



WATER METERING CODE

24 July 2006

TABLE OF CONTENTS

Section	Contents	Page
1.	Introduction	1
2.	Legal Basis	1
3.	Scope of Document	1
4.	Compliance with the Metering Code	1
4.1.	Compliant Installations	1
4.2.	Non-Compliant Installations	2
5.	Responsibility for Metering Installations	2
5.1.	Supply and Installation of Equipment in New Installations	2
5.2.	Maintenance of Existing Installations	3
6.	Metrological Requirements for Water Meters	3
7.	Metering Installation Arrangements	3
7.1.	Standard Meter Types	3
7.2.	Combination Meters	4
7.3.	Card Operated Filling Points	4
7.4.	Portable Meters	4
7.5.	Ancillary Components	5
7.6.	Installation Requirements	5
8.	Testing and Replacement of Meters	5
8.1.	Meter Replacement Program	6
8.2.	Special Meter Tests	6
9.	Requirements for Meters for Non-Potable Water	7
10.	Protection and Security of Metering Installations	7
10.1.	Physical Protection of Meters	7
10.2.	Security of Meters Against Tampering	7
11.	Access to Metering Installations	8
11.1.	Personal Identification	8
11.2.	Locked Premises	8
11.3.	Access to Meters - Buried and Overgrown Meters	8
12.	Customer Complaints	9
	Attachments	10

FORWARD

This Metering Code sets out the rights and responsibilities of customers and the Power and Water Corporation (Power and Water) in relation to the metering of potable water, recycled effluent and non-potable water.

The Metering Code implements the requirements of Power and Water's license and has been approved by the Utilities Commission

Sections of the Metering Code may be amended from time to time following a specific request from a customer, the Utilities Commission, or as deemed appropriate by Power and Water. The Utilities Commission must approve all amendments to the Metering Code.

The Water Metering Code provides customers with confidence that they are being fairly and equitably charged for water or recycled effluent purchased from Power and Water.

1. INTRODUCTION

The purpose of the Water Metering Code is to set out the rights and obligations of customers, and the Power and Water Corporation (Power and Water), in relation to the metering of water services in the Northern Territory. The Metering Code applies to all users where potable water or recycled effluent or non-potable water is metered for retail sale.

The Metering Code defines the standards for the installation, testing, maintenance and replacement of these metering points.

2. LEGAL BASIS

Power and Water is licensed by the Utilities Commission under the *Water Supply and Sewerage Services Act 2000*, to provide services in the Northern Territory. Section 72 of the Act requires all licensees to develop and implement a Metering Code setting out the arrangements and conditions for installing, testing and maintaining its metering installations. The same Section of the Act requires this Metering Code to be approved by the Utilities Commission.

This Metering Code implements those requirements.

3. SCOPE OF DOCUMENT

This document identifies national standards and requirements for water meters, addresses Power and Water's installation requirements, and specifies its testing and meter replacement policies. The Metering Code also outlines the responsibilities of Power and Water and its customers in relation to the supply, installation and maintenance of equipment, and Power and Water's rights of access to metering points.

The Water Metering Code applies to all meters used to measure potable water or recycled effluent or non-potable water supplied for retail sale.

4. COMPLIANCE WITH THE METERING CODE

4.1. Compliant Installations

A metering installation is compliant with this Metering Code when it meets all of the following requirements:

- the installed meter(s) are of a pattern that is approved by the National Measurement Institute for use in Australia;
- meters and ancillary equipment are approved and installed in accordance with the relevant Power and Water specifications and standard drawings;
- access to the metering installation is readily available to authorised Power and Water officers; and
- the installation is maintained and meters are replaced in accordance with the schedules at Attachment A.

Metering points installed prior to the introduction of this Metering Code shall be deemed to comply with the Metering Code, provided they fully comply with the requirements of the day. However, where an existing installation is upgraded, it is to be made fully compliant as would be the case if it were a new installation.

4.2. Non-Compliant Installations

Where an installation is found to be non-compliant with the Metering Code and that non-compliance is the responsibility of Power and Water, the installation will be made compliant within 28 days.

Where the non-compliance is the responsibility of the customer, the customer will be advised in writing and required to rectify the non-compliance within 90 days. Failure to do so may result in disconnection of supply.

Power and Water will make appropriate adjustments to customers' accounts to take account of any metering data errors resulting from non-compliance.

5. RESPONSIBILITY FOR METERING INSTALLATIONS

5.1. Supply and Installation of Equipment in New Installations

Power and Water is responsible for the supply and installation of all meters in new installations. Customers and property developers are responsible for supply and installation of all ancillary fittings and pipework beyond the meter (refer to Power and Water standard drawings for

further details). Customers and developers are also responsible for ensuring that both equipment and installation work meet all of the relevant requirements of this Metering Code.

5.2. Maintenance of Existing Installations

Power and Water is responsible for the maintenance and replacement of water meters and supply side stop valves in existing installations, and for the supply side upstand. Customers are responsible for the maintenance and replacement of all other components including the upstand on the customer side of the meter.

6. METROLOGICAL REQUIREMENTS FOR WATER METERS

From July 2004, it became an offence to use a domestic cold water meter that has not been verified in accordance with the National Measurement Act.

Meters already in place when the new national standard was implemented are deemed to be of an approved type while they remain in service, but will lose that exemption once they are removed from their original installation point.

Power and Water will ensure that all meters that it installs will meet the required standards.

7. METERING INSTALLATION ARRANGEMENTS

7.1. Standard Meter Types

Each meter will be capable of measuring and displaying the flow of potable water or recycled effluent or non-potable water in kilolitres. The size and type of meter will be appropriate for the individual customer's overall consumption and maximum flow rates.

Power and Water's current policy is to use displacement type water meters for meter sizes of between 20 mm to a 50 mm diameter, because of their durability and long term performance, and to use turbine type meters, from 80 mm to 150 mm, where displacement meters are not readily available. For some specific applications, 40 mm or 50 mm turbine type meters may be used in lieu of displacement type water meters.

Attachment B provides a list of standard Power and Water's water meter types and Attachment C descriptions of displacement and turbine meters.

7.2. Combination Meters

Where a high maximum demand flow rate is required, but the typical average flow rate is significantly lower, a combination type meter will be used. See Attachment D for a description of combination meters.

7.3. Card Operated Filling Points

Power and Water has installed a number of card operated filling points in the Darwin, Katherine and Tennant Creek. Installation of similar filling points is proposed for Alice Springs. These filling points are intended for use by water truck operators and other users taking bulk water supplies from Power and Water's reticulation systems. Details of the location of these units are available at Power and Water offices in each centre.

In order to use these filling points, customers will need to apply for an account at Power and Water and when doing so will be issued with a smart card that allows water to be taken from any of the points. The quantity of water taken by each customer along with the date and time will be automatically recorded and a monthly account issued for that usage.

7.4. Portable Meters

Meters are normally located at a specific site to record consumption at a specified property. However, portable meters may be issued to nominated users, particularly in the construction sector, whose consumption is intermittent and occurs at a number of locations over time.

No water may be taken from Power and Water's infrastructure unless it has been measured by an appropriate meter as the basis for an account. In the construction sector work may commence which requires access to the mains water supply, before a water meter has been provided for the property concerned. In these circumstances, the developer may obtain and draw water from Power and Water's infrastructure through a portable meter.

The terms and conditions on which portable meters will be issued are set out at Attachment E.

7.5. Ancillary Components

All meters shall have a stop valve on the supply side of the meters, for the purpose of isolation and maintenance, that is capable of isolating the flow through that connection point.

Depending on the size and type of installation, metering points may also include:

- Manifolds for servicing more than one metering point or customer;
- Backflow prevention devices;
- Non-return valves;
- Isolation valves downstream of meter
- Air valves;
- Dirt boxes;
- Remote read-out displays and electronic outputs;
- Protective meter covers;
- Meter boxes or pits; and
- Protective barriers.

7.6. Installation Requirements

Details of Power and Water's requirements for all installations can be found in its technical specifications and standard drawings.

8. TESTING AND REPLACEMENT OF METERS

As a licensed supplier of water and sewerage services, Power and Water recognises the need for accurate and reliable meters to ensure it receives the proper revenue for the services it supplies and for the equitable distribution of costs. In addition to only using meters approved by the National Measurement Institute, Power and Water has the option to ensure meter accuracy through on-site testing of meters or through a program of routine meter replacement.

Due to the difficulties associated with on-site testing, Power and Water has implemented a routine replacement program as its preferred option. This program has been implemented to ensure that meters are removed from service prior to their performance and accuracy being adversely affected by age and wear.

The schedules for this replacement program are shown at Attachment A.

8.1. Meter Replacement Program

The program involves the replacement of meters up to 50 mm, and the replacement of calibrated measuring element in meters larger than 50 mm. In some specific applications where 40 mm or 50 mm turbine type meters have been installed, the measuring element may be replaced in lieu of replacement of the complete meter. The interval at which each meter or measuring element is replaced is based on either time-in-service or on a maximum total integrated flow through the meter, whichever level is first reached. A replacement schedule for each meter type is shown at Attachment A.

In the case of smaller meters (up to and including 25 mm) a sample of the removed meters are periodically tested to confirm that the replacement criteria for that type of meter is still applicable. For larger meter sizes (DN30 and above), Power and Water relies on information from meter manufacturers and other Australian utilities to confirm the meter replacement criteria.

Testing of small batches of meters as removed in accordance with Schedule 1 at Attachment A) will be arranged at an independent test facility at least once every five years as an additional cross-check.

8.2. Special Meter Tests

Power and Water also offers a meter testing service to customers who wish to have their meter tested. Power and Water will arrange for all such tests within five days of the customer's request. The customer is responsible for paying for this test, however, the fee is refundable if the meter is found to have been running faster than the permissible error for that type of meter.

Customers are encouraged to look for other reasons as to why their water costs are high, as water meters are very rarely found to run fast. Power and Water publishes a number of brochures describing ways in which water costs can be reduced, and a simple method of checking the accuracy of a meter using a large container of known volume.

Where a customer wishes to proceed with a test, the customer's meter will be replaced with a new meter and arrangements will be made with an independent NATA accredited test facility to have an accuracy test carried out on the removed meter. Arrangements will be made for that facility to send a copy of the test report for the meter directly to the customer as

well as to Power and Water. Power and Water's approved fees for water meter tests are set out in the Minister's current pricing order.

9. REQUIREMENTS FOR METERS FOR NON-POTABLE WATER

Metering installations for recycled effluent or non-potable water have a number of additional requirements, over and above those required for potable supply. These are:

- The need for signage indicating that the installation is for recycled effluent or non-potable water;
- The painting of meters lilac, in colour, which is the Australian Standard colour for recycled effluent or non-potable water; and
- The inclusion of a dirt box in the installation to protect the mechanical components of the meter. These dirt boxes also need routine inspection, maintenance and cleaning.

10. PROTECTION AND SECURITY OF METERING INSTALLATIONS

10.1. Physical Protection of Meters

Water meters are calibrated measurement devices and require some degree of protection against physical shock, maltreatment and tampering.

In order to provide this protection, Power and Water may require that one or more of the following measures be incorporated into the installation by the customer or property developer:

- the incorporation of protection barriers;
- the enclosure of the installation in a meter box with a hinged lid; or
- the location of the installation in a pit with a removable cover.

10.2. Security of Meters Against Tampering

In addition to physical protection, meters also need to be kept secure against tampering. Power and Water uses a number of sealing and locking devices to protect against meter tampering or disclose that it has occurred. These approaches include a master keyed metering lock system, a high security meter sealing system and lockable meter covers.

Power and Water also employs an authorised inspector who, as part of his duties, investigates suspected cases of meter tampering, and may refer these to Power and Water's prosecutor for further action.

11. ACCESS TO METERING INSTALLATIONS

Authorised Power and Water officers require unfettered access, at any reasonable time, to all metering points located on customer's premises for the purposes of reading, maintaining and replacing meters.

11.1. Personal Identification

When entering a customer's property, authorised Power and Water officers will carry a current identification cards at all times and are required to produce that card on request. For the purposes of access, authorised contractors are also considered employees of Power and Water and are subject to the same requirements.

11.2. Locked Premises

Where a customer wishes to lock a gateway or other means of access then that locking is to be done with a Power and Water metering master key locking system. These locks are available through Power and Water Retail offices on payment of a deposit.

11.3. Access to Meters - Buried and Overgrown Meters

Customers must ensure that Power and Water has easy access to any meter on their property. Customers are required to ensure that water meters do not become buried by garden dressing or fill, covered by concrete or paving, or become inaccessible from overgrowth by trees and plants.

Where any such obstruction prevents access to the meter, then Power and Water may require the customer to remove the obstruction. Failure to remove such an obstruction may result in prosecution or in Power and Water undertaken the necessary work and billing the customer for the costs involved.

12. CUSTOMER COMPLAINTS

All customer complaints are referred, in the first instance, to Power and Water's customer services staff. Where that complaint is related to meter performance or accuracy, and a satisfactory resolution to the complaint cannot be achieved by customer services staff, the complaint may be referred to Power and Water Technology Services for further investigation. This may involve one or more of the following actions:

- The removal and testing of the meter in question by an independent accredited test facility;
- The temporary installation of a check meter;
- The installation of logging equipment and the collection and analysis of consumption data over a period of time; and/or
- Site audits and inspections.

Any complaint will be handled in line with the procedures set out in Power and Water's Customer Contract.

ATTACHMENTS

A Replacement Schedule for Meters

Provided that meters do not suffer external damage, willful interference or stoppage due to chokage or damage by suspended matter, meters will be replaced when the register quantities of water or recycled effluent or non-potable water exceed an amount predetermined by Power and Water.

The following meter replacement intervals should always be considered as guidelines for the purpose of replacing and maintaining accurate metering devices.

Meters

1. Replace all meters in suburb with register readings exceeding meter replacement values listed in Schedule 1. For 20mm and 25mm meters, randomly batch test five percent of removed meters and record test results for future comparative analysis; and
2. Replace all meters in suburb which exceed an operational life of ten years. For 20mm and 25mm meters, randomly batch test five percent of removed meters and record test results for future comparative analysis.

Schedule 1

Meter Size (mm)	Meter Type	Meter Replacement Reading Range (kL)
15 ‡	Displacement	2,000
20	Displacement	7,000
25	Displacement	12,000
30 ‡	Displacement	27,000
40	Displacement	40,000
40	Helical Vane Turbine	65,000
50	Displacement	60,000
50	Helical Vane Turbine	95,000
80	Helical Vane Turbine	135,000
100	Helical Vane Turbine	215,000
150	Helical Vane Turbine	385,000

‡ Used only on combination meters

B Standard Meter Types

Meter Model	Meter Size	Meter Type
V100	15	Positive Displacement ‡
V100	20	Positive Displacement
V100	25	Positive Displacement
V100	30	Positive Displacement ‡
V100	40	Positive Displacement
V300	50	Positive Displacement
HELIX 4000	40	Helical Vane Turbine *
HELIX 4000	50	Helical Vane Turbine *
HELIX 4000	80	Helical Vane Turbine
HELIX 4000	100	Helical Vane Turbine
HELIX 4000	150	Helical Vane Turbine
C4000	50/15	Helical Vane Turbine *
C4000	80/20	Helical Vane Turbine
C4000	100/20	Helical Vane Turbine
C4200	150/30	Helical Vane Turbine

* Not commonly used

‡ Used only on combination meters

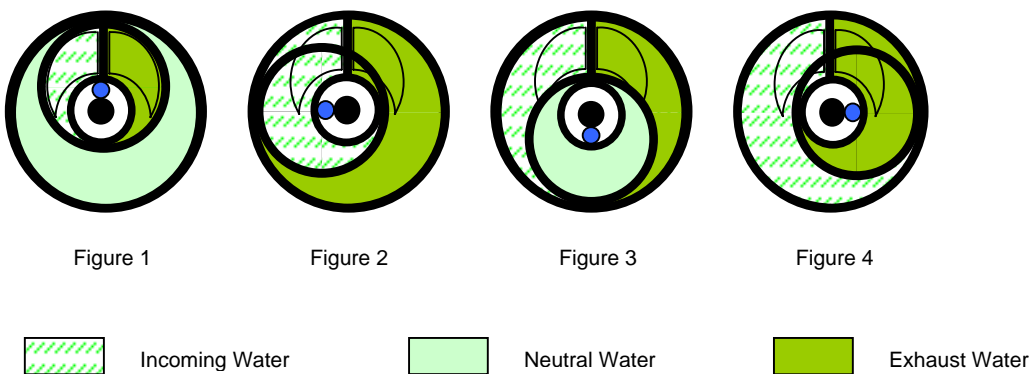
C Displacement and Turbine Meters

Power and Water utilises two main types of meters within its infrastructure, these are:

Positive Displacement Meters (Volumetric)

This type of meter utilises a piston rotating within a volumetric outer chamber. The outer chamber is ported so that the inner piston rotates around the periphery of the outer chamber. The pressure differential between the two chambers causes the inner piston to rotate. As the piston completes each revolution, a measurable amount of water is displaced. By coupling the inner piston to a counter via a transmission system, the total volume of water passing through the meter can be recorded – Refer to figures 1, 2, 3 and 4.

Positive displacement water meters cannot be calibrated, they rely on the precision of manufacture to obtain initial accuracy. Any undue clearances between the piston and the outer chamber in which it rotates, allows uncontrolled by-passing of water from the inlet to the outlet which is not registered on the counter. Long term accuracy of these meters is affected by natural wear and tear which increases the clearances. Impure water supplies can cause jamming, and also have a tendency to increase the rate of wear, which in turn accelerates the occurrence of inaccurate registration on the counter.



Helical Vane Turbine Meter

This type of meter has a multi-bladed impeller/ turbine with helical blades, positioned in the water flow with the axis of rotation aligned with the flow. The movement of the water as it passes through the impeller blades causes rotation of the impeller, which, via a magnetic coupling moves a rotary counter to record the volume passed.

Helical vane meters are factory calibrated by aligning a small guide vane, either, with the angle of the impeller blades, which increases the rate of impeller movement, or an opposing angle which decreases the rate of impeller movement. This increase or decrease is reflected in the movement of the counter.

D Combination Meters

This type of meter utilises a combination of helical vane bulk flow meter (for high flow) and a positive displacement by-pass meter (for low flows), hence its namesake. Combination meters are designed for installation in areas where a wide variation in flow can be expected, such as schools, hospitals, offices and all other places where both very low and very high flows can occur. These wide flow ranges are measured by using a built-in changeover device.

Low flows are directed through the by-pass meter only. When the flow is increased, the changeover device opens due to the increase in flow and differential pressure across the meter. With the changeover valve open, flows are measured by both meters.

Flows will pass through the main and by-pass meters in the forward direction only, and as long as the differential pressure is sufficient, both meters will register flows. Only when the differential pressure and the flow reduces does the changeover device close, again directing all flow through the by-pass meter.

E Portable Meters - Terms and Conditions

1. Portable meters will only be issued in instances where the use of a card operated filling is deemed by Power and Water to be not viable.
2. Where a portable meter has been issued it is not to be used for the filling of trucks or other bulk containers where there is a card operated filling point within the vicinity. Non-compliance with this condition will result in the withdrawal of the approval to hold a portable meter.
3. All portable meters must be returned to a venue nominated by Power and Water at three monthly intervals so that readings can be taken and the meters inspected for serviceability and accuracy. Failure to comply with these requests may result in the withdrawal of the approval to hold a portable meter.
4. Any tampering, bypassing or any other misuse of the portable meter will result in the immediate withdrawal of the approval to hold a portable meter and when theft is suspected, it will be reported to the NT Police.
5. Payment of a deposit fee which is to be not less than the current value of the meter to be supplied;
6. If the portable meter is discovered to be damaged at any time, the cost of repairs shall be deducted from the deposit fee;
7. If the meter is lost, stolen or misplaced, the deposit fee will be forfeited, and if another meter is required, a further deposit fee is required to be paid;
8. On safe return of the meter, the deposit will be refunded;
9. If the meter is attached to a water cart or tanker, the cart or tanker will be presented for inspection to a Power and Water representative at a mutually agreed time and place;
10. Pipework on the tanker shall be so arranged such that backflow siphonage cannot occur or alternatively, a reduced pressure zone device (RPZD) shall be fitted;
11. Where a meter is to be connected to a hydrant for uses other than filling a tanker, a backflow prevention device shall be supplied and fitted by the operator;

12. All pipes and fittings for attaching to the meter to enable hydrant to tanker or hydrant to construction site connections shall be supplied and fitted by the operator;
13. No meter larger than 25mm diameter shall be connected directly to a hydrant and for meters of a larger size, a flexible hose shall be used for connecting hydrants through the meter to the tanker or construction site;
14. Failure to return the within one month on demand will result in forfeiture of deposit, withdrawal of approval to hold a portable meter and where theft is suspected, it will be reported to the NT Police;
15. If any Power and Water pipes and/or fittings are damaged during use of the portable meter, the cost of repairs shall be deducted from the deposit fee
16. Portable meters must not be taken or used outside the Water Supply District in which they are issued unless written approval has been granted.