

# Counting Every Drop

## Understanding your meter

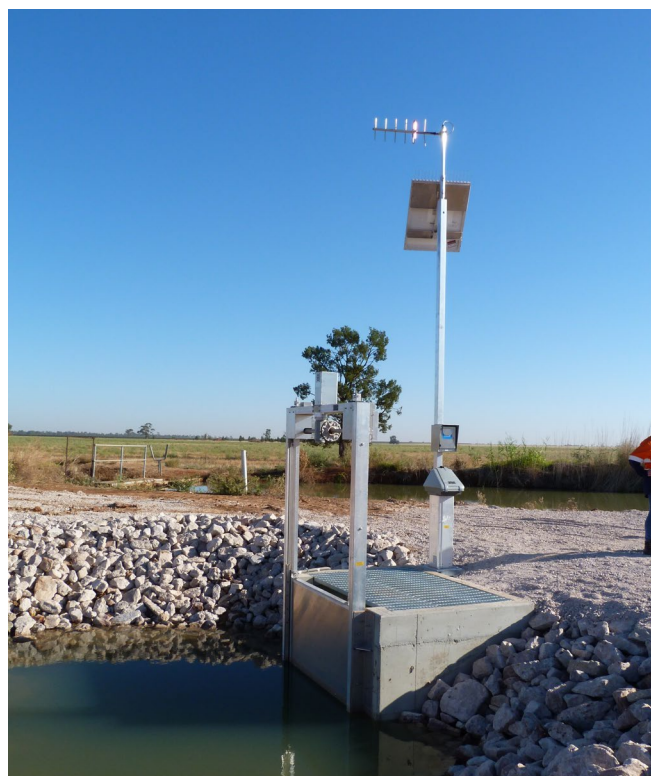
At Murrumbidgee Irrigation (MI) we have had a long history of investing in metering technology including testing different meters and assisting in the development of industry standards. We are proud of our meter program. Over the last 25 years, as standards have been developed and new technology has become available, we have responded by updating our meter fleet from the iconic Dethridge wheels of the turn of the century to Doppler meters in the 1990's and now to Electro-Magnetic meters.

**Dethridge meters** have served the MIA well for the best part of 80 years. They are a robust meter with a demonstrated high level of accuracy when operated under their design flow conditions. They are however easy to obstruct and are known to be inaccurate at very low and very high flow rates. Towards the end of the 1990's, new cost-effective metering technology was becoming available that better supported the changing irrigation practices of customers (eg more frequent, lower flow irrigation due to drip irrigation in horticulture crops). Consequently, MI commenced a program of replacing Dethridge Wheels with Doppler meters.

The **Doppler meters** pre-dated any Australian or industry metering standard and were chosen by MI for their tamper resistance and accuracy under a range of flow conditions. Doppler meters measure the shift in frequency of sound waves reflected from particles in the water that flow down a tube. The cross-sectional area of the tube is used in the calculation of the flow rate. Because tube diameters vary during manufacture, MI sets a standard diameter that is always slightly less than the actual flow tube diameter. This conservative approach means that Doppler meter readings have a small bias in favour of the customer.

In December 2018 the NSW Government adopted the NSW Metering Framework. From 1 April 2019, new and replacement meters (above a certain size threshold) are required to be pattern approved and meet the Australian Standard for metering (AS4747). The MACE Doppler Meters and some of the older Electro-Magnetic meters used by MI are not currently pattern approved but have been "grandfathered" under the Framework. This means that they must be replaced with a pattern approved meter at the end of their useful life.

MI is currently replacing our Doppler fleet with pattern approved Electro-Magnetic meters. Electro-Magnetic meters measure flow rate by measuring the voltage across the flow as it moves through a magnetic field and so do not have the same configuration bias as Doppler meters. This means that when your meter is upgraded to an Electro-Magnetic meter there may be a small increase in recorded usage.



*MI's Electro-Magnetic meters*

**If you are concerned about your meter or changes to your metered usage please contact our customer engagement team on 02 6962 0200 to discuss.**



## Mace Doppler Meters



These meters use ultrasound to measure the speed of dirt, bubbles and other particles in the stream flow. Doppler meters transmit a sound wave into the flow. This sound wave is reflected by the particles in the water. The difference between the transmitted frequency and the received frequencies is proportional to the velocity of the flow.

To calculate the flow rate the cross-sectional area of the flow tube must be known. Because pipe size diameters vary between manufacturers and production runs, MI uses a “recommended” pipe diameter for configuration. This is a conservative approach which slightly biases the meter reading in the customer’s favour.

- Doppler meters currently in service include:
  - MACE Series 2
  - MACE Series 3

## Electro-Magnetic Meter



Electro-Magnetic flowmeters use Faraday’s Law to determine the flow of water in a pipe. A magnetic field is generated around a flow tube. As the water passes through the magnetic field it causes a voltage signal which is sensed by electrodes located on the flow tube walls. When the water moves faster, more voltage is generated. The voltage generated is proportional to the flow rate.

- Electro-Magnetic meters currently in service include:
  - Siemens MAG8000
  - Siemens MAG5000
  - ABB
  - Tyco i300
  - Tyco M300
  - Aquamonix i500
  - Sensus IPEARL

## Low Flow Mechanical Meters



A relatively low-cost meter for low volume flows, usually for domestic or garden connections. Mechanical meters have an impeller that records the flow inside a fully flooded tube.

- Mechanical meters currently in service include:
  - Bermad MT-KD-P
  - Elster MI50

## SlipMeter



Used around our network to measure flows at regulating structures and for large (custom) on farm meters. The SlipMeter uses an ultrasonic array to measure instantaneous flow.

- Slipmeters currently in service include:
  - Rubicon SlipMeter

### What is Pattern Approval?

The National Measurement Institute of Australia checks non-urban water meters for compliance with the Australian Pattern Approved Standards. A meter is Pattern approved when it meets these requirements within the operating range specified by the meter manufacturer.

**This fact sheet indicates the Pattern Approval status of our meters as of June 2023:**

- Pattern Approved
- Not Pattern Approved
- Pending Pattern Approval

For more information see: [Pattern Approved ‘non-urban’ Water Meters \(revised June 2022\)](#) Department of Climate Change, Energy, the Environment and Water.