



Department of Primary Industries and Water

WATER METER STANDARD

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SCOPE

This document details the Department's Standard for water meters intended for the metering of non-urban water in full flowing pipes. It includes the technical specifications and requirements for meter design, construction and installation.

This Standard applies to water meters used to measure flow volumes and rates as required under Part 11 of the *Water Management Act 1999 (WMA)*.

This Standard does not apply to measuring devices intended for the metering of non-urban water in open channels or partially filled pipes. The use of such devices requires written DPIW approval and will have to be installed in compliance with DPIW directions, which will be given on a case specific basis.

Water meters **must** meet the requirements of this Standard at all times during their operation.

For the purpose of this document, the definitions below shall apply:

Water meter (a "meter"): *an instrument that measures and records a flow or level of water and includes any ancillary device attached to or incorporated in the instrument.*

The instrument must be able to measure and display the cumulative flow volume and allow for readings to be taken to determine the instantaneous flow rate of water passing through a pipeline.

Flow display unit: *the part of the meter that displays the measurement results*

Data logger: *an electronic device that records data over time either with a built in instrument, sensor or via external instruments and sensors*

Discharge side of the meter: *Downstream of the meter*

Intake side of the meter: Upstream of the meter

DPIW: Department of Primary Industries and Water

Written DPIW approval: Documented approval on Departmental letterhead signed by a DPIW officer authorised under the Water Management Act 1999

TECHNICAL REQUIREMENTS

Meter Design and Construction

All meters **must** conform to the following technical specifications:

Accuracy limits

Meters must be designed with an accuracy of $\pm 2.5\%$ across the flowrate range under rated operating conditions and the maximum permitted uncertainty of a meter installation shall not exceed $\pm 5\%$.

The meter manufacturer must warrant that the new meter will meet this accuracy standard. The owner must maintain the stated accuracy of their meter by replacing the wearing components as required; depending on the manufacturer's requirements and the amount and quality of water pumped through the meter.

Flow display unit

The meter must include an integrated flow display unit for the display of flow data. The flow display unit must be resistant to corrosion and fogging. The flow display unit must be of a size and type that is easy to read with clearly specified units and must indicate and/or enable a determination of the following parameters to be made:

Cumulative flow totaliser able to be expressed in megalitres (ML) with a minimum of a six digit display, and instantaneous flow rate able to be expressed in litres/second (l/s).

Output requirements

The meter must have the capability to provide an electronic output suitable for sending to ancillary equipment such as a remote data logger. *(Note: In the case of some meters, this will require an additional component. While it will not be necessary to install this component until a data logger is to be connected, at that time it must be available. Therefore it is strongly recommended that this component be obtained at the time of meter purchase.)*

Electrical power source

Where a meter installed relies in any way on an electrical power source, then it shall have a non-volatile memory to ensure that recorded data is not lost in the event of a power or battery failure. The meter must be designed such that in the event of an external power supply failure (AC or DC), the meter indication of volume just before failure is not lost, and remains accessible for a minimum of one year.

Any other properties or parameters of the meter shall not be affected by an interruption of the electrical supply.

The power supply shall be secured from tampering or any such tampering will be evident.

Water quality

The meter must be able to operate accurately where water contains suspended solids and/ or entrained air.

Flow direction

The meter must be labelled so as to show the direction of flow, orientation and any other necessary installation information to achieve the required accuracy. The flow volume totalised must be unaffected by flow in the opposite direction to the labelled flow direction.

Serial number

The meter must have a clearly identifiable manufacturer's serial number securely attached to or imprinted on the meter, and is to be located in a position that is easily visible when taking manual readings from the meter display unit.

Security

The meter must be tamper proof and include protection devices that prevent and/or indicate tampering of the meter.

Testing/certification

The meter must be an irrigation type meter supplied from a manufacturer certified as compliant with Australian Standard/ New Zealand Standard (AS/NZS) 9001 – Quality Management Systems. The brand and model of meter must have been tested in a flow rig utilising a reference flow meter traceable to a National Association of Testing Authority (NATA) accredited laboratory.

Element protection

The measuring mechanism of the meter must be protected to at least IP68 in accordance with AS1939 (IP Code).

User's guide including installation manual

The meter must be supplied with a User's Guide and Installation Manual. The Guide is to detail the installation requirements to achieve the stated accuracy, and provide a diagram of the configuration of the pipe work and meter to meet the accuracy requirements.

Materials

The meter must be manufactured from sound, durable, corrosion resistant materials. Where materials are coated, the coating shall be in accordance with AS4158. All parts of the meter in contact with water must be manufactured from materials that are non-toxic, non-reactionary and biologically inert.

Maintenance

The meter must be designed for easy and quick maintenance and cleaning and should be of a type that incorporates a self-cleaning mechanism.

Installation

The meter **must** be installed in accordance with the manufacturer's specifications however the following minimum standards **must also** be adhered to:

1. Meters are to be located as close as practical to the point of extraction. There must be no offtake of water between the point of extraction and the meter. To reduce interference it is preferable that the meter is mounted on the discharge side of the pump and located within a weatherproof enclosure (ie pump house).

Note: Written DPIW approval is required prior to installing a meter on the intake side of the pump.

2. The measuring mechanism of the meter must be located in straight clean pipe of uniform, circular cross section and without any fittings or obstructions. In all

cases the meter must be installed so that at all flow rates there is a full pipe of water on both the intake and discharge sides of the meter.

In addition, subject to any specific installation requirements, a minimum length of ten (10) diameters of straight rigid pipe¹ must be fitted on the intake side of the meter and a minimum of five (5) diameters of straight rigid pipe¹ on the discharge of the meter to minimise flow disturbance. Where this requirement cannot be met, it may be acceptable for the meter to be installed with a minimum of five (5) diameters of straight rigid pipe¹ upstream of the meter and a minimum of two (2) diameters¹ of straight rigid pipe¹ immediately downstream. This will only be considered in those circumstances where the meter manufacturer warrants that the meter will operate to the required accuracy under the revised conditions.

Note: Written DPIW approval is required prior to installing a meter with straight rigid pipe with lengths of less than the 10 and 5 diameters requirement.

Table: Examples of lengths (in metres) of straight uninterrupted pipe that must be fitted either side of the meter

	Meter Size						
	80mm	100mm	125mm	150mm	200mm	250mm	300mm
10 diameters (Intake side of meter)	0.80m	1.0m	1.25m	1.5m	2.0m	2.5m	3.0m
5 diameters (Discharge side of meter)	0.40m	0.5m	0.625m	0.75	1.0m	1.25m	1.5m

3. The meter must not be installed in a section of pipe where there may be air pockets or the pipe does not run full of water. If it is likely that air will become entrapped near the meter, an air valve must be installed.
4. Any filtering equipment must be installed on the intake side of the meter.
5. The meter must be accessible at all times and the surrounding area must be kept clear of vegetation and other obstructions. The meter must be mounted in a way that allows for both easy access and reading of the counter display. Horizontal mounting is preferred for best access to the counter.
6. The meter must be installed in the correct direction to the flow.
7. Where the meter is to be fitted to plastic or polyethylene pipelines, it must be supported by concrete thrust block or fabricated steel bracing to ensure stability.
8. The meter must be located to allow easy readability of the serial number when taking manual readings from the meter display unit.
9. In circumstances where the meter is not located at a fixed point and is used in conjunction with a portable pump, the meter and associated pipework must be connected to the pumping equipment at all times and must not be detached when not in use. This connection must be fixed with a tamper proof security seal by DPIW to ensure the integrity of the installation. .

¹ All references to "x diameters of straight pipe" refer to a straight length of pipe that has the same internal diameter as the internal diameter of the meter and equivalent in length to at least x times the diameter

10. DPIW may require that tamper proof security seals be affixed to water meters for compliance and enforcement reasons. These must not be removed without DPIW approval. Should a licensee need to remove the seal for any reason, then they must notify the Department in writing and obtain permission before doing so.
11. The preferred location for all meters is above ground. No meter shall be installed deeper than 1.5 metres below ground level. Where a meter is installed underground, sufficient space must be provided to facilitate easy access for maintenance and reading at all times. Meters located down to 0.5 metres below ground will require a suitable meter box to house the meter. For meters located between 0.5 metres and 1.5 metres, an access pit in accordance with Departmental guidelines will be required.

Note: Written DPIW approval is required prior to installing any meter below ground level.

12. The licensee must be able to demonstrate with the installation and housing of the meter, due diligence in meeting their responsibilities as defined under the *Workplace Health and Safety Act 1995* and any relevant regulations drafted under that Act, in relation to persons who may in their work: i) safeguard, site, install, test, alter, repair, maintain or dismantle any plant; or ii) work in an isolated or remote area. For example, meters located on riverbanks or steep slopes shall be provided with suitable access and safety facilities (eg handrails).

OTHER REQUIREMENTS

Maintenance

The meter must be maintained in full accurate operating condition whenever in use. Servicing and maintenance of the meter must always be performed in accordance with manufacturer's specifications. Servicing must be undertaken by a service provider certified by the meter manufacturer.

Licensees must maintain copies of maintenance records as evidence of the service record of the meter. These must be made available to DPIW officers for inspection, when requested.

Reporting

In all circumstances where the installation of a water meter has been made a condition of a Water Licence, DPIW Reporting Requirements and Guidelines must be adhered to.

FUTURE DEVELOPMENTS

At the time of issue of this version of the Standard, there is in development by the National Measurement Institute of the Australian Government, a process whereby meters intended for the metering of non-urban water will be required to obtain pattern approval in order meet Australian requirements.

Pattern approval is the process whereby an impartial body examines the pattern (design) of an instrument prototype against a set of national or international metrological specification. This determines whether an instrument is capable of retaining its calibration over a range of environmental and operating conditions and ensures that the instrument is not capable of facilitating fraud.

Pattern approval protects measuring instrument manufacturers and importers from substandard measuring instruments that would otherwise provide unfair competition.

It also means that when a measuring instrument is bought there can be confidence that the instrument will meet certain metrological standards of performance over a range of operating conditions and that the instrument will not need to be excessively re-calibrated.

Of particular relevance to the DPIW Water Meter Standard is a National Measurement Institute document currently being drafted entitled *NIM M 10-1 Meters intended for the metering of non-urban water in full flowing pipes Part 1: Metrological and technical requirements*. This document will specify the metrological and technical requirements for the pattern approval and verification of water meters used for trade, which measure the actual volume of non-urban water flowing through fully charged, closed conduits.

The Meter Design and Construction section of the current of DPIW Water Meter Standard is based upon many of the same principles as the National Measurement Institute document. Once the National Measurement Institute's process is finalised, the section of the DPIW Standard will be superseded by the pattern approval requirements set out by the National Measurement Institute.

It is anticipated that eventually only those meters that have successfully undergone the necessary pattern approval process will be authorised for sale and use within Australia. It is expected that there will be a phasing-in period of several years for practical application of the process. Meters that meet the current Meter Design and Construction requirements of the DPIW Water Meter Standard will not be required to be replaced before the end of their operational life, provided that they are fully operational, as per the requirement of the Standard.