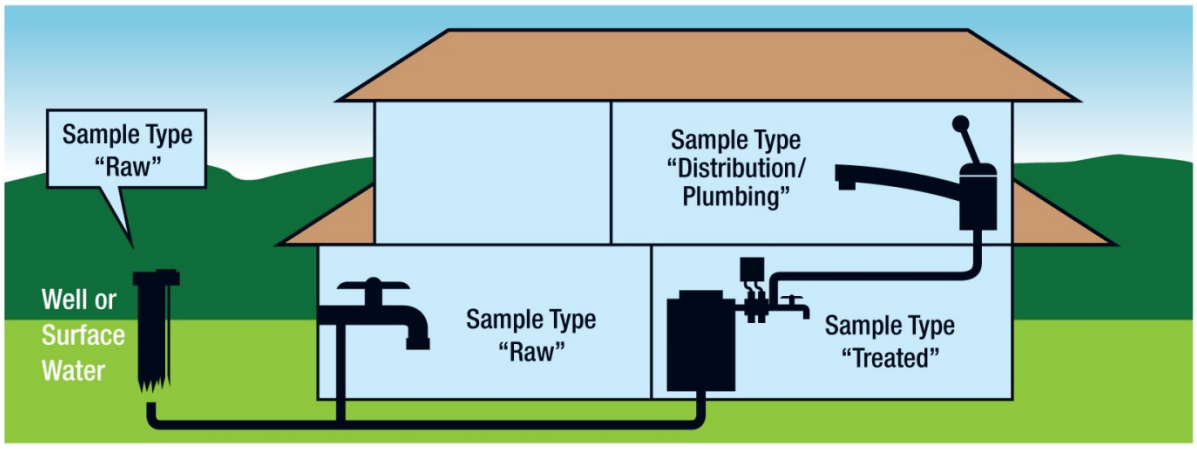
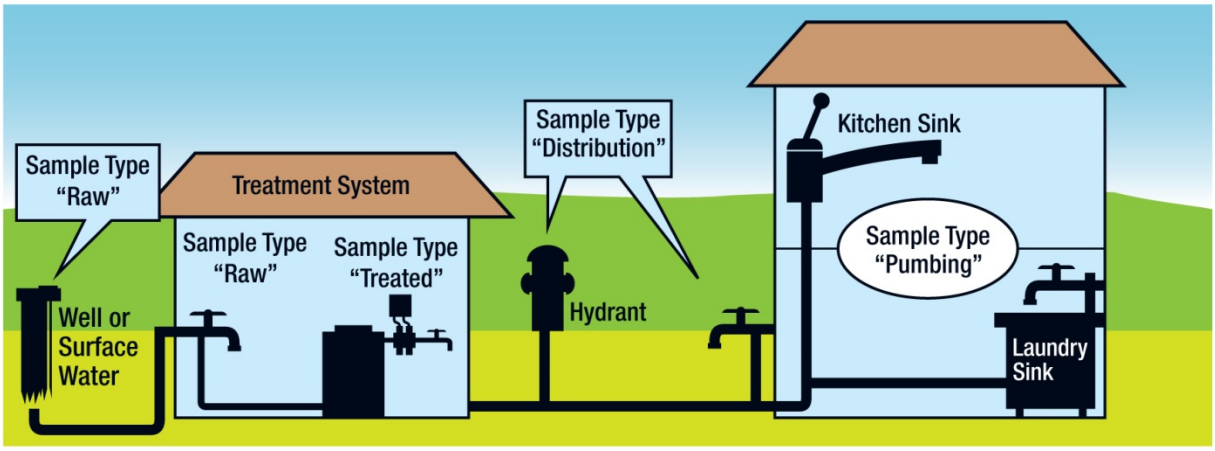


Figure 3 shows sampling locations in separate buildings.

Figure 3: Example of sampling locations: treatment and distribution/plumbing in separate buildings



When microbiological sampling should start:

- Existing systems should already be sampling their water
- New systems must begin sampling as soon as they start operating and soon as the Laboratory Services Notification form is submitted to the ministry
- If you have stopped operating your system for seven or more days, you must submit samples to your licensed laboratory and receive the results prior to supplying drinking water to users once you start your system back up

You must send raw and distribution system water to be tested for microbiological sampling. Table 7 shows how frequently these samples must be taken.

Table 7: Microbiological sampling and testing requirements

Samples	Frequency
Raw water samples for ground water and GUDI	• At least once a month (at least 20 and not more than 40 days apart) from each well
Raw water samples for surface water	• None required
Raw water samples for transported water	• None required • You must ensure the storage container that receives the water (e.g., a cistern) is constructed and maintained in a manner that prevents surface water and other foreign materials from coming into contact with treated drinking water.
Distribution samples (drinking water taken	• At least once every two weeks or • At least once a week if you have an exemption from

Samples	Frequency
from distribution or plumbing fixtures such as taps)	treatment
Distribution samples for point-of-entry (POE) treatment	• You must take these samples on a rotating basis • A sample must be taken downstream of every POE treatment unit the system supplies, at least once every 24 months

Important!

If your drinking water system is using chlorine, then you must also sample and test for chlorine residual using the appropriate analyzer to monitor disinfection at the same time and location your microbiological distribution samples are taken. You need to be an operator, trained person or supervised person to take a chlorine residual. You must record the chlorine residual value clearly on the Chain of Custody form provided by your licensed laboratory. In the event there is a microbiological adverse test result, you and the laboratory are required to tell the ministry and the local medical officer of health what chlorine level was recorded on the form.

What licensed laboratories test your microbiological samples for:

They test for the following bacteria:

- E. coli
- Total coliforms
- Heterotrophic plate count (HPC) - only for distribution samples and if the distribution system is required to have secondary disinfection

When you do not have to take microbiological samples:

If your system is:

- not operating for seven days in a row or more, or
- supplying water for seven or more days in a row to five or fewer private residences all of which are occupied by the system owner or their family, or by the system owner's employees, agents or their families.

When chemical sampling should start

New systems must start sampling in their first year of operation, according to the frequencies described in the following table.

Table 8: Chemical sampling and testing requirements (other than lead)

Samples	Frequency	Where to sample
• All organic and inorganic parameters listed in *Schedules 23 and 24 of O. Reg. 170/03* • Sodium and fluoride	• At least once every 60 months (not more than 90 days before or after the date of the last sample taken five years prior)	• A point where water enters the distribution system or plumbing connected to the drinking water system. i.e. treated as per Figures 2 and 3.
• Nitrate and nitrite	• At least once every three months (at least 60 and not more than 120 days apart)	• A point where water enters the distribution system or plumbing connected to the drinking water system. i.e. treated as per Figures 2 and 3.
• Trihalomethanes or THMs (only if your system provides chlorination or chloramination)	• At least once every three months (at least 60 and not more than 120 days apart)	• From a location that is likely to have an elevated potential for the formation of trihalomethanes (e.g., the ends of the lines or the furthest point in the distribution system).
• Haloacetic acids or HAAs (only if your system provides chlorination or chloramination)	• At least once every three months (at least 60 and not more than 120 days apart)	• From a location that is likely to have an elevated potential for the formation of HAAs (e.g., at the beginning of the distribution system).

Lead sampling and testing requirements

There are two kinds of lead sampling: standard sampling and reduced sampling.

Standard sampling

When to sample

- Sample twice a year:
    - once between December 15 and April 15 (winter sampling period) and
    - once between June 15 and October 15 (summer sampling period).
- If you start operating a new system during a sampling period, start sampling during that period.
- If you start operating a new system in between the sampling periods, start sampling during the next sampling period after start-up.

Sampling points and locations

- Samples must be taken from a mix of three types of locations, as applicable:
    1. Plumbing serving private residences, including single family homes and individual units within multi-unit residential buildings
    2. Plumbing serving non-residential buildings, including commercial and industrial properties, designated facilities and public facilities, and
    3. Distribution system or, if no distribution system, from plumbing where necessary to do so

The minimum number of sampling locations depends on the population served by your drinking water system, outlined in Table 9.

Table 9: Standard sampling - minimum number of sampling points by location type

Population served by drinking water system	In plumbing serving private residences	In plumbing serving non-residential buildings	In distribution system
1-99	5	1	1
100-499	10	1	2
500-3,299	20	2	4

- For larger populations please consult the regulation.

Important!

If you cannot secure the required number of sampling points, you can apply for relief from this requirement. Learn more about regulatory relief from lead sampling.

Selecting where to take plumbing samples

- The occupant of the premises must give consent to sampling.
- Samples must be taken from:
    - plumbing that is connected or suspected of being connected to lead service pipes or
    - lead plumbing or plumbing that is suspected of being lead plumbing.
- If this is not reasonably possible, samples may be taken from:
    - plumbing connected to service pipes that are not lead but have lead solder or
    - plumbing that is not lead plumbing but has or is suspected of having lead solder.
- If no such plumbing exists, samples may be taken from any other plumbing connected to the system.
- Samples must not be taken from more than one point in the same building, unless your system serves fewer buildings than the number of samples required for standard sampling.
- If your system serves fewer than 100 people and has less than five buildings, take one lead sample per building, even if this number is lower than the minimum number of required samples.
    - For example, if your system serves only three buildings with private residences, take one sample per building for a total of three samples.
- If your system serves 100 or more people and the number of buildings served is less than the minimum number of required samples, more than one sample can be taken per building to meet the requirement.
    - For example, if your system serves 200 people, you are required to sample plumbing in 10 private residences. If your system only serves three buildings with private residences, you can sample from more than one location per building to meet your requirement of 10 samples.
- If possible, plumbing samples must be geographically dispersed.
- All samples must be collected from a cold water tap.
- Samples are to be collected from a kitchen tap if the building has a kitchen tap, or a tap commonly used to provide water for human consumption if the building has no kitchen tap.

How to take samples from plumbing

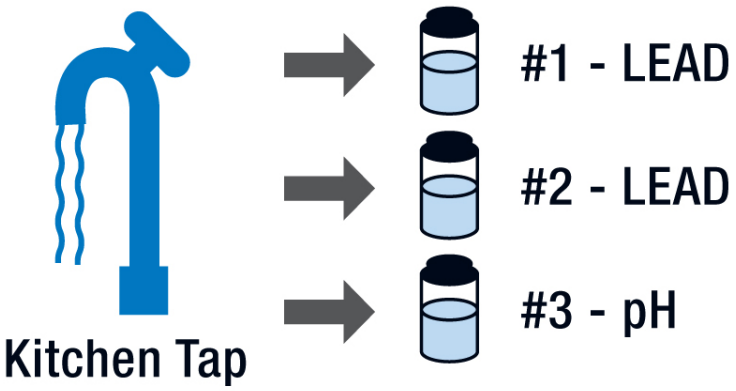
- Before taking your samples:
    - If an aerator is installed on the tap, do not remove it.
    - If a treatment device, for example a filter, is installed on or at the tap, bypass the device without removing it if possible.
    - If bypassing is not possible:
        - use another kitchen tap or one used to provide water for human consumption, or
        - remove the device before flushing and sampling the tap.
- Turn on the cold water tap for at least five minutes to flush. The intent of this flushing is to replace the stagnant water in the plumbing with fresh water from the water main. You may need to flush longer than five minutes if the sampling tap is located a far distance from the street.
- Once flushing is complete and the tap is turned off, the plumbing must not be used for 30-35 minutes. After this time period has passed, the samples can be taken.
- Take two one-litre samples to send to a licensed laboratory for lead testing and then one sample for pH testing to be tested on-site.
- Take the samples in the following sequence:
    - Put a sampling container for the first one-litre sample under the tap and turn the tap on so that water flows into the container at a rate that is similar to normal use of the tap. Make sure the water doesn't splash out of the sampling container. The first one-litre sample must include the first water that comes out when the tap is turned on after the plumbing was not used for 30 to 35 minutes. This sample must be clearly marked as the first sample.
    - Take the second one-litre sample immediately after the first sample (clearly mark it as the second sample) and the third sample immediately after the second sample without turning the tap off or changing its flow rate, and with as little as possible spillage between the samples.
- Conduct a pH test on the third sample immediately on-site. The pH test results must be given with at least two significant digits (e.g., pH 7.4 or pH 7.0 but not pH 7).
- Record the sampling details for the first and second litre samples on the Chain of Custody form provided by the laboratory.
- Record the pH results for your system's records. These results are not sent to the laboratory but must be kept and provided if requested by a provincial officer.
- Send the send the first and second one-litre samples to your licensed laboratory for testing. Follow any sample handling and transport directions provided by the laboratory.

Tip:

- pH testing must be done using a proper device. Litmus strip paper is not acceptable.
- You may use multiple smaller size bottles if provided by the laboratories.

Figure 4 shows the types of plumbing samples required for testing.

Figure 4: Plumbing samples



Selecting when and where to sample from distribution systems

- Distribution system samples must be taken on the same day when plumbing samples are taken.
- Distribution samples must be taken from locations as close as reasonably possible to the locations where plumbing samples are taken.
- Do not use points in the distribution system where lead levels are likely to be elevated due to materials used in plumbing fixtures or other appurtenances. You want your samples reflect the quality of water provided to buildings served by the system.
    - For example a hydrant may not be suitable point of sampling if the hydrant is made of lead-based materials.
- Other sampling locations can include distribution sampling taps or, if none of these is available, use plumbing taps that best represent the water quality in the distribution system.
    - If using plumbing taps, take the sample immediately after flushing the tap to ensure the quality of water sampled is representative of the water in the distribution system.

How to take samples from distribution systems

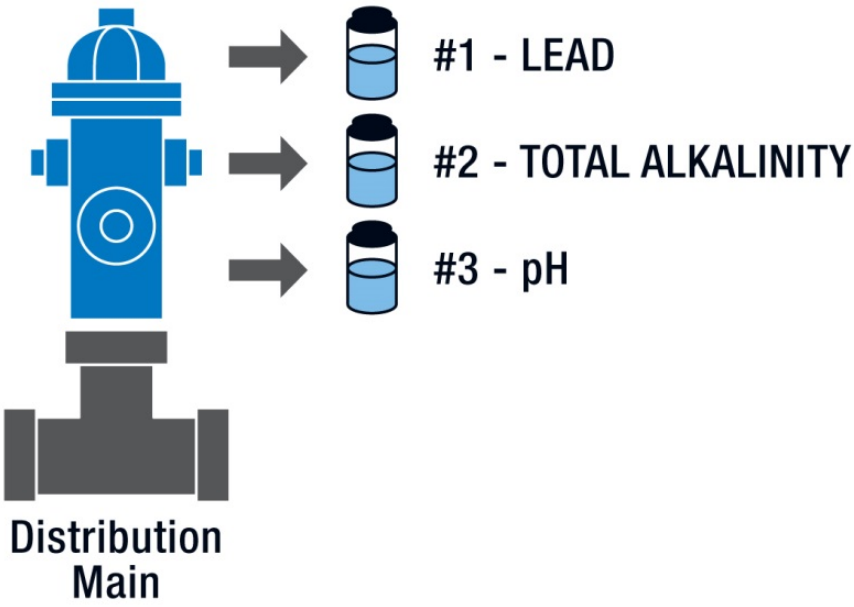
- Flush the point from where samples are to be taken until the quality of the water at that point is representative of the quality of the water in that part of the distribution system.
- Take three samples of the water from the sampling point:
    - First sample for lead testing
    - Second sample for total alkalinity testing
    - Third sample for pH testing
- These samples may be of any volume specified by the licensed laboratory.
- Following the collection of the three samples, conduct the pH test immediately on the third sample.
- Record the sampling details for the first two samples on the Chain of Custody form that the laboratory provides.
- Send the first sample for lead testing and the second sample for total alkalinity testing to the licensed laboratory.
- Record the pH results for your system's records. These results are not sent to the laboratory but must be kept and provided if requested by a provincial officer.

Tip:

- There is no legal requirement for alkalinity to be tested by a licensed laboratory. This test may be conducted by a licensed laboratory or by a certified operator, water quality analyst or a person who, in the preceding 36 months, has successfully completed a course approved by the ministry that relates to the operation and maintenance of drinking water.

Figure 5 shows the types of distribution samples required.

Figure 5: Distribution samples



Who can take the lead samples and conduct pH tests

The sample collection and pH testing for lead must be done by a person with any one of the following qualifications:

- a certified operator
- a water quality analyst
- a trained person or supervised person.
- a medical officer of health or a public health inspector (as defined in the *Health Protection and Promotion Act*).

Reduced lead sampling

- The standard for lead is 0.010 milligrams per litre which is equivalent to 10 micrograms per litre.
- A system serving a population of less than 50,000 people may be able to reduce the number of sampling locations and the frequency of sampling and testing if:
    - in two consecutive winter and summer sampling periods done over one year, not more than 10 per cent of all plumbing sample results exceed 5 micrograms per litre and no individual plumbing sample results exceed 10 micrograms per litre, or
    - in four consecutive sampling periods (two winter and two summer) not more than 10 per cent of all plumbing sample results exceeded 10 micrograms per litre.

- Of the two samples taken for lead sampling from each sampling point in plumbing, the sample with the highest result will be the one considered for the purpose of qualifying for reduced sampling.
- If your system meets the criteria for reduced lead sampling, your testing frequency drops to two consecutive sampling periods (one winter and one summer) once every three years.
- The number of locations is reduced as shown in Table 10.

Table 10: Reduced sampling – minimum number of sampling points by location

Population served by drinking water system	In plumbing serving private residences	In plumbing serving non-residential buildings	In distribution system
1-99	3	0	1
100-499	5	1	1
500-3,299	10	1	2

- For larger populations please consult the regulation.

When reduced sampling would no longer apply

- The system must revert back to standard sampling if more than 10 per cent of all the plumbing samples taken during any sampling period (winter or summer) exceed the standard for lead.
- Of the two samples taken for lead sampling from each sampling point in plumbing, the sample with the highest result will be the one considered.

Exemption from lead sampling in plumbing

- Your drinking water system is eligible for an exemption from lead sampling in plumbing if:
    - Your system serves less than 50,000 people
    - You are already doing reduced sampling or have been doing plumbing sampling according to an approved relief granted by the ministry, and
    - Not more than 10 per cent of plumbing results exceeded the lead standard from two consecutive reduced sampling periods (both winter and summer).
- Ministry approval is not required for this exemption. It is automatic once the test results have been submitted to the ministry. Once exempt, if future changes impact water chemistry, lead testing in plumbing could be reinstated by the ministry.

Important!

- Even if you receive an exemption from lead sampling in plumbing, you are still required to complete your distribution sampling as follows:
    - Sample for pH and alkalinity every winter and summer sampling period
    - Sample for lead once every three years, both winter and summer sampling periods.

Reporting of lead results

- Owners must record and submit to the ministry the number of points sampled and the number of points where samples exceeded the standard as part of their annual report.

Important!

- Lead samples that are taken outside the sampling period but in accordance with *Section 11 (6) of O. Reg. 170/03* and which have adverse test results must be reported as part of your annual report results.