



SUB METERING WATER – LEAK DETECTION

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Why is leak detection important?

It is estimated that 14% of the average American household's water use is actually due to household leaks. According to Water Sense (EPA water program) the average household's leaks waste more than 1 trillion gallons annually nationwide. Just fixing leaks can save multi-family property owners about **ten to twenty percent** on their water bills.

Water leaks affect the water bill and the sewer bill. Sewer rates are based on the amount of water consumed.

Where is the most prevalent leak?

Toilets are the number one water fixture that leaks water. Often times since a toilet leak may not be seen it can go undetected for weeks if not months. Causes of toilet leaks include damaged flappers, cracked fill valves and hung up flapper chains.

How can the multi-family property owner both sub meter water consumption and stop leaks?

It is highly recommended to install water meters from H2Odegree that are designed to both sub meter water consumption in apartments and can provide the information required so a server can e-mail daily leak report to the property owner's maintenance team.

How does the H2Odegree water meters work and why can't other water meters detect leaks?

There are three basic types of water meters used to sub meter water in multi-family housing; small turbine water meters, pulse water meters and encoded register water meters. Only the H2Odegree water meter can detect and report water leaks.

1) H2Odegree small turbine water meters

This category of water meter was invented by H2Odegree in 2005. This water meter has a small turbine which spins inside of a capsule as water flows through the water meter. A microprocessor counts the number of revolutions. The turbine may rotate 1800 revolutions for every gallon. Each revolution of the turbine equates to a predetermined fractional gallon. In addition to counting the gallons the microprocessor also counts events. Events are the number of times the flow of water starts and then stops. Finally the microprocessor counts the number of seconds water was flowing.

Leaks are detected by looking at daily water consumption (gallons), the daily number of events and the daily total water flow time.



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Daily gallons per day

For a one to two bedroom apartment the daily number gallons should be less than 200 gallons.

Daily gallons per event

If the number of events is very high (hundreds or thousands) then the gallons per event will be very low (typically 0.1 gallons per event). This is very indicative of a flapper leak. The flapper allows water to flow into the bowl, the fill valve refills the tank and the cycle starts all over again. Each stop and start of water flow is recorded by the water meter.

Daily total water flow time

If the number of seconds the water was flowing into the apartment is high and the number of events is low or even zero then water is continuously running. This is indicative of a cracked fill valve or hung up flapper chain. Water is constantly running into the toilet bowl.

The H2Odegree reports water consumption (gallons) for each apartment for billing purposes.

Advantage

Small turbine water meters are inexpensive, since there is no electronics in the water meter
The small turbine water meters are specifically designed to support leak detection.

Disadvantage

If the radio device loses power then the water which passes through the water meter while there is no power is lost.

Pulse water meter flow rate range

Typical range is 0-12 gallons per minute

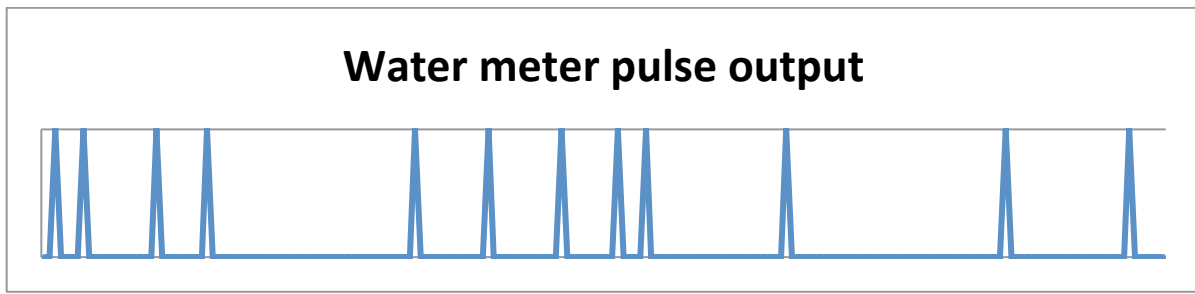
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2) Pulse water meters

Most water meters used in sub metering generate a pulse each time a fixed amount of water passes through the water meter. A pulse water meter outputs one pulse every 1 gallon or every 10 gallons. In the example below the pulse output is 1 pulse for every 10 gallons so the 12 pulses represent 120 gallons.



Advantage

Pulse water meters are inexpensive, since there is no electronics in the water meter
The interface to count pulses is easy to implement

Disadvantage

No leak detection other than “that seems like a lot of water”

If the radio device loses power then the water which passes through the water meter while there is no power is lost.

Pulse water meter flow rate range

Typical range is 0-40 gallons per minute but can reach as high as 0-1,000 gallons per minute

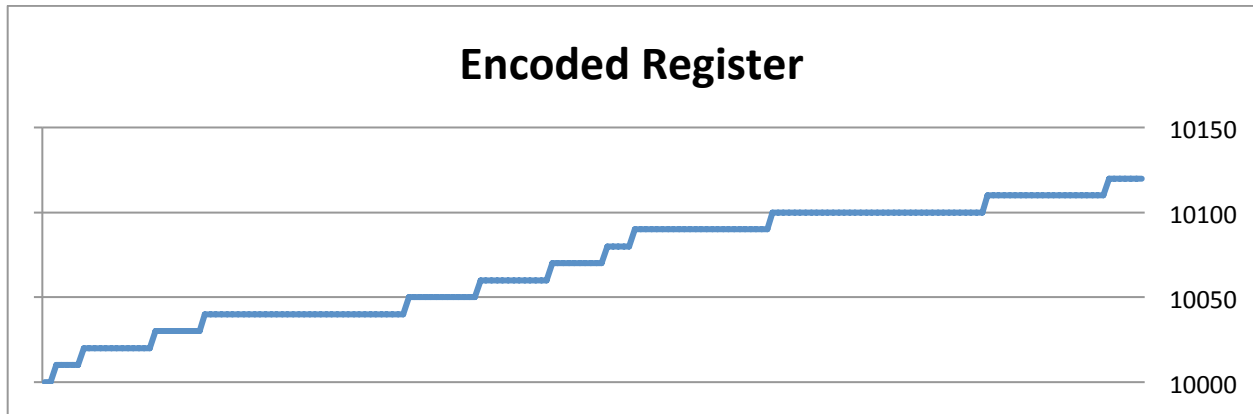
3) Encoded register

Most water meters used in utility metering have a mechanical register. An interface board in the meter reads the mechanical register and encodes the data in order to send the data over a three conductor cable.



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As shown on the next page the encoded register starts at 10000 and every 10 gallons that passes through the water meter increases the mechanical register by 10. The graph shows the same data as the “Water meter pulse output”. Over the time period shown 120 gallons flowed through the water meter and the mechanical register shows 10120 gallons at the end of the time period.



Advantage

Encoded register water meters are more expensive than pulse water meters
If the radio device loses power it can read the encoded register and not miss any water consumption.

Disadvantage

No leak detection other than “that seems like a lot of water”
The interface to read the encoded register may be difficult to implement and may be proprietary

Encoded register water meter flow rate range

Typical flow rate range is 0-40 gallons per minute but can reach as high as 0-1,000 gallons per minute