# Knowledge On Tap:
# Understanding Your Water Meter

## Meter & Service Line Maintenance

### Who owns and maintains the meter? What about the lines attached to the meter?

The City of Columbia owns and maintains:

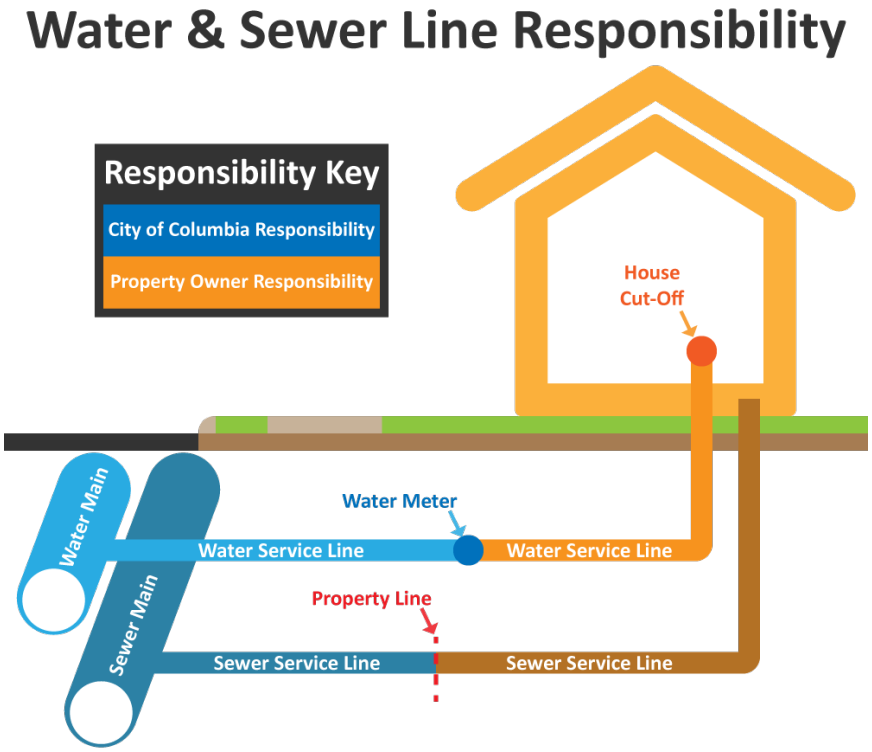
- The water main
- The water service line running to the meter
- The meter box
- The meter
- The sewer service line from the property line to the sewer main
- And the sewer main.

If there is a problem with any of these, contact the City at 803-545-3300, and we will address it.

The property owner owns and is responsible for maintaining:

- The water service line running between the meter and the building
- All plumbing attached to the water service line
- And the sewer service line up to the property line.

The image below shows which portions of a customers' water and sewer service are the responsibility of the City and which are the responsibility of the property owner. The City cannot repair private lines.

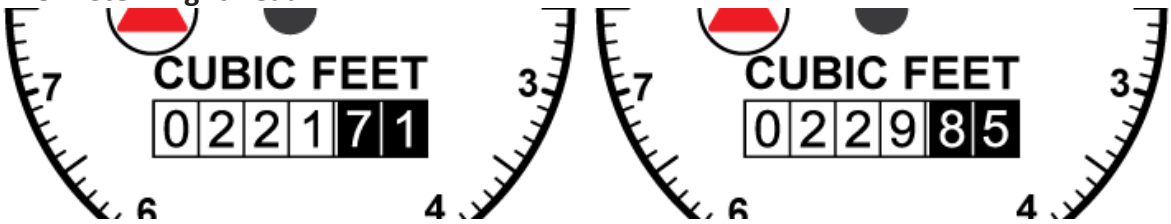


# General Meter Questions

## How do you read a meter?

Your water meter is designed to read cubic feet. You are charged for your water use in units of 100 cubic feet. When City forces read your meter, they do not round up. Instead, they drop the two black boxes on your meter from the reading. This means you are only billed for complete units of 100 cubic feet.

**The Meter Might Read:**




**The Bill Reads:**

| CHARGE DESCRIPTION | SERVICE PERIOD | DAYS OF SERVICE | METER NUMBER | PREVIOUS READING | PRESENT READING |
|---|---|---|---|---|---|
| Residential Water | [redacted] | 31 | 12345678 | 221 | 229 |
| Residential Sewer | [redacted] | 31 | | | |
| Storm Water | [redacted] | 31 | | | |
| Total New Charges | | | | | |

Over time, these partial uses will add up to a complete 100 cubic feet unit that will be added to that month's bill. For example, if you use on average 750 cubic feet per month, during one month you may only be charged for 700 cubic feet while the next you would be charged for 800 cubic feet (50 from the previous month + 750 from the current month).

## Where do I find my meter?

Most meters are located along the right of way in your front yard. For most residential customers, a box will look like:


## How does a water meter work?

Your water meter is a **positive displacement water meter with a nutating disk**. The meter is designed so that the pressure of moving water rotates a disk. As the disk revolves, it turns a magnet which causes gears to move. The moving gears advance the numbers on the meter dial.

# Meter Accuracy

## How accurate are the City's water meters?


The City of Columbia's water meters are designed to accurately measure the water being consumed by its customers. The accuracy tolerance is currently ±2%; this standard is established for the water industry by the American Water Works Association (www.AWWA.org). These standards are designed to assure rate payers that all of the water used will be accurately and fairly measured. The image to the right show a ±2% error range (blue box) for a 1 cubic foot ($ft^3$) reading on a standard residential meter.

## Who guarantees the accuracy of the City's meters?

The accuracy of the meter is guaranteed by its manufacturer when it is purchased by the City of Columbia.

## Can my meter register inaccurately one month then go back to normal?

No. If your meter is registering inaccurately, there is something wrong with the meter. A broken meter cannot repair itself.

## Can meter accuracy change over time?

**Under-Register (Register less than actual use):**

**Yes.** The meter is designed so that the pressure of moving water rotates a disk. As the disk revolves, it turns a magnet which causes gears to move. The moving gears advance the numbers on the meter dial. The disk and gears are mechanical parts that can wear down and cause the meter to start to under register the amount of water being used.

This under-registering can happen primarily by:

- **Slippage:** Either the disk that rotates in the measuring chamber or some part of the gear train starts to slip. If something is slipping in your meter, it is similar to when a belt slips in your car – the engine may be turning, but a slipping belt won't grip whatever mechanism is on the other end so that mechanism won't turn. In the meter, this means that the disk or gear might still be moving with the water flow, but it can't properly grip the next mechanism in the meter to make it turn and make the numbers advance as quickly as they should.
- **Sticking:** Either the disk that rotates in the measuring chamber or some part of the gear train sticks. If the disk sticks, water can still flow into the chamber, over the disk, and out of the chamber, but without a moving disk, nothing is driving the gears and the numbers do not advance. If the gears stick, even if the disk is still rotating, the numbers do not advance.

In each of these cases, extra water gets through without advancing the numbers on the meter, and the end result for a customer is a bill that is lower than the actual use.

**If you had an old meter that was recently replaced, you will likely see your registered consumption go up since the new meter is more accurately reading all of the water that passes through it.**

**Over-Register (Register more than actual use):**

**No.** Meters do not start to over register as they start to wear. The only time a meter might over register is if there is a manufacturer defect. If the meter is defective and over registering, we can tell with a meter test.

## Can I test my meter for accuracy?

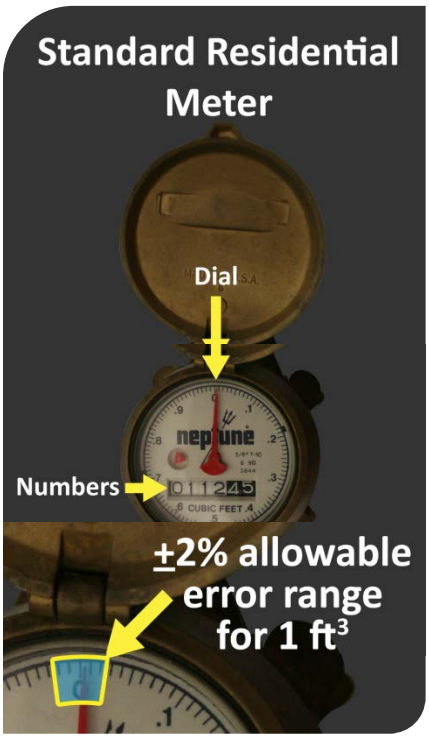
You can test your own meter for accuracy. While the City cannot accept your results as proof of a faulty meter, it could indicate a problem that staff can further investigate. If we confirm there is something wrong with your meter, we will replace it free of charge.

You will need the following supplies:

- A bucket that holds at least 1 gallon and clearly marked ½ gallon (2 quart) and 1 gallon (4 quart) lines.[A]
- A piece of paper and a pen or pencil

To test the meter, we recommend using a kitchen faucet. Do NOT use a hose as it may leak and ruin the test. Once the test starts, make sure you measure ALL the water that comes from the faucet. If you spill any, you will need to start the test over. Before you start the test, confirm that your system is not leaking. (See **Testing For Leaks With A Meter** below.)

1. Go outside and note the location of the dial and the numbers. In the example to the right, the **Dial** measures portions of a cubic foot ($ft^3$) in 1/10 (numbers on the dial face) and 1/100 (little hash marks) increments. The **Numbers** show the total $ft^3$ that have passed through the meter. The **Dial** reads 0.00 $ft^3$; the **Numbers** read 11245 $ft^3$. The total for the meter is the **Dial** + **Numbers** or 11245.00 $ft^3$.
2. Go inside and fill your bucket or jug one (1) time up to the ½ gallon mark and seven (7) times up to the gallon mark until you have measured out 7.5 gallons.[B]
3. Go back outside and note the value of the **Dial** and the **Numbers**. If you accurately measured 7.5 gallons, the **Numbers** should have advanced one (1) space, and the **Dial** should be in approximately the same place (it would have made one complete revolution to end up in approximately the same location).[C]




***Notes:***

**A.** *You can also use a 1 gallon jug like a cleaned, empty milk jug. You will need to make a ½ gallon mark on the jug. Do this by carefully filling the jug with 8 cups of water. Place the jug on a level surface and mark a line. This is your ½ gallon mark. The 1 gallon mark should be at the neck of the jug, but you can also add 8 more cups and make another mark.*

**B.** *This test uses approximately $0.06 worth of water for an in-city residential customer and $0.10 worth of water for an out-of-city residential customer. In addition, you can save the water for plants.*

**C.** *The industry standard allows for a 2% margin of error in a meter. This is equivalent to two smaller hash marks on either side of the 1/10$^{th}$ Ft2 dial. In the example picture, if the 1/10$^{th}$ Ft$^2$ Dial fell anywhere in the blue region, the meter would be registering correctly.*

## I think there's a problem with my meter. Will the City test it for me?

Absolutely. Contact the City of Columbia at 803-545-3300 if you have any concerns about water service or meter.

## I think there's a problem with my meter. Will you replace it?

Contact the City of Columbia at 803-545-3300 if you have any concerns about your meter. We will send someone to test it. If testing reveals something wrong with your meter, we will replace it at no cost to you.

## How does the City test a meter for accuracy?

When staff test a homeowner's meter for accuracy, they use a calibrated meter. To do the test, they first confirm that the system is not leaking. They will ask the homeowner to confirm that all the faucets are turned off and that any machines that use water, like the dishwasher or ice maker, are also not running. To test the meter, they:

1. Hook the calibrated meter to one of the house's spigots.
2. Note the reading on both the property's meter and the calibration meter.
3. Run a set amount of water through the spigot with the calibrated meter.
4. If the system is not leaking, the same amount of water should have passed through both meters. Staff then notes the reading on both meters and confirms whether or not they are showing the same change in reading.

If the test confirms a problem with the meter on the property, the City will replace it at no cost to the homeowner.

***Note:*** *The industry standard allows for a ±2% margin of error in a meter. For 1 $ft^3$ of use, this is equivalent to two smaller hash marks on either side of the small numbers on the dial face (see blue area in the image above).*