

Water Meter Basics – leak detection and water consumption calculations

Calculating Water Use

Have you ever received your water bill and thought to yourself, “How could I have used that much water in two months?” Fortunately, every home in the Town of Windsor comes equipped with one of the best tools available for finding out the answer. It’s called your water meter. Wondering how much water you use to water the lawn each week? Check the meter. Do you want to know how much water you use to do laundry each week? Again, you can use your water meter to find the answer. All that is required to find the answers to these questions is the ability to read the numbers from an odometer-like display and some simple math skills. And if you’re wondering if you might have a leak somewhere, your water meter can help you with that too.



For residential customers, your water meter displays water consumption down to a tenth of a gallon, providing you with some very accurate use information. Calculating the amount you’re using can be as simple as writing down the numbers from the readout, before and after an activity, and then subtracting. Using the two examples mentioned earlier, here’s how to compute how much water is being used to water your lawn and for doing laundry.

Make sure to turn off all the water before beginning. This includes turning off automatic icemakers, water-softening systems, and automatic irrigation systems, which may otherwise cycle on during the test.

The first thing you’ll need is a large, flat-head screwdriver to assist with removing the lid from the water meter box. The meter will be located near the street (often near a mailbox or at the property line between two lots) and the lid will be marked WATER. Insert the screwdriver through the hole in the lid, lift and slide the lid forward until you have a clear view of the meter. **Use caution when placing your hands inside the box, as Black Widow spiders often inhabit this dark, moist area.* Verify that the serial number imprinted on the top of the meter lid corresponds with the meter number listed on your billing statement.

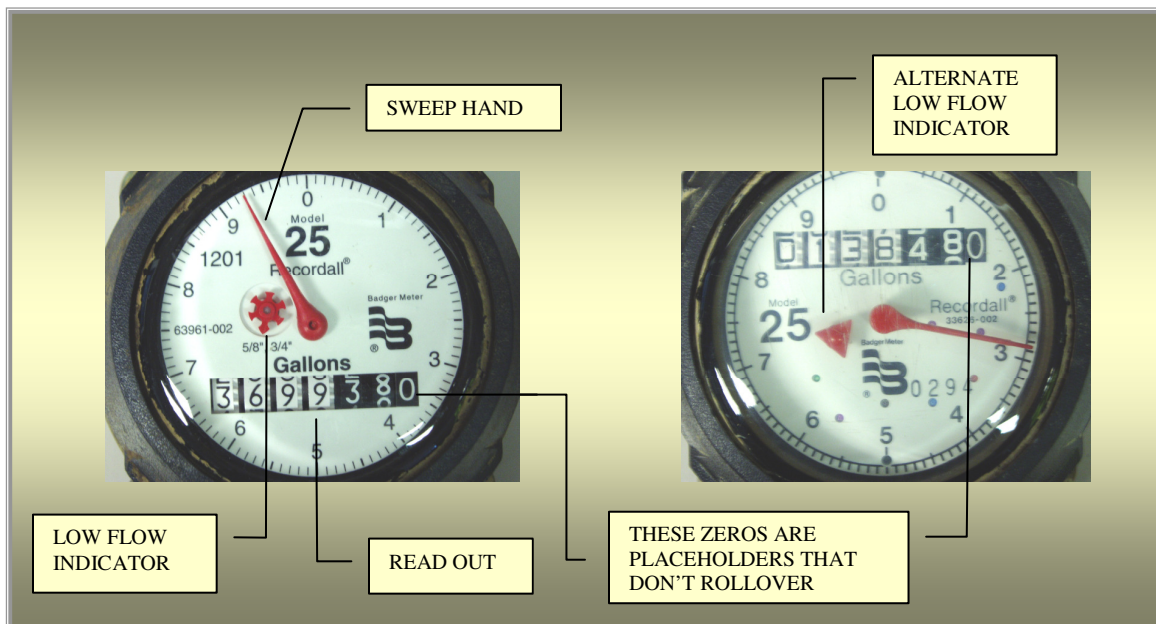
Once you’re sure you’re looking at the correct meter, you’re ready to write down the beginning read. From the odometer-like readout, write down the numbers from left to right, taking note that some of the numbers have a white background and some of the numbers have a black background. When you get to the last digit on the right (a zero), upon close inspection you will notice that the number does not roll over like the higher place digits do. That’s because this zero is just a placeholder, and the sweep hand on the face of the dial indicates which number to write instead. So if the sweep hand is pointing at the “2” on the face of the dial, then the last digit on the readout would be written “2”. If the sweep hand is



The meter number is located on the lid of the meter

pointing at the “3”, the last digit of the readout would be written “3”. The hash marks on the dial are incremented in tenths of a gallon, so if the sweep hand is somewhere in between the “2” and the “3”, you simply count the number of hash marks, add a decimal point after the “2”, and write down the number of tenths. Confused yet? Let’s look at some actual meters for practice.

These are the two types of meters installed for residences in Windsor. The only difference is the arrangement of the features on the dial and the shape of the low flow indicator. Water flow through Windsor’s meters is measured in gallons as opposed to CCF, or Hundred Cubic Feet, another commonly used unit of measure for water meters.



For the meter on the left, the readout is **3,699,389.3**, and for the meter on the right the readout is **138,482.9**. Again, the last digit on the right (the zero) is the number indicated by the sweep hand, plus any tenths. That’s all there is to it.

Some side notes: ¹If you are comparing the meter readout listed on your bill to the actual numbers on the dial, you may be wondering why the bill has fewer digits listed. That’s because you are only billed for each 1000 gallons of use. The numbers on the dial with a white background indicate 1000’s of gallons. The numbers with a black background indicate hundreds, tens, and single digits. For the purposes of billing, only the white digits are read and recorded on your statement. ²If the meter read indicated on your bill is higher than the current readout on the meter; an estimated read of your water use has been entered for your account. This occurs when physical obstructions prohibit the Town’s meter reader from accessing your meter. If you haven’t already received one, an obstruction letter will be forthcoming with instructions on how to remedy the problem. Once the obstruction is remedied, allowing the meter reader to obtain an accurate read, an adjustment to your bill will be made to reflect actual consumption. ³On the outside chance that the meter (or low flow indicator) is moving, double check to make sure that all the water is off. If everything is off and there is still movement, you have a leak. Read the end section, *Leak Detection*, for ideas about what to do next. Otherwise, continue with the water use test.

Now that you have a beginning read, you can calculate your water use. For the laundry example, simply do a full load of wash. When the washing machine has finished running, go out and re-read the water meter. ***Do not use any other water while the test is being conducted!*** Now subtract the first water meter read from the end read and you will know the number of gallons used for each load of laundry. For example, if the beginning read is **138,482.9** and the end read after doing a load of laundry is **138,526.4** then:

$$\begin{array}{r} \text{Gallons} \\ \text{Per} \\ \text{Load} \end{array} = \frac{138,526.4 - 138,482.9}{43.5 \text{ gal}}$$

Once you know the number of gallons per load, it's a simple matter of multiplying the gallons times the number of loads in a week, or in a two-month billing period.

The method for calculating water use for lawn irrigation is very similar. Most homeowners utilize some type of automatic sprinkler timer for irrigation. These timers have from 3-12 stations on average, and are automated to run each station for a set amount of time and for a set number of days each week. If you can calculate how much water a single station uses in one minute, then you can do some simple multiplication to figure out how much water is used per station, per week, month, or billing period. For example, let's say your front yard lawn is watered by two stations (1 & 2) and your automatic timer is programmed to run each station for 12 minutes, three days a week. First, get a beginning read from the water meter. Run station #1 for precisely 5 minutes, and then re-read the meter. ***Again, do not use any other water while the test is being conducted!*** Subtract the first meter read from the second read to calculate the number of gallons used in 5 minutes. Repeat the test for station #2.

	Station #1	Station #2
End Read:	3,669,478.3	3,669,543.9
Beginning Read	- 3,669,389.3	- 3,669,478.3
Gallons Used (5 min):	89.0	65.6

Now calculate gallons per minute for each station:

Station #1	Station #2
$\frac{89.0 \text{ gal}}{5 \text{ min}} = 17.8 \text{ gal/min}$	$\frac{65.6 \text{ gal}}{5 \text{ min}} = 13.1 \text{ gal/min}$

Based on the automatic irrigation program of 12 minutes per station / 3 days per week, the total minutes programmed per week to water the lawn would be 36 minutes per station. Multiplying total minutes per week by gallons per minute for each station gives

you gallons per week for each station. Adding each station's total gallons per week gives you the gallons per week used to water your front yard lawn:

Total Minutes Per Week: $12 \text{ min/day} * 3 \text{ day/week} = 36 \text{ min/week}$

Gallons Per Station / Week: Station #1 $17.8 \text{ gal/min} * 36 \text{ min/week} = 640.8 \text{ gal/wk}$
Station #2 $13.1 \text{ gal/min} * 36 \text{ min/week} = 471.6 \text{ gal/wk}$

Front Yard Lawn

Total Gallons Per Week: $640.8 \text{ gal/wk} + 471.6 \text{ gal/wk} = 1112.4 \text{ gal/wk}$

You can complete the same test for each irrigation station to calculate the total water used for all your irrigation. Because some drip irrigation lines are long and take a few minutes to fully pressurize, it would be better to lengthen the test time to 10 minutes for drip stations to get a more accurate measure of gallons per minute.

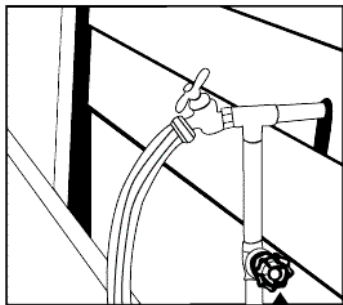
Leak Detection

If your meter's low flow indicator is moving and you are certain that all the water is turned off, both inside and outside the house, you have a leak. The low flow indicator is designed to aid in the detection of small amounts of water flow through the meter, such as might be seen with leaking faucets, toilets, or irrigation valves. These continuous, small volume leaks can add up to significant and costly water waste over the length of a couple months or a year, often going undetected until a homeowner receives an elevated water bill. As a precaution against a false indication of a leak, take care before proceeding further to ensure that no scheduled irrigation is running due to an automatic timer, that automatic icemakers are off, and that no water softening systems are recharging. If movement on the meter is still detected following a thorough check of the premises, then further investigation is warranted.



The best place to begin the investigation is outside the house where the master valves are found. Once located, shut off the master valves to both the house and the irrigation system. Re-check the meter for movement. If there is still movement, the leak is likely located in the transmission pipe between the meter and the main shut off valves. The services of a leak detection company may be required to pinpoint the source of this type of leak before undertaking costly excavations. If the movement on the meter has stopped, open just the master valve to the irrigation system, and then re-check the meter for movement again. If the meter is once again moving, the leak is likely due to a faulty control

valve in the irrigation system or can be traced to a leaky hose bibb. If no movement is detected, shut off the master valve to the irrigation system and open just the master valve to the house.



water valve



Again, re-check the meter for movement. If movement is detected, the leak is occurring somewhere in the house.

To narrow down the source of a leak in the house, it is best to eliminate the most common offenders first. Starting with the toilets, the Town of Windsor offers free leak detection dye tablets which, when dissolved in the toilet tank, can diagnose a leaking flapper. These are available 7am - 6pm, Monday through Thursday at the Town's Utility Billing Office. While you are conducting this test, check to see that the water level in the toilet tank is set at the correct height. It should be ½" to 1" below the top of the overflow tube. An elevated water level can be indicative of another type of toilet leak that occurs when the fill valve in the tank fails to shut off entirely, filling the tank to the point of overflow into the overflow tube. After checking the toilets, visibly inspect all faucets and fixtures for leaks. Be sure to inspect the points of connection within any cabinetry. If nothing is found leaking, more complete information and diagnostic help is available from the *Practical Plumbing Handbook*, a publication of the [California Urban Water Conservation Council](#) that is available free at the Town's Utility Billing Office. The Town's Water Conservation staff is also available to assist you by conducting a free water use assessment for your home. Call 838-5357 for more information.

