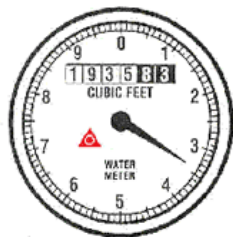


How to do your own Assessment:

1. **Note how and where your business uses water** (i.e., Toilet flushing, dishwashing, showers, ice machines, cooling towers, irrigation, etc.)
2. **Determine flow rates on all fixtures and devices.**
3. **If you pay your own water bill, take inventory of your water history and past plumbing maintenance**, noting the average monthly cost and usage per person.
4. **If you are a tenant of the building, discuss your goals with the owners/property managers.**
Be prepared to meet with the manager and building engineer to discuss factors affecting the property's water usage.
5. **If you are a landlord** be sure that tenants are regularly informed as how to report maintenance issues so they can be promptly repaired. (i.e., leaks are major cause of water loss)
6. **Review the Water Conservation portion of the checklist.**
7. **Compile and review any maintenance reports from outside agencies that service water-related process equipment** (e.g., tunnel washers, icemakers, cooling towers).

Please use the following resources to help your business with water conservation.

1. **Learn How To Read Your Water Meter**
2. **Detect Leaks**
3. **Toilets**
4. **Urinals**
5. **Faucet Aerators and Showerheads**
6. **Dishwashers**
7. **High Efficiency Clothes Washers**
8. **Ice Machines**
9. **Water Brooms and Pressure Washers**
10. **Pre-Rinse Spray Valves**
11. **Water Pressure**
12. **Cooling Towers**
13. **Water-Efficient Landscaping**



1.

Figure 1

Learn How To Read Your Water Meter

There are several reasons why your business should be able to locate and read your water meter. By reading your meter at the beginning and the end of the day you can determine how much water your business has used. You can also use the reading to check for leaks. For instance, if you turn off all the taps on the property and see that the meter is still turning, this may indicate a leak.

Here are some hints to help you find and read your water meter:

1. **Locate Your Meter** - Your water meter is generally located near the curb in front of your home or place of business in a direct line with the main outside faucet. Some water meters in commercial properties are located in the basement under the sidewalk of the property. Water meters are usually housed in a concrete box usually marked "Water Meter – painted blue." Carefully remove the lid by using a tool, such as a large screwdriver, to pry it off.
2. **Read Your Water Meter** -

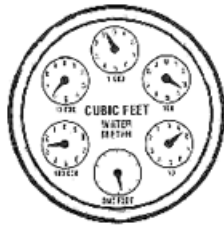


Figure 2

Most customers have their water use measured by a meter. The water and wastewater charges are based on the amount of water that passes through the meter on a monthly or bimonthly basis.

There are two types of water meters: **the straight-reading meter**, which resembles the mileage odometer in an automobile (figures 1 and 2), and the **round-reading meter** which has separate clock-like dials. Both record water use in cubic feet.

Some straight reading meters also have a leak detection dial, shown as the red triangle indicator. If all fixtures are off and the dial rotates continuously in one direction even slightly, this could mean there is a leak somewhere on the property.

2. Detect Leaks

Once you figure out how to read the water meter you can use it to detect leaks, notice sudden spikes in usage, and monitor daily usage. Start by turning all water-using appliances off so that no water is being used anywhere in the building. Then check the position of the meter dial and wait. If after 15 minutes the dials haven't moved your meter is "holding" and all fixtures are tight.

However, if you notice that the dials have moved check the toilets for leaks. Put a few drops of food coloring or dye tablets (provided by your water utility) into the toilet tank and wait a few minutes. If there is blue in your toilet tank you have a leak, probably at your flapper valve. Also, check the water level in your toilet's tank. In a standard toilet the water level should be one inch

below the overflow tube. If the water is overflowing into the tube try to set reset the water level according to manufacturer's specifications. If the valve fails to shut off your fill valve should be replaced.

If there is no leak in the toilets check all angle stops under your sinks and hose bib connections. If the connections are tight there may be a hidden leak, or blind, leak in an underground pipe or within the walls of the property.

Detecting "Blind" Leaks - If you think you might have a blind leak you can try to isolate the leak by use of your main house valve or supply valve. You can also contact your local water company to assist with leak detection and give recommendations for reducing your water use.

If you choose to isolate the leak yourself locate the main house valve which is usually a round gate valve inside the property structure in a straight line from the water meter. This is designed to turn off and on very slowly to prevent a surge of pressure that may cause damage to your plumbing fixtures. Turn off the main house valve and empty all the water from the house by opening the faucets highest in elevation. If the water continues to flow from the faucet after about ten minutes then your main supply valve must be repaired before continuing the blind leak test. If water stops flowing from the faucet proceed. Otherwise you must make repairs to the main shut off valve before going to the next step.

If your house valve is holding, and no water can run from your faucets inside the home, but the dials on the meter still continue to move, you may have a blind underground leak in your house pipe. If the meter stopped moving after shutting off the valve the leak is likely inside the property.

Using the water meter to track irrigation use:

Turn on the lawn sprinkler and watch the meter dial move for exactly one minute. One complete revolution of the sweep hand (on the straight-reading meter) or the one-foot dial (round-reading meter) represents 7.5 gallons. Count the number of revolutions and multiply it by 7.48 to get the amount of gallons used per minute. Now estimate how long you usually leave the sprinkler running. The hundreds of gallons of water going into your lawn and garden each week may come as a surprise to you. This test can be used to assess a number of other household water fixtures like your clothes washer, dishwasher, or faucet flow rates.

3. Toilets

It is best to use toilets with 1.6 gallons or less flush volume. ULFTs and HETs are approved for use.

ULFTs: New water conserving toilets, called ultra-low-flush toilets (ULFTs) use 1.6 gallons per flush and are much more water efficient than older toilets, which use up to 7 gallons per flush. Each installed ULFT can save a typical family 70 gallons a day in water use.

A number of commercial ULFTs are available in a range of rough-in sizes and shapes. Both wall-mount and floor-mount 1.6 gallon per flush toilets are readily available. The efficiency of a flushometer and bowl combination toilet depends mainly upon the right combination and regular



maintenance of the flushometer valve.

HETs: High-Efficiency toilets (HETs) are fairly new to the American market but have long been used overseas. The HET flushes at least 20% below the standard model. Many HETs are dual-flush toilets, which have two separate flush volume options, a half flush (.8 gallons) and a full flush (1.6 gallons). There are several industrial flushometer HETs on the market

Dual-flush handle retrofit for flush valves: This water saving mechanism retrofits to most existing valves and reduces water volume by up to 30% when activated for half-flush. More information on flapper replacement is available at www.toiletflapper.org.

4. Urinals

Use urinals with 1.0 gallon or less flush volume. More efficient urinals called "High Efficiency Urinals or HEUs" that flush .5 gallons per flush or less are available on the market.

HEUs: High-Efficiency Urinals (HEUs) are defined as fixtures that function at 0.5 gpf or less. Based on data from studies of actual usage these urinals save 20,000 gallons of water per year with an estimated 20-year life

Urinal retrofit kit: The flush volume in typical 1.0 gallon per flush urinals can be retrofitted with a .5 gpf diaphragm kit. This is a great cost-effective way to turn the ultra-low flush urinal into a high-efficiency urinal for around \$50 a fixture.

5. Faucet Aerators and Showerheads

Installing low-flow showerheads and faucet aerators is the single most effective water conservation savings you can do for your home and office. All green business applicants are required to use only low flow faucet aerators and showerheads.

Low Flow Shower Heads: Showerheads, produced after 1994, will usually have a stamped flow rate. The flow rate stamp is usually located on the underside of the showerhead that should read 2.5 gpm or less (1.5 gpm required for Green Business recognition). If the showerhead does not have a stamp it is likely an old (pre 1994) showerhead with a high flow rate (greater than 2.5 gpm) and needs replacement.

Faucet Aerators: Standard aerators are devices that are designed to reduce the flow of the water coming out of the faucet while introducing air into the water flow. That is why they are called "**aerators**". Water has to pass through very small holes and spreads out to cover more surface.

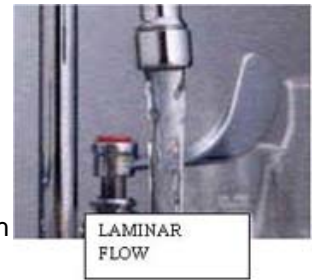


If an aerator is already installed on your faucet it will have its rated flow (in gallons per minute or gpm) imprinted on the side. If there appears to be an aerator installed, but there is no flow rate stamped on the side, the aerator may not be a low flow type and should be replaced with a new one not to exceed 1.5 gallons per minute.

If no aerator is visible check to see if there are threads just inside the tip of the faucet. Most

modern faucets are threaded to accept aerators.

Some designer faucets have an internal built in "**laminar**" restrictor. Laminar restrictors work differently than standard faucet aerators. Aerators add air to the water stream to make the flow feel stronger. Laminar flow controls, on the other hand, work by producing dozens of parallel streams of water. You can ask the manufacturer for the flow rate of these faucets. Alternately, you can use a "flow meter bag" which can be purchased at several online conservation websites and measure the flow.



If your aerators keep suddenly disappearing tamper proof aerators are a great alternative.



Inexpensive and simple to install, low-flow shower heads and faucet aerators can reduce water consumption by as much as 50% and reduce your energy cost of heating the water also by as much as 50%.



1.5 and 2.0 gpm kitchen faucet aerators

1.5 lavatory faucet aerators

If your faucets are not threaded for aerators installing **Flow Control Valves or Flow Regulator** devices are the best option for reducing flow rates. The flow (gallons per minute) can be varied to fit the function (e.g. less than 1.5 gpm for commercial lavatory applications and 1.75 to 2.2 gpm for kitchen use due to volume related activities). Located under the sink, flow control valves go undetected by the faucet user. They cost about \$20 a pair. Prices are reduced with bulk purchasing.

6. Dishwashers

Dishwashers use at least two times less water than washing by hand. If you are looking to purchase a new efficient dishwasher please visit the links below.

For residential dishwashers visit Green Ratings of various water efficient dishwashers:

<http://www.greenerchoices.org/ratings.cfm?product=dishwasher>

Commercial dishwashers are now using less than 3 gallons per cycle. For commercial dishwashers visit the Food Service Technology Center (www.fishnick.com) for water and energy efficient models.

7. High Efficiency Clothes Washers

High-Efficiency Clothes Washers (HECWs) utilize technological advances to deliver excellent wash performance while saving both water and energy. Resource efficient models use 35-50% less water and approximately 50% less energy. The water efficiency of clothes washers is rated using the term "water factor" to describe and compare its water use. Water factor is measured by the quantity of water (gallons) used to wash each cubic foot of laundry. A lower water factor represents greater water and energy efficiency.

8. Ice Machines

Water-cooled ice machines use far more water and energy than air-cooled models. Various



retrofit options for water-cooled ice machines can be found on the Food Service Technology Center website www.fishnick.com.

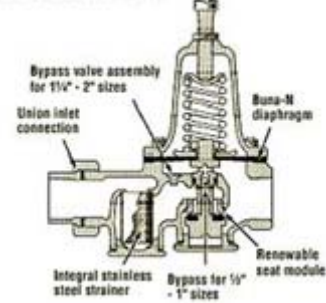
9. Water Brooms and Pressure Washers

A water broom uses a combination of air and water pressure to clean decking, patios, tennis courts, exterior walkways, entryways, etc., and uses 3.5 gallons per minute. Pressure washers are using as little as 1.6 gallons per minute, which might be the best option for heavily soiled sidewalks and common areas. For examples, visit Watermiser Waterbroom or American Waterbroom.

10. Pre-Rinse Spray Valves

A low-flow pre-rinse spray valve is one of the easiest and most cost effective energy saving devices available to the foodservice operator. In addition to minimizing water consumption, water heating energy and sewer charges are also reduced. Pre-rinse spray valves can use as little as .65 gallons per minute compared to 3 or more gallons per minute. In order to qualify for Green Business program recognition applicants must use 1.6 gpm spray valves or less.

cross section view



For more information about pre-rinse spray valves, go to <http://www.fishnick.com/saveenergy/sprayvalves/>.

11. Water Pressure

Water Pressure that is too high wastes water and causes stress to pipes and fixtures. Water should enter the property at 45 to 60 pounds of pressure per square inch (psi).

You can check your water pressure with a pressure gauge that attaches to your outdoor/indoor faucet threaded for a 3/4 inch hose bib available at most hardware stores for around \$10. Water pressure over 60psi can cause a strain on your plumbing fixtures or pipes and can even cause bursts in the water line. Pressure in excess of 80 psi may void warranties in some appliances and fixtures. If your water pressure exceeds 70 psi install a pressure-regulating valve (see images below). Depending on the size and type of regulator they cost anywhere from \$40 and up, and can prevent future maintenance costs and leaks.

12. Cooling Towers

Cooling towers help regulate temperature by rejecting heat from air-conditioning systems or by cooling hot equipment. In doing so they use significant amounts of water. The thermal efficiency, proper operation, and longevity of the water cooling system all depend on the quality of water and its reuse potential.

In a cooling tower water is lost through evaporation, bleed-off, and drift. To replace the lost water and maintain its cooling function more make-up water must be added to the tower system.

Sometimes water used for other equipment within a facility can be recycled and reused for cooling tower make-up with little or no pre-treatment, including the following:

Water used in a once through cooling system

Pretreated effluent from other processes, provided that any chemicals used are compatible with the cooling tower system.

Retrofit Options:

Install a sidestream filtration system that is composed of a rapid sand filter or high-efficiency cartridge filter to cleanse the water. These systems draw water from the sump, filter out sediment, and return the filtered water to the tower enabling the system to operate more efficiently with less water and chemicals. Sidestream filtration is particularly helpful if your

system is subject to dusty atmospheric conditions. Sidestream filtration can turn a troublesome system into a more trouble-free system.

Install covers to block sunlight penetration. Reducing the amount of sunlight on tower surfaces can significantly reduce biological growth such as algae.

Consider alternative chemical-free water treatment options such as ozonation or ionization to reduce water and chemical usage. Be careful to consider life cycle cost impact of such systems.

Install automated chemical feed systems on large cooling tower systems (over 100 ton). The automated feed system should control blowdown/bleed-off by conductivity and then add chemicals based on makeup water flow. These systems minimize water and chemical use while optimizing control against scale, corrosion, and biological growth.

- **Water-Efficient Landscaping**

Xeriscaping refers to the conservation of water through creative landscaping. Originally developed for drought-afflicted areas, the principles of xeriscape today have an ever-broadening appeal.

With water now considered an expensive and limited resource all landscaping projects, residential or commercial, can benefit from this alternative. Xeriscapes do not have a single look - almost any landscaping style can be achieved. The principles can be applied to all or part of a yard in any geographic region of North America.

- **Night time landscape irrigation:** a) night time landscape irrigation saves water (less evaporation loss), and b) consideration for installing rainwater barrels for landscape irrigation (less potable water use).

Web sites for additional information:

<http://www.greenhomebuilding.com/conservewater.htm>

<http://www.nrdc.org/cities/building/smoffice/guides/water.pdf>

http://www.whygreenbuildings.com/water_conservation.php

<http://www.astm.org/Standards/E2635.htm>

*** Special thanks to the San Francisco Green Business for allowing us the use of their literature <http://sfgreenbiz.org>. ***