



Choosing a Water Meter

When Horizons grants resource consent to take ground or surface water, installation of a water meter will often be specified as a condition of the consent. A water meter allows both us, and the consent holder, to accurately check the amount of water being taken.

Purchase and installation of the meter is the consent holder's responsibility. In many cases, once the meter is in place, we will install equipment to link it to our telemetry system so information on the volume of water taken can be sent directly to our office.

A reliable and accurate water meter is key to providing good information so there are some important things you need to consider when choosing a water meter.



Our Requirements

To meet Horizons requirements a water meter must...

- **Have an accuracy of +/-5% under field conditions.**
To achieve this accuracy we recommend the meter be documented with a wet calibration carried out under laboratory conditions demonstrating an accuracy of at least +/-2%. When you purchase a meter, ask your supplier for a calibration certificate.
Choosing a meter with an accuracy of +/-2% will also allow for some degradation and loss of accuracy before it will fall outside the +/-5% threshold and require replacing.
- **Be tamper-proof**, or where unauthorised interference can occur, it should be easily detectable.
- **Provide flow data as instantaneous rates and/or totalised volume** and be simple to operate and read.
- **Include a pulse output that is compatible with our telemetry systems** (Horizons, or your supplier can advise you on this).
- **Have sufficient pipe length.** Pipe length should be 10 x pipe diameter before the meter and 5 x pipe diameter after the meter or manufacturer's specifications. This reduces turbulence in the pipes and gives the most accurate readings.
- **BE INSTALLED TO MANUFACTURER'S SPECIFICATIONS AND CONDITIONS OF YOUR RESOURCE CONSENT**
If you need further information call Horizons on 0508 800 800 or contract your supplier.



Our Role - Telemetry



Telemetry is an electronic way of transferring your water meter data to Horizons using cell phone technology. It allows us to collect your meter records automatically without having to manually read the meter.

- 1 Typical telemetry installation in a pump shed where power is available (left).



- 2 Telemetry installation powered by solar panel and set above flood level (left).

If you would like more information about water meters or our telemetry systems please contact our Hydrology team on 0508 800 800 or see www.horizons.govt.nz



Also consider the following...

Water Source

Where you are sourcing water from will have a bearing on water quality (silt, weed etc), range of flow rates and head, so take into account whether the source is a river, surface water, groundwater, open channel or pressurised pipe.

Head (Pressure)

How much head do you have? Do water levels fluctuate during a season? Remember the pipe must run full to provide an accurate measurement.

Flow Range

What is the flow range of your abstraction throughout the year? Most meters have a minimum flow below which they cannot provide an accurate reading. If you choose a large meter, you may lose accuracy at the lower end of the flow range. Meters continually operated in the high flow range wear out and fail much quicker than meters that operate in the middle of their flow range. Size your meter appropriately for the flow you intend to abstract - Remember; the meter is required to be accurate to the full amount of the consented abstraction.

Access to Power

When selecting meters for remote locations consider whether they can run accurately on solar power, batteries or if they even need power at all. There may also be a requirement in your consent to maintain power to our telemetry unit.



Accuracy

You will need to choose a meter that will allow you to achieve a minimum of +/-5% accuracy. Remember that a meter will only be accurate if the environmental conditions meet all the manufacturer's requirements of flow profile, temperature, humidity, flow range, vibration etc.

Access to Meter

Meters can be buried, with some manufacturers providing special containers for just this purpose, however, this can cause access problems for you and us. It is preferable that meters be installed so they are accessible at all times. In particular, we require access to the meter itself and the straight lengths of pipe on either side of the meter.

Longevity

Consider the average operating life before overhaul will be required. This will depend on the meter type and the situation it is used in. Typical mechanical insert meters (paddle or turbine) have an average operating life of 4 years before requiring overhaul, while electromagnetic meters typically have an average operating life of 20 years. Remember this is just a guide and the lifespan of any meter will depend on water quality.

Pulse Output

The pulse output from your meter should be of a 'clean contact' of between 50 - 200 milliseconds (Horizons or your supplier can advise you on this).

Cost

Generally, the more accurate and reliable the meter, the more expensive it is. However, the purchase price should not be your only consideration - also check out the cost of installation, maintenance, data collection, calibration and longevity.



Types of Water Meters

Electromagnetic Meter

How it works

The meter consists of a section of pipe with a magnetic field around it and electrodes to detect electrical voltage changes. When a conductive fluid passes through the pipe an electrical voltage is created in the fluid, which is proportional to the fluid velocity. Electrodes in the probe detect the voltages generated by the flowing water. Measurement of the voltage is then converted to velocity so flow rate can be derived. This type of meter is produced in a range of standard sizes and flow capacities.

Advantages

- High degree of accuracy (+/-0.15% - 2%) and consistent over full flow range.
- Wide flow range and no obstructions of flow.
- Robust with only minimal routine maintenance required.
- No moving parts.

Disadvantages

- Power supply required.
- Electronic components vulnerable to lightning damage.
- Repairs require skilled technician and specialised equipment.



Mechanical Insert Meter

How it works

An impellor is rotated by water passing through the meter, which is translated to a volumetric reading. The mechanism is calibrated by an adjustable device that is preset and security sealed. These meters are available in various sizes and have to be full of water during measuring.

Advantages

- Reliable and accurate means of measurement providing meter is correctly installed.
- Relatively low initial cost.
- In-line maintenance with simple, efficient mechanism.
- Headworks replacement readily available.

Disadvantages

- Mechanical parts can be damaged, making frequent accuracy testing necessary.
- Prone to wear in silty water, potentially resulting in loss of accuracy and need for replacement.
- Some headloss possible.
- Short useable life.

**ALWAYS ENSURE THAT THE METER IS
INSTALLED TO MEET THE CONDITIONS OF
YOUR RESOURCE CONSENT.**



Types of Water Meters continued

Ultrasonic meters

How it works

Ultrasonic meters use transducers (electronic sensors) to measure water velocity in full pipe applications and convert this to a flow rate.

Transducers are fixed on the outside of the pipe and a transit time method is used to calculate the velocity of water within the pipe. The transit time method calculates velocity from the differences in time for an impulse to pass between two transducers located on the outside of the pipe.

Advantages

- Robust with minimal routine maintenance required.
- Simple to install and no moving parts
- Same meter can be used in a wide range of pipe sizes.
- Consistent over full flow range.

Disadvantages

- Repairs require skilled technician and specialized equipment. Power supply required.



How They Compare

SPECIFICATIONS	ELECTROMAGNETIC FLOWMETER	MECHANICAL INSERT METER (PADDLE OR TURBINE)	ULTRASONIC METERS
Accuracy	+/-0.15% - 2%	+/-2% - 5%	Better than +/-2%
Reliability and tamper proof protection	Very High	Medium	High
Flow rate indication available	Yes	Yes - with data logger attached	Yes
Remote reading capability	Yes	Optional	Yes
Average operating life before overhaul (dependant on water quality)	20 years	4 years	15 years
Pressure (head) loss	Negligible	400mm (insertion type meter) Negligible (paddle type meter)	Negligible
Resistance to blockage	Very High	Medium	Very high
Resistance to blockage with weed	High	Medium	High
Relative installed cost	Medium	Relatively low	Low
Water quality	Can cope with silty water	Prone to wear with continued exposure to silty water	Yes or solar/battery Can cope with silty water

Note: only use the table above as a guide. Contact manufacturer for complete details.



Installation

Installing your water meter in accordance with the manufacturer's specifications and your resource consent conditions is essential for your meter to be as accurate as it claims. Good installations leave sufficient straight length of pipe between gate valves, elbows etc. and the water meter to ensure there is no turbulence in the water passing through the meter, which reduces accuracy. This may also be part of your consent conditions. Your consent conditions may have requirements beyond the manufacturers specifications.

Good Installation

A good water meter installation is a meter installed with sufficient distance between the meter and upstream and downstream sources of turbulence, such as elbow and valves, in accordance with the resource consent conditions and manufacturer's specifications e.g.



Poor Installation



1. Meter too close to elbow.



2. Meter too close to flange and gate valve, and insufficient straight length of pipe.



3. Meter too close to control valve and gate valve.

For more details see the Resource Management section of our website www.horizons.govt.nz.



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If you would like more information about water meters or our telemetry systems please contact our Hydrology team on **0508 800 800** or see **www.horizons.govt.nz**



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