7

ENERGY SAVING GUIDE:
Energy saving solutions for home comfort

Water heaters

Manitoba Hydro

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3. Attic insulation
4. Wall insulation
5. Doors & windows
6. Heating systems
7. Water heaters
8. Indoor air quality & ventilation
9. Energy savings tips

BOOKLET #7

7

Water heaters

Important Notice

Care has been taken to ensure the accuracy of this booklet. However, because of changing codes, standards and equipment design, you should seek professional advice before you modify or replace the water heater in your home. Manitoba Hydro cannot assume responsibility for injury, loss or damage that results from relying solely on the information contained in this booklet.

Contents

Introduction

Who should read this booklet

Water heating is the second largest energy use in most homes. This booklet contains valuable advice for both first-time and experienced homeowners on how to improve the performance and safety of water heaters.

Use this illustrated guide to learn how to:

- maintain your home's water heater between regular service visits by a heating contractor;
- make improvements to reduce water heating bills;
- deal with a water heater that needs to be replaced;
- care for a new water heater; and
- select and work with a contractor.

This booklet concentrates on storage-type water heaters, which are the most common system used in Manitoba. Other hot water options available include:

- tankless water heaters, which heat water as needed but have no storage tank;
- combination hot water systems that use either a boiler or high capacity storage water heater to provide both space and water heating; and
- solar water heaters, which use a conventional size storage water heater for back-up.

How to use this booklet

Before you undertake any work discussed in this publication, read the instructions carefully. If you are unsure how to do something, ask a contractor who installs and services water heaters to show you the correct procedure. Only perform tasks that are within your level of expertise.

If you want to modify or replace your home's water heater, consult a licensed contractor. It can be dangerous or even illegal to do otherwise.

If your water heater develops a leak or stops working, you'll probably need to find help in a hurry. Consult the section **Choosing an experienced and reliable contractor** if you find yourself in this situation.

Water heaters

Maintenance tips

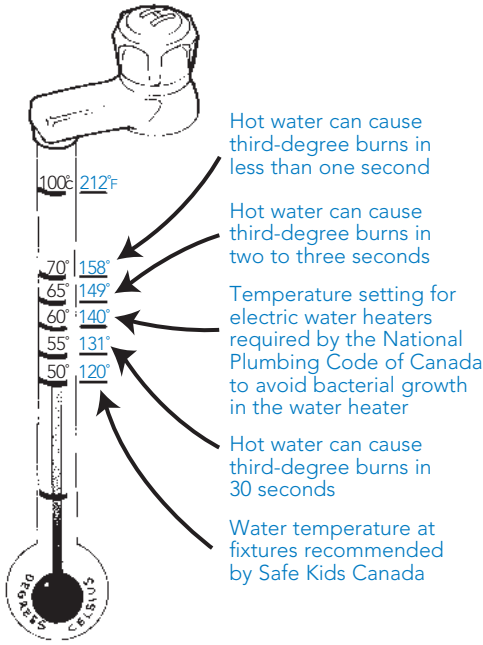
Ask your heating contractor to inspect your water heater as part of an annual visit to service your home's furnace or boiler. Between these visits, perform a few basic tasks to maintain the safety and performance of your water heater.

Measure whether the water temperature is too high or too low

Too high a temperature setting creates problems:

- Energy bills will be higher than necessary and the water heater won't last as long as it should.
- More importantly, excessively high water temperatures can cause serious burns within seconds (see **Figure 1**). Infants, small children, the elderly, and disabled persons are especially susceptible to hot water burns. See **Figure 1** to learn more about recommended water temperatures.

Figure 1 • Water temperature chart



Too low a setting also creates problems:

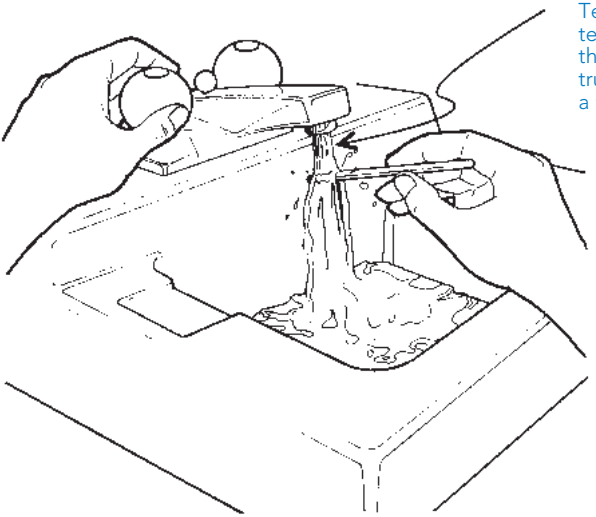
- It may cause a shortage of hot water during periods of heavy use.
- Low water temperatures may result in poor performance from your clothes washer and dishwasher.
- Bacterial growth in some water heaters, especially electric models, create a health concern if the water temperature is too low.

People with a weakened immune system, lung/respiratory problems, or organ transplants should check with their doctor before reducing the temperature of the water in their homes.

To find out whether your water heater is set too high or too low, run hot water from the kitchen faucet for two minutes. Measure the water temperature with a reliable thermometer – a candy or meat thermometer will do. Repeat the test with the bathroom faucets (see **Figure 2**). To avoid a misleading measurement, make sure a major use of hot water has not occurred for at least three hours.

Opinions vary on what the hot water temperature should be in a home. For example, manufacturers of clothes washers and dishwashers usually recommend a setting of 60°C (140°F). However, with today's improved detergents, the slightly lower temperatures recommended are more than adequate in most homes. Your dishwasher may even have a heater to boost water temperatures (check your owner's manual).

Figure 2 • Test the water temperature



Test hot water temperature at the taps – don't trust settings on a water heater

Water burn prevention

Besides making sure that your water heater isn't set too high, follow these common sense practices:

- Always test the water temperature before placing a child, or yourself, in a bathtub or shower.
- Never leave an infant or small child alone in a bathtub or shower. Many children are burned when they accidentally turn on the hot water.
- Be careful if the faucets or showerheads in your home are prone to a sudden increase in water temperature when cold water is drawn elsewhere. Remind your family to be especially careful when someone is showering. Talk to your plumber about installing a pressure-balancing tub and shower valve to eliminate this problem.

Drain water to reduce sediment build-up

Sediment can collect on the bottom of a water heater tank. This can reduce the efficiency of the water heater and may shorten its life. Sediment can also promote the unhealthy growth of bacteria, especially in an electric water heater.

To drain the sediment, consult your owner's manual or talk to your plumbing contractor.

Be aware of safety hazards

Water heaters that use natural gas, propane, or oil need an unobstructed supply of air to operate safely. Keep the area around the water heater free from clutter. At least twice a year, vacuum the area to remove dust and dirt. Be careful not to blow out the water heater's pilot light with the exhaust from the vacuum cleaner.

Don't store or use flammable liquids near the water heater. Vapour from these liquids can explode if ignited by the pilot light or burners.

All new natural gas and propane domestic hot water heaters are constructed with "flammable vapor ignition resistant" (FVIR) technology, which is intended to prevent or minimize the risk of ignition of flammable vapors which may occur near the water heater.

Also, be extremely careful when using flammable liquids elsewhere in your home. Contact your local fire department for advice. The vapours could find their way to the water heaters, furnace or other igniter source in your home. Aftermarket water heater insulating blankets are not recommended for fuel-fired

water heaters because they could slip and block the air inlet for the burners and pilot light, the temperature and pressure relief valve, or the drain tap.

Combustion gases from natural gas, propane, or oil-fired water heaters can sometimes escape into a home rather than exit through the chimney. Indicators of backdrafting include:

- unusual combustion odours, especially when the water heater starts up;
- condensation or rust on the vent from the water heater;
- soot discoloration or other signs of overheating on top of the water heater.

For an added measure of safety, ensure that your home is equipped with a carbon monoxide (CO) detector certified to the Canadian Standards Association (CSA) 6.19-M standard.

These devices will sound an alarm if the CO inside your home reaches a dangerous level.

Although CO detectors aren't a substitute for the proper installation and maintenance of a natural gas, propane or oil-fired water heater, they do provide a second line of defence.

For more detailed information about carbon monoxide detectors or identifying and correcting backdrafting or spillage, call Manitoba Hydro for a copy of **Booklet #6: Heating systems**. Also, call us for a copy of our brochure on **Carbon monoxide safety**.

How to reduce your water heating bills

There are several no-cost and low-cost actions you can take to lower water heating costs. Many of these improvements have the added benefit of reducing your water and sewer bills.

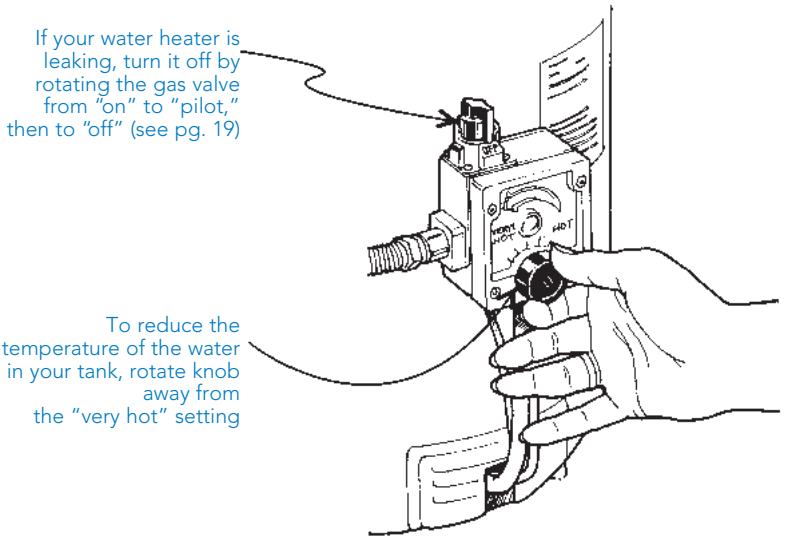
Adjust the water temperature

Set your water heater to the correct temperature to reduce heat loss from the tank and prolong its life.

Instructions on adjusting the water temperature should be in the owner's manual or on the tank itself. If you can't find the instructions, ask your heating contractor to show you how to adjust the water heater as part of their annual servicing or use the following guidelines:

Natural gas, propane, and oil water heaters: Adjusting the temperature setting on these types of water heaters is easy. Simply rotate the temperature control away from the "very hot" setting. To learn more about adjusting the temperature of your gas water heater see **Figure 3**.

Figure 3 • Adjusting the temperature of a gas water heater



Electric water heaters: Adjusting the temperature of an electric water heater may be more difficult because it generally requires removing safety covers and exposing exposed electrical connections. This work should be handled by someone who is trained to do this work.

Install water-saving showerheads

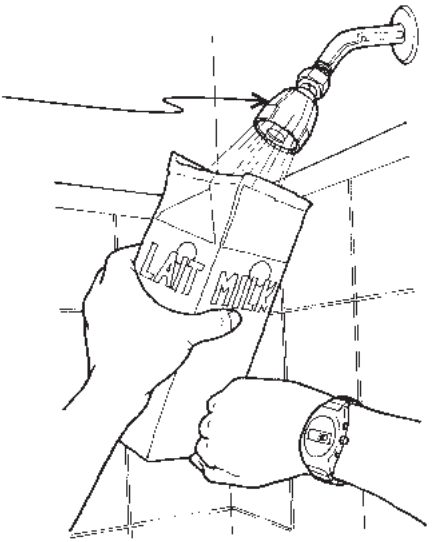
Showers are the single largest user of hot water for most families. Installing a water-saving showerhead (which are 1.5 gallons per minute or less) is easy, inexpensive, and an excellent investment.

Measure the flow rate of your current showerheads as shown in **Figure 4**. Use the cold water to avoid burns.

Figure 4

Replace an existing showerhead with a water-saving model if a 2 litre milk carton fills in less than 21 seconds with the water taps fully open

Run the cold water to avoid burns



If the showerhead releases more than about 5.7 litres of water per minute (1.5 gallons per minute) with the taps fully open, replace it with a more efficient model.

Water-saving showerheads are available at your local home improvement store, hardware, department and plumbing supply stores as well as kitchen and bathroom specialty stores.

Look for a showerhead with a flow rate of 5.7 litres per minute (1.5 gallons per minute) or less.

Showerheads are available in a wide variety of styles and sizes. Costs range from less than $10 for a basic fixed model to $80 or more for a top-of-the-line, hand-held unit. Most cost less than $30.

Since personal preferences vary, consider purchasing a showerhead with an adjustable spray. Also, look for models with a trickle valve. These devices maintain the temperature and flow setting while you temporarily interrupt the water flow to a trickle to soap up or apply shampoo. Check resources such as **Consumer Reports** for the names of top-rated brands and models.

Most showerheads come with installation instructions. If the model you purchased did not, follow the steps shown in **Figure 5**.

Over time, minerals or dirt may build up, causing the showerhead to deliver an irregular or reduced spray. If this happens, remove the showerhead and wash it thoroughly in hot soapy water. To remove mineral build-up, soak the showerhead in vinegar for a few hours.

Figure 5 • Install a water-saving showerhead

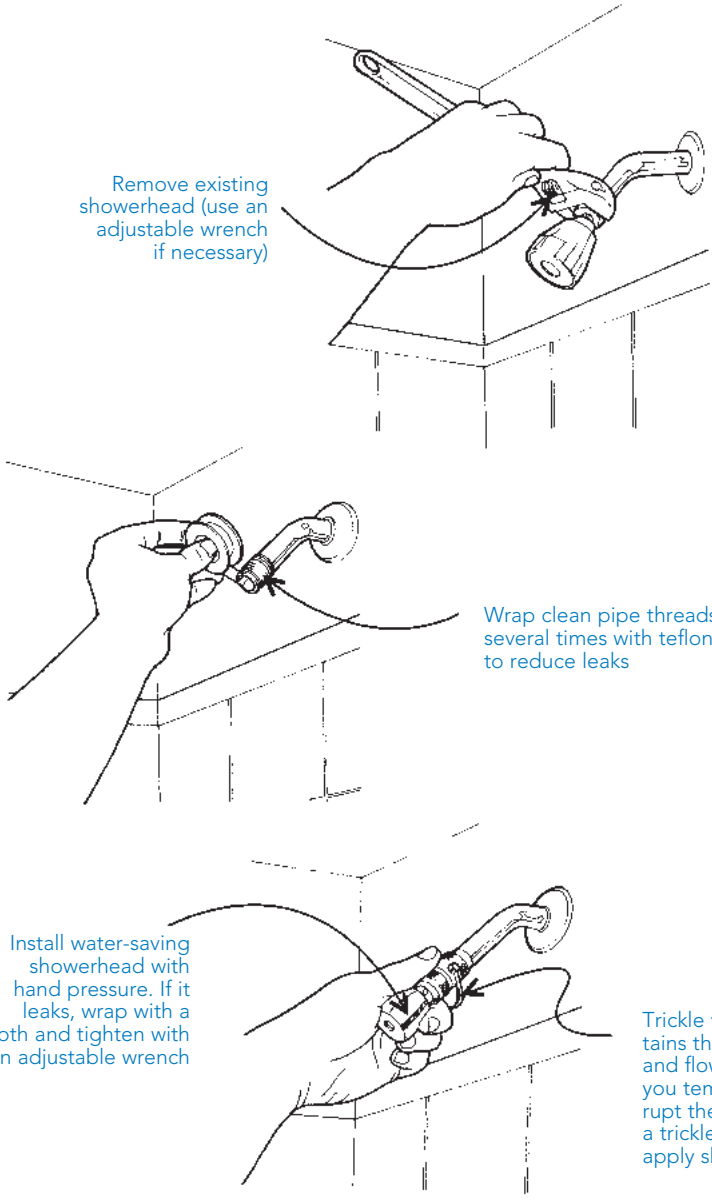
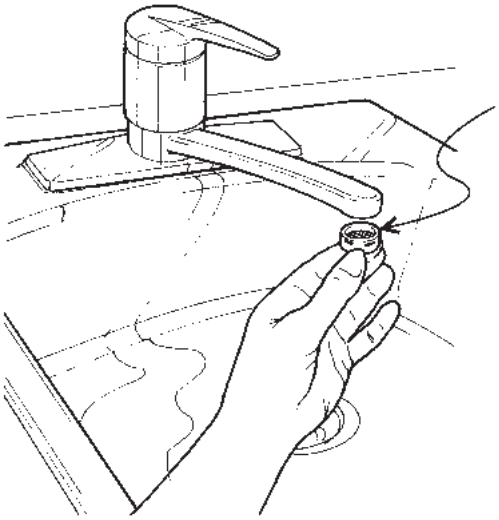


Figure 6 • Use water-saving faucet aerators



Replace faucet aerators with water-saving models

Install water-saving aerators on the kitchen and bathroom faucets

Much hot water is wasted by leaving faucets running while rinsing vegetables, brushing teeth, washing hands, or shaving. Turn off the faucet or install water-saving aerators to minimize consumption.

Measure the flow rate of your kitchen and bathroom faucets as shown in **Figure 6**. Replace aerators on faucets that use more than 5.7 litres of water per minute (1.5 gallons per minute).

Before shopping for a water-saving aerator, first remove the existing aerator. Most can be removed with simple hand pressure (see **Figure 6**). Take the old one with you to a home improvement, hardware department, or plumbing supply store to ensure you select the correct size.

Water-saving aerators are available with flow rates that vary from two to 5.7 litres per minute (0.5 to 1.5 gallons per minute). Choosing a model with a flow rate of about 5.7 litres per minute (1.5 gallons per minute) will give good performance and substantial savings.

Wrap an approved insulating blanket around your electric water heater

A water heater constantly loses heat to the surrounding air. This energy loss occurs whether or not hot water is being used. Wrapping the water heater with an insulating blanket will add to the existing insulation and save money. Older water heaters will benefit most since they are not as well insulated as newer models.

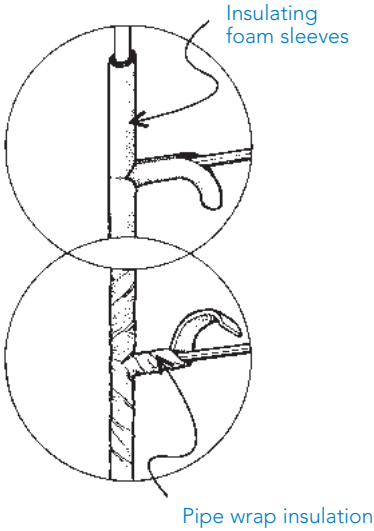
Insulating kits sell for $25 to $40. They consist of a vinyl or foil-faced fibreglass

insulation cover, tape or straps to secure the insulation cover, and illustrated instructions. You may have to contact several home improvement stores or plumbing supply dealers to find a kit.

Before you insulate your water heater, be sure the water temperature does not exceed 60°C (140°F). Refer to the earlier sections on measuring water temperature and adjusting the water temperature of your water heater.

To insulate the water heater, wrap the cover around the tank and secure it with the tape or straps supplied with the kit. Make sure that the temperature and pressure relief valve and drain pipe are outside the insulation. Also avoid covering the drain tap and labels that contain safety or operating instructions. Carefully follow all instructions that come with the kit. If in doubt, contact the dealer that sold you the kit or your fuel supplier.

Figure 7



Insulate the water pipes

Insulate hot and cold water pipes with insulating foam sleeves or pipewrap insulation. See **Figure 7** for details of insulating water pipes.

Besides saving energy, water will arrive at the faucets warmer or colder. Insulating cold water pipes will also avoid condensation from forming on the pipes. This prevents dripping on ceiling tiles or the basement floor.

It is especially important to insulate long pipe runs that travel through cool areas.

As a minimum, insulate the first two metres (six feet) of hot and cold water pipe from the water heater.

Maintain a 15-centimetre (six-inch) clearance between the water piping insulation and a fuel-fired water heater vent pipe. This may not be possible on some fuel-fired water heaters.

Apply more energy/money saving tips

Washing clothes — About one-quarter of the hot water used in a typical house is for laundry. Wash clothes in cold water rather than hot, and rinse in cold water. Use the water level control, small load attachment or suds saver if your washing machine has these features. Review the owner's manual for additional tips on how to use your washer efficiently.

Washing dishes — Your dishwasher works better when full but not overloaded. Consult the owner's manual for advice on selecting the most efficient cycle that matches how much cleaning the load needs. Use the "no heat" or "cool dry" feature if you don't need to unload the dishwasher immediately.

Buying new appliances — When buying a new clothes washer or dishwasher, ask to see the **EnerGuide** label. It will help you compare the efficiency of different models and brands. The lower the kWh listed, the more energy efficient the washer will be.

Look for ENERGY STAR® certified clothes washers and dishwashers. They are more energy efficient than non-ENERGY STAR certified washers and will cost you less to operate on an annual basis.

Leaking taps — A leaking tap can waste hundreds of litres of hot water each month. Replacement washers are available at building supply and hardware stores.

Showers vs. baths — A shower uses less water than a bath. This is particularly true if you have installed a water-saving showerhead. If the showerhead has a trickle valve, save even more by using it to reduce the water flow while you soap up or apply shampoo.

What to do when your water heater stops working

The decision to replace a water heater often needs to be made in a hurry. Although standard water heaters usually last about 7 to 12 years, they can fail at any time. This may occur at night or on a weekend when there is little time to comparison shop. The next few pages will help you make an educated decision before the need arises.

What to do if you suddenly run out of hot water

If the supply of hot water suddenly runs out, it doesn't mean that the water heater has failed. You may have simply run out of hot water during a period of heavy demand. This is more of a problem with electric water heaters because of the slower recovery rates.

If the water from the hot water taps isn't noticeably warmer after waiting an hour or two, check the tank for leaks. If it is leaking, the water heater must be replaced. Skip ahead to the next section on how to shut off the fuel and water supply.

If the tank appears leak-free, follow these guidelines:

1. Check whether the electrical power has been interrupted

For electric and oil fired units, check the main electric service panel for a tripped circuit breaker or burned-out fuse.

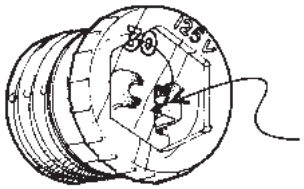
If the water heater circuit is protected by a fuse, check whether the fuse appears to have blown (see **Figure 8**). If it has, unscrew the old fuse and replace it with a new one with the same amperage rating. The amperage rating is stamped on the bottom of the fuse or printed on the face. In most cases, it will be a 30-amp fuse.

If you find a tripped breaker on the circuit for the water heater, flip the breaker's toggle switch to the "on" position.

If you reset the circuit breaker or replace the fuse and find that they continue to trip or blow, call an electrician or heating contractor for repairs.

If you have an electric water heater and the circuit is okay, the trouble could be a malfunctioning heating element. Call your heating contractor to test the elements and replace them if they have burned out.

Figure 8



2. Re-light the pilot light in natural gas or propane units

Most natural gas and propane water heaters have a pilot light that burns continuously. Check to see if the pilot light is still burning by looking through the inspection opening at the base of the tank. Consult the owner's manual, your heating contractor or Manitoba Hydro if you are unsure whether your water heater has a continuously burning pilot light.

If the pilot light has gone out, re-light it following the instruction label on the water heater or contact your heating contractor. If you are a Manitoba Hydro gas customer, contact our 24 **Hour Emergency Service** number at (204) 480-5555 (Winnipeg), 1-800-465-3816. A Manitoba Hydro service person will re-light the pilot at no charge.

What to do if you smell natural gas, propane, or fuel oil

Leaks from natural gas or propane units — Check the area around the water heater for the smell of gas. If there is a strong odour, extinguish open flames and don't touch the light switches or anything else that may generate a spark. Leave the house immediately and call for assistance using a neighbour's telephone. If you are a Manitoba Hydro gas customer, contact our **24 Hour Emergency Service** number at (204) 480-5555 (Winnipeg) or 1-800-465-3816.

For propane customers, contact a propane heating contractor who offers emergency repair service. If you can't reach a contractor, contact your propane supplier or local fire department for advice.

Leaks from oil units — Check the oil tank gauge to make sure the tank hasn't run dry. Examine the oil line for leaks from the tank to the heater. Have your heating contractor or fuel oil supplier repair any oil leaks immediately.

Shut off the fuel / power and water supply if the water heater leaks

If your water heater develops a leak, shut off the fuel/power, and the water supply, and have the tank replaced. It rarely pays to repair a leaking tank.

Always shut off the supply of natural gas, propane, oil or electricity to the water heater before you shut off the water supply.

If the water is shut off and the fuel/power supply left on, a potentially dangerous build-up of steam can occur within the tank.

To turn off the fuel supply to a natural gas, propane, and oil water heater, simply rotate the gas valve on the lower front of the tank to the "off" position (see **Figure 3**).

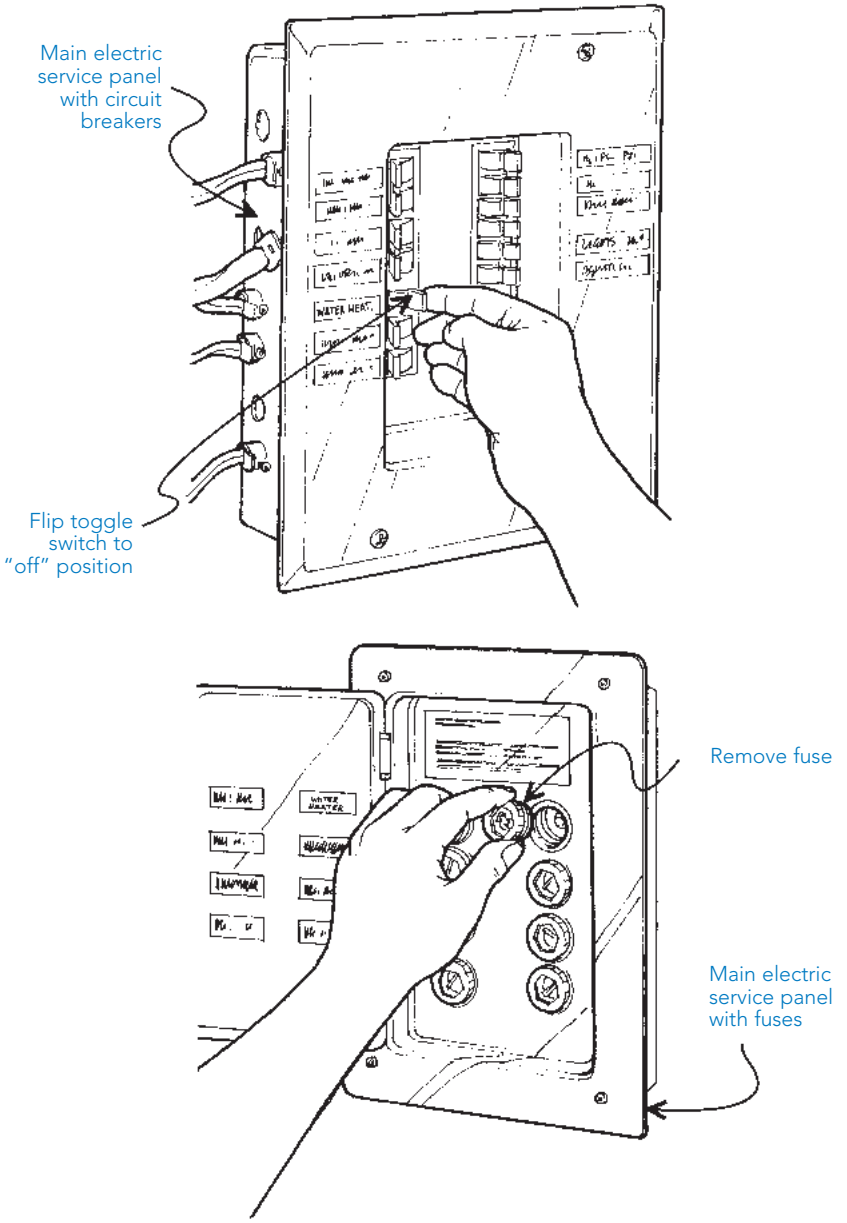
To turn off the electrical supply to an electrical, oil water heater or power-vented natural gas model, flip or press the circuit breaker's toggle switch to the "off" position (see **Figure 9**). If the water heater circuit is protected by a fuse, unscrew and remove it immediately.

Select a Contractor to Replace the Water Heater

After shutting off the fuel and water supply to a leaking water heater, call a contractor to replace the unit. Removing an old natural gas, propane or oil water heater and installing a new one must be done by a contractor licensed by Manitoba Labour. More advice on how to choose a contractor is provided later in this booklet.

Although replacing an electric water heater can be a do-it-yourself project, it should only be attempted if you are experienced in wiring and plumbing. Carefully follow the installation instructions that come with the water heater. Check with your local municipality about permits and inspection requirements.

Figure 9 • Turning off power to an electric or oil-fired water heater



Choose a water heater to match your needs

The contractor you select should offer several different water heaters. Use these tips to choose an energy-efficient water heater that matches the needs of your family:

1. Compare energy costs — We routinely update our Home Heating Cost Comparison Chart to reflect current energy prices and technologies for an average home in Manitoba. To obtain the most current energy cost comparison chart, please visit Manitoba Hydro's website at hydro.mb.ca or contact Manitoba Hydro at 204-480-5900 (Winnipeg) or 1-888-624-9376. There is also other information provided on this website that you should review if you are thinking about replacing your heating system.

2. Determine the heating and storage capacity you need — Insist that your new water heater is properly sized. If it is too small, you may run out of hot water during periods of heavy use. If it is too large, it will waste energy.

Think of your future needs, since a hot water heater may last up to a decade or longer. A new baby, adding a dishwasher, or building an extra bathroom may increase your hot water needs.

Use **Table 1** as a general guide to determine the capacity of water heater you need based on your family's size and the characteristics of your home.

If you feel that your family's daily hot water use is unusually high, a more detailed calculation should be done. Most contractors have special sizing charts from water heater manufacturers that they can use to assist you.

Table 1

Tank capacity	Family size	House characteristics
Natural gas and propane water heaters		
150 litres (40 U.S. gallons)	up to 3	Moderate use (e.g., up to two bathrooms, automatic dishwasher or automatic clothes washer)
190 litres (50 U.S. gallons)	4 – 6	Moderate to heavy use (e.g. two or more bathrooms, auto matic dishwasher and clothes washer)
Electric water heaters		
180 litres (40 Imp. gallons)	up to 3	Moderate use (e.g., up to two bathrooms, automatic dishwasher or automatic clothes washer)
270 litres (60 Imp. Gallons)	4 – 7	Heavy use (e.g. two or more bathrooms, automatic dishwasher and clothes washer)
Oil water heaters		
120 litres (32 U.S. gallons)	up to 8	Heavy use (e.g. two or more bathrooms, automatic dishwasher and clothes washer)

Tankless natural gas water heaters

Tankless water heaters can provide hot water without a storage tank. This is because the water is only heated as required by the type of use, such as a shower. Tankless heaters are approximately the size of a small suitcase, and are used for whole home use. They can provide water for multiple end-uses at the same time, and are generally large enough to supply two larger end uses at the same time (shower and clothes washing).

When the hot water tap is opened the water passes through a heat exchanger in the water heater. As the water flows through the heat exchanger, larger burners heat the water within the heat exchanger. When the tap is shut off the water heater shuts off.

Tankless units are mounted on a wall in your home, and because this system requires venting, power vented models that utilize special plastic venting are available to provide more flexibility in their installation location. Generally a new gas line has to be installed to these units, due to the higher natural gas energy input, compared to a conventional storage type natural gas water heater.

All natural gas equipment installed in Manitoba must be approved by an inspection agency such as the Canadian Gas Association (CGA), CSA, ULC, or Warnock Hersey Certification (WH). It also has to be installed by a licensed gas fitter who first obtains a permit from the Manitoba Department of Labour.

The average installation cost of a whole home use natural gas tankless system is approximately $3000 to $5000.

Advantages:

- Endless supply of hot water at a limited flow rate, as there is no tank to run out of hot water;
- Energy savings due to the elimination of the stand-by loss that a conventional water tank has (heat given off by the storage tank, and heat lost up the chimney). Typical energy savings range on average from 20 to 30 per cent annually compared to a conventional natural gas storage water heater;
- Size – tankless water heaters are considerably smaller than a conventional tank water heater;
- Life expectancy – tankless water heaters have an average expected life of approximately 20 years compared to a conventional tank of 13 years.

Disadvantages:

- Tankless heaters are turned on by water flowing through the heater, so if the flow rate is too low the water heater may not turn on. Each tankless heater has different minimum flow rates for operation, so you should check the manufacture specifications. Some manufacturers provide optional "low-flow" kits. A well insulated storage tank can also be used to handle this issue;
- Installation cost – tankless water heaters cost approximately $3000 to $5000 installed. This is considerably higher than a conventional storage tank water heater;
- Maximum flow rate limitation (usually two larger end uses). A well insulated storage tank can also be used to handle this issue
- More maintenance;
- Installation difficulty because it is not the same installation process as the existing water heater (may be difficult to re-pipe gas line or vent water heater).

Electric tankless water heaters

Whole house electric tankless hot water heaters are generally only large enough to handle one end use at a time (e.g. one shower). They usually require

an electric panel upgrade, and there is an additional monthly charge on your electricity bill if the panel size exceeds 200 amps. Electric tankless water heaters have a similar efficiency and operating cost when compared to an efficient electric storage water heater. However, these systems are generally more expensive to operate than a natural gas water heater.

Solar hot water heating

A solar water heating unit is typically more expensive to install, but these systems can generally reduce your water heating costs by 50 per cent. Visit Manitoba Hydro's website at http://www.hydro.mb.ca/your_home/solar_water_heating/index.shtml or call Manitoba Hydro at 1-888-MBHYDRO (1-888-624-9376) for more information on solar water heating systems.

3. Choose an energy-efficient model — The more energy efficient your heater is, the more you will save on utility bills. Over the lifetime of the water heater, these savings can be substantial.

Federal government regulations require that water heaters must meet minimum energy efficiency levels specified by CSA. Ask your contractor to confirm that the water heater they propose to install complies with the most recent edition of one of the following standards:

Fuel Source	Standard
Natural Gas or Propane	CAN/CSA-4.1
Electric	CAN/CSA-C191
Oil	CAN/CSA-B211

These standards are minimums. Most manufacturers produce water heaters that are more efficient than what is required by law. Energy-saving features to look for include better tank insulation, heat traps on piping, more efficient burners and heat exchanger, and electronic ignition.

To compare the performance of natural gas, propane or oil-fired water heaters, ask about their energy factor. This term describes the energy efficiency of the water heater. The more efficient the unit, the higher the energy factor.

The performance of electric water heaters can be compared by their standby losses. This term describes how much energy the water heater loses through the tank. For 180 litre (40 gallon) electric water heaters, the **maximum** acceptable standby loss is 71 watts for top inlet and 76 watts for bottom inlet. For 270 litre (60 gallon) units, the **maximum** acceptable standby loss is 89 watts for top inlet and 94 watts for bottom inlet.

4. Carefully compare warranties — The type of warranty can affect the price of a water heater as much as the storage or heating capacity. Questions to ask about a warranty include:

- How long is the water heater under warranty?
- Can I purchase an extended warranty? How much does it cost?
- Who is responsible for honouring the warranty, the installer or manufacturer?
- Are both parts and labour covered?
- Is the warranty coverage pro-rated?
- Is the warranty transferable if I sell my home?

How to care for a new water heater

Complete the warranty card and return it to the manufacturer. Besides registering your warranty, it ensures that you are notified if a safety notice is issued.

If you don't receive a warranty card, keep a copy of the invoice you receive from the contractor. This is commonly accepted as proof of the warranty period.

Make sure you receive an owner's manual. Review the manual for instructions on how to operate and maintain your water heater. Keep the manual with your other important household papers, and leave it behind if you sell or rent the home.

Ask the contractor who installs the water heater to show you how to:

- adjust the temperature settings;
- drain water and sediment from the bottom tap;
- relight the pilot light (natural gas and propane heaters only);
- test the temperature and pressure relief valve; and
- shut off the water and fuel supply if the tank develops a leak.

Measure and adjust the water temperature as described earlier in the booklet. Wait several hours or until the day after the water heater is installed to allow it to reach normal operating temperature.

Have the water heater inspected during your contractor's annual visit to service your home's furnace or boiler. Between these visits, maintain your water heater in accordance with the owner's manual and the **Maintenance tips** discussed earlier.

How to get the help you need

Choosing an experienced and reliable contractor

How to find and select a contractor

Compile a list of potential contractors. Ask friends, relatives, or neighbours whether they have recently had a problem with their water heater and if they would recommend the contractor they hired.

Be selective. It is usually better to choose contractors who promote the quality of their service and products at reasonable rates rather than just low prices.

Look for contractors that are members of the Heating, Refrigeration and Air Conditioning Contractors of Canada (HRAC), a division of the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). This industry association conducts training on the design, installation and servicing of mechanical systems, including water heaters.

HRAC members demonstrate that they comply with regulation regarding valid trade qualification, valid provincial fuel license(s), municipal business licenses (where applicable), Worker's Compensation Board coverage and liability insurance coverage. They also sign and agree to conform with the HRAC Members' Code of Ethics. However, HRAC membership solely does not guarantee high quality work.

After you have compiled a list of at least three or four contractors and their addresses, contact the Better Business Bureau (BBB) and inquire about their business performance records. Not all contractors are BBB members. However, all BBB members are committed to respond to customer concerns and to make adjustments when necessary. The BBB reports on all firms in its database regardless of membership status and does not endorse or recommend any product, service or company.

If you are approached by a door-to-door salesperson, exercise caution. This method of marketing is rarely used by reputable heating contractors who install and service water heaters.

What a quote should include

When a water heater fails, most people will want it replaced as soon as possible. This means that you will probably have to rely upon verbal rather than written quotes.

Questions you should ask contractors when obtaining quotes include:

- What model of water heater do you install and does it have any special features?
- What heating capacity and size of water heater do you recommend? (See **Determine the heating and storage capacity you need**.)
- Do you offer energy-efficient models and, if so, what are their energy factors or standby heat losses? (See **Choose an energy-efficient model**.)
- What are the details of the warranty? (See **Carefully compare warranties**.)
- Are your workers licensed by Manitoba Labour? Are they covered by the Workers Compensation Board and liability insurance?
- Will they obtain any necessary permits and request any required inspections by the utility or local building authority?
- Do you remove the old water heater?
- Is there an extra charge for evening, weekend, or holiday calls?
- What is the total cost of the job including PST and GST?
- What payment methods do you accept?
- How soon can the work begin and how long will it take?

When the contractor visits your home to replace the water heater, they may discover a problem that wasn't apparent when they gave their verbal quote by telephone. For example, the existing water heater may be in an awkward location and require considerably more labour to replace.

In these cases, the contractor can be justified in adding an extra charge, provided it is reasonable, to the price they quoted before they saw your home.

Signing the contract

If you have only received a verbal quote, consider asking the contractor for a written contract before they begin their work. This reduces the chance of a misunderstanding.

Do not sign the contract until you have read it carefully. Never sign an incomplete contract. Check all standard terms and conditions. Read the fine print. If you need help, contact the Consumer Protection Office or seek the advice of a knowledgeable family member, friend or neighbour.

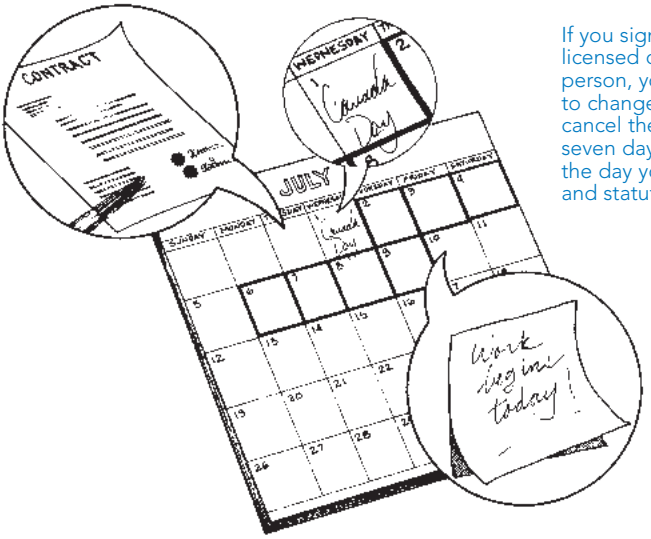
Cross out and initial any standard terms which you are not willing to accept. Ask the contractor to also initial any changes. Make sure that everything in the contract matches the original proposal.

If you sign a contract with a licensed door-to-door salesperson, you have the right to change your mind and cancel the contract within seven days (see **Figure 10**). This excludes the day you sign, Sunday and statutory holidays.

You can cancel the contract by registered letter or delivering a written letter of cancellation in person.

Door-to-door sellers must provide you with written information about your right to cancel a direct sales contract. Upon cancellation, the company must return any money you have paid. For further information on your cancellation rights, contact the Consumer Protection Office at (204) 945-3800 (Winnipeg), or 1-800-782-0067or by email at consumersbureau@gov.mb.ca.

Figure 10



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Paying for the work

A down payment is normally not required for replacing a water heater. However, if your contractor has to order special equipment or materials, a nominal down payment in "good faith" may be requested.

Since replacing a water heater can normally be done in a few hours, only one payment is usually required. However, if replacing the water heater is part of a much larger and time consuming renovation project, you may be asked to make a progress payment. In these instances, only pay for the work that has been completed.

For major projects, you have the right to withhold some money from all payments to protect yourself against liens. A lien can be placed on your home by suppliers or workers who were not paid by your contractor. The lien holds your property as security for the contractor's debts, even if you paid the contractor in full.

In Manitoba, the law limits your liability to 7.5 per cent of the contract price. The correct procedure is to withhold this amount from all payments for 40 days. This period is the time limit that creditors have to place a lien on your property.

In actual practice, few homeowners bother to withhold money to protect against liens when they have a water heater replaced.

Do not make a final payment or sign anything that releases the contractor from further responsibility until everything promised in your contract is done. Check that the make and model and capacity of water heater you ordered was actually installed.

It is advisable to pay down payments and progress or final payments by cheque or credit card rather than cash. This will give you a record of the transaction. For added protection, ask the contractor for a signed receipt each time you make a payment.

How to handle problems with your contractor

If you have a disagreement with your contractor, carefully review your contract. Listen to what the contractor has to say and be reasonable. If you remain dissatisfied, seek another opinion before taking action. Contact the Consumer Protection Office for advice.

Metric Conversion Factors

A. Converting Imperial Units into Metric Units

Unit	Conversion	Multiply By
Thermal Resistance	R values to RSI values	0.1761
Length	inches to millimetres inches to centimetres feet to metres	25.40 2.540 0.3048
Area	square feet to square metres	0.09290
Volume	gallons to litres cubic feet to cubic metres	4.546 0.02832
Mass	pounds to kilograms	0.4536
Density	pounds/cubic feet to kilograms/cubic metre	16.02

B. Converting Metric Units into Imperial Units

Unit	Conversion	Multiply By
Thermal Resistance	RSI values to R values	5.678
Length	millimetres to inches centimetres to inches metres to feet	0.03937 0.3937 3.281
Area	square metres to square feet	10.76
Volume	litres to gallons cubic metres to cubic feet	0.2200 35.31
Mass	kilograms to pounds	2.205
Density	kilograms/cubic metre to pounds/cubic foot	0.06243

If you are uncertain of, or have any question or concern regarding, any subject matter herein or the safety and/or proper handling of any material(s) and/or product(s) that you may encounter in your undertaking, please consult resources such as Health Canada (Health Links) @ 1-888-315-9257, the Manitoba Department of Labour @ 1-800-282-8069, or Canada Mortgage & Housing Corp. @ 1-800-668-2642.

Manitoba Hydro

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