

# Specification For Water Meters

Pr10068



Unitywater

## Pr10068 - Specification for Water Meters

### Documents Details

This document is only valid on the day it was printed.

### Version Review

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
0.1	25/03/2014	D. Fillmore			For comment
0.2	06/04/2014	D. Fillmore			Includes comments from S. Walker & S. Palipana
1.0	19/05/2014	D. Fillmore	D. Fillmore	19/05/2014	Initial release
1.1	30/05/2014	D. Fillmore	D. Fillmore	30/05/2014	Minor amendments

### Written Direction Control

Document Sponsor	Infrastructure Technical Standards Committee
Document Author (Owner)	Infrastructure Standards Manager
Subject Matter Expert	Infrastructure Standards Manager
References	Refer to Section 3 of this document

# Pr10068 - Specification for Water Meters

## Contents

<b>1. Purpose</b> .....	<b>4</b>
<b>2. Scope</b> .....	<b>4</b>
<b>3. References</b> .....	<b>4</b>
3.1. General.....	4
3.2. Applicable Legislation and Regulation .....	4
3.3. Codes of Practice and Pattern Approvals .....	4
3.4. International and Australian Standards .....	4
<b>4. Definitions/Abbreviations</b> .....	<b>5</b>
<b>5. Technical Details</b> .....	<b>5</b>
5.1. Samples and Supporting Literature.....	5
5.2. Materials and Workmanship .....	5
5.3. Resistance to Ultraviolet Exposure and General Durability .....	6
5.4. Meter Dimensions.....	6
5.5. Meter Connections.....	6
5.6. Spare Parts.....	7
5.7. Ratio $Q_3/Q_1$ .....	7
5.8. Accuracy Class.....	7
5.9. Temperature Class .....	7
5.10. Stage 1 Desktop Assessment Tests .....	7
5.11. Stage 2 Service Evaluation Tests .....	7
5.12. Stage 3 Field Evaluation Tests .....	8
5.13. Backflow Prevention .....	8
5.14. Strainers / Filters / Dirt Boxes .....	8
5.15. Combination Meters.....	9
5.16. Electromagnetic Flow Meters.....	9
5.17. Automatic Meter Reading .....	9
5.18. Serial Numbers and other distinguishing markings .....	9
5.19. Initial Readings .....	10
5.20. Security Sealing.....	10
5.21. Additional Testing .....	10
5.22. Quality Assurance.....	10
5.23. Performance Guarantee .....	11
5.24. Training and Product Support .....	11

# Pr10068 - Specification for Water Meters

---

## 1. Purpose

- 1.0.1 The purpose of this Specification is to detail the minimum requirements for the supply, testing and delivery of water meters and spare parts.

## 2. Scope

- 2.0.1 This Specification is applicable to all water meters that are to be incorporated within Unitywater's asset networks (water supply, sewerage or recycled water).
- 2.0.2 This Specification is applicable whether Unitywater purchases the water meters directly or whether they are acquired indirectly (e.g. through a contractor or donated to Unitywater).

## 3. References

- 3.0.1 The following reference documentation forms part of this specification and all water meters shall meet the requirements of this reference documentation.

### 3.1. General

- 3.1.1 For water meters supplied under quotation or tender, Unitywater's procurement policy and procedures shall apply including all requirements detailed in the quotation or tender documentation.

### 3.2. Applicable Legislation and Regulation

- 3.2.1 The following National and State legislation and associated regulations (as amended from time to time) are applicable.
- National Measurement Act 1960;*
  - South-East Queensland Water (Distribution and Retail Restructuring) Act 2009;*
  - South East Queensland Design and Construction Code and the associated Accepted Products Lists.

### 3.3. Codes of Practice and Pattern Approvals

- 3.3.1 The following codes of practice and pattern approval requirements (as amended from time to time) are applicable:
- NMI R 49 Water meters intended for the metering of cold potable water and hot water.*

### 3.4. International and Australian Standards

- 3.4.1 The following international and Australian standards (as amended from time to time) are applicable:
- AS1565 Copper and copper alloys – ingots and castings*
  - AS1722 Pipe threads of Whitworth form*
  - AS2345 Dezincification resistance of copper alloys*
  - AS2845 Water supply – backflow prevention devices*

## Pr10068 - Specification for Water Meters

- e. AS/NZS3500 *Plumbing and Drainage*
- f. AS3565 *Meters for cold and heated drinking and non-drinking water supplies*
- g. AS/NZS4020 *Testing of products for use in contact with drinking water*
- h. ISO4064 *Measurement of water flow in fully charged closed conduits*
- i. AS/NZS4087 *Metallic flanges for waterworks purposes*
- j. AS4141 *Customer/utility information exchange*
- k. ISO/IEC 17025 *General requirements for the competence of testing and calibration laboratories*
- l. ISO 9001 *Quality management systems*
- m. IEC 61000 *Electromagnetic compatibility.*

### 4. Definitions/Abbreviations

Term	Meaning
AMR	Automatic Meter Reading
DCV	Detector Check Valve
RMI	Radio Meter Interface

### 5. Technical Details

#### 5.1. Samples and Supporting Literature

- 3.5.1 If requested, the supplier of water meters shall make available a sample of the water meter for inspection by Unitywater. The supplier shall provide a return address for the sample water meter.
- 3.5.2 Supporting literature for all water meters and associated fittings shall be provided to Unitywater. Where possible, evidence of the long term reliability of the meter should be provided. For instance, there has been some concern over the reliability of multi-jet meters.

#### 5.2. Materials and Workmanship

- 5.2.1 All components shall be sound and free from all defects and shall be constructed to a high standard of workmanship.
- 5.2.2 The materials used for components of the water meter must comply with AS 3565 and relevant standards (e.g. Section 3.4). All materials in contact with potable water shall comply with AS/NZS4020 and be non-toxic, non-contaminating and biologically inert.
- 5.2.3 All components shall be corrosion resistant and suitable for service in the environmental conditions that can be expected in South East Queensland including regular immersion in groundwater. The register must be watertight. Any and all anti-corrosion treatment shall be disclosed.
- 5.2.4 The composition of any non-ferrous alloy used in the manufacture of any parts of the meter shall be fully disclosed.

## Pr10068 - Specification for Water Meters

- 5.2.5 In the case of parts manufactured from non-metallic materials, full technical specifications shall be provide including the following:
- Coefficient of thermal expansion
  - Impact strength
  - Dimensional stability.
- 5.2.6 All copper alloys in contact with potable water must comply with AS2345.
- 5.2.7 The reading glass shall be manufactured in a material that is both shatterproof and scratch resistant. The design of the water meter shall be such that reading of the meter will not be affected by condensation.
- 5.2.8 All meters must have a system that adequately seals the top cover, body joint and calibration ports.

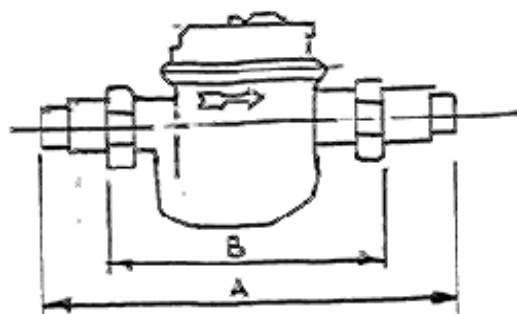
### 5.3. Resistance to Ultraviolet Exposure and General Durability

- 5.3.1 All water meters shall provide evidence of meeting the requirements of Appendix C and Appendix D of AS 3565.

### 5.4. Meter Dimensions

- 5.4.1 The overall length of the meter assembly is shown in table below.

Meter Size (mm)	Dimension 'A' (mm)	Dimension 'B' (mm)
20	244	154
25	282	178
32	N/A	190
40	N/A	232
50	N/A	300
80	N/A	413
100	N/A	483
150	N/A	500



### 5.5. Meter Connections

- 5.5.1 Couplings must be spigot and collar (with gasket) joints complete with coupling nuts and with screw threads generally in accordance with AS1722.
- 5.5.2 The supplier shall supply the following fittings with each meter:

Meter Size (mm)	Fittings
20 – 32	Two threaded couplings and seals (nut and tail) with replacement seal Threads to AS 1722 and AS 3565
40 – 50	Two flanged mating kits with oval flanges to AS 3565 Threads to AS 1722 and AS 3565

## Pr10068 - Specification for Water Meters

---

5.5.3 Attention is drawn to Clause 2.4.3 (b) of AS/NZS 3500 *Plumbing and Drainage, Part 1: Water Services* which states: "Plastic pipes and fittings shall not be used to support valves, meters or associated pipes and fittings".

### 5.6. Spare Parts

5.6.1 The supplier must guarantee the availability of replacement parts, as may be required, for a period of ten years from the date of supply of the water meter.

5.6.2 For larger meters (i.e.  $\geq 40$  mm) preference will be given to meters with removable mechanisms.

### 5.7. Ratio $Q_3/Q_1$

5.7.1 The ratio  $Q_3/Q_1$  shall be as defined by NMI R 49.1. For 15 mm and 20 mm meters the minimum value of  $Q_3/Q_1$  shall be 200.

### 5.8. Accuracy Class

5.8.1 All water meters shall be of Accuracy Class 2 as defined by NMI R 49.1.

### 5.9. Temperature Class

5.9.1 The accuracy of the water meter will not be adversely affected by water temperature variations.

5.9.2 All meters shall be of Temperature Class T50 as defined by NMI R 49.1.

### 5.10. Stage 1 Desktop Assessment Tests

5.10.1 The evaluation of the suitability of water meters shall be via a three stage process.

5.10.2 Stage 1 is a desktop assessment of the following documentation (as a minimum):

- a. Evidence of compliance with AS 3565, NMI R 49 and associated standards
- b. Material specifications and evidence of compliance with AS/NZS 4020
- c. Evidence of product durability
- d. Details of pulse output capability
- e. Performance guarantees.

### 5.11. Stage 2 Service Evaluation Tests

5.11.1 Stage 2 of the evaluation process may include Unitywater requiring the water meter supplier to undertake the following tests at a NATA accredited facility:

- a. Accuracy flow tests over a range of flow rates
- b. Continuous minimum flow test
- c. Pressure loss test
- d. Hydrostatic pressure test
- e. Reverse flow or non-return valve leakage test
- f. Endurance testing
- g. Ultraviolet light exposure tests

## Pr10068 - Specification for Water Meters

---

- h. Torque resistance tests on threaded end connections
- i. Other tests as deemed suitable by Unitywater.

### 5.12. Stage 3 Field Evaluation Tests

- 5.12.1 Water meters that pass the Stage 1 and Stage 2 tests will be given an 'interim approval'.
- 5.12.2 At the end of a 12 month 'interim approval' period Unitywater may randomly remove from service a number of water meters for testing.
- 5.12.3 Unitywater may in its absolute discretion cancel the approval status of a type of water meter if in its view the water meters do not comply with any relevant aspect of this water meter specification and associated standards.
- 5.12.4 The cancelled approval status will remain until the supplier satisfies Unitywater that the identified problems have been rectified.

### 5.13. Backflow Prevention

- 5.13.1 All water meters up to 40 mm must be fitted internally with an integral non-return valve that prevents the meter operating in the reverse direction. The non-return valve shall be designed so as to prevent any unauthorised interference and shall comply with the requirements of AS3565. Proof of certification by an approved certifier must be provided to Unitywater.
- 5.13.2 Backflow prevention may be provided via a testable single check or dual check valves.
- 5.13.3 Backflow prevention devices shall comply with AS2845.

### 5.14. Strainers/Filters/Dirt Boxes

- 5.14.1 Y strainers must mount to the inlet side of the meter to prevent objects from entering the meter. The strainer must be provided with blow off plug, which could be replaced with a ball valve for cleaning and flushing.
- 5.14.2 Plate type strainers must mount to the inlet side of the meter to prevent objects such as stones and pebbles from entering the meter and causing physical damage.

The strainer should be designed for minimum weight and pressure loss. The screen must be made of perforated stainless steel plate and shaped to give maximum rigidity against the flow stream forces.

The effective straining area must be at least double that of the meter main case inlets.

An access cover plate must be provided. Casing bolts, nuts, screws and washers must be made of a copper alloy containing not less than 57% copper or stainless steel. Australian Standard and approved for use with potable water is required.
- 5.14.3 Basket type dirt-boxes must mount to the inlet side of the meter and be a flow through straining device incorporating a cylindrical removable stainless steel basket designed to hold residue at the bottom.

Even if dirt collects and fills a portion of the basket, water must flow freely. The Basket must be easily removed to cleaning any accumulated dirt or objects. The dirt-box should be designed for minimum weight and % loss.



## Pr10068 - Specification for Water Meters

---

Casing bolts, nuts, screws and washers must be made of a copper alloy containing not less than 57% copper or stainless steel.

5.14.4 All materials in contact with potable water shall comply with AS/NZS4020.

### 5.15. Combination Meters

5.15.1 Combination meters, incorporating a change-over valve, shall allow water to pass through only the secondary meter at low flows.

5.15.2 The change-over valve shall ensure that the primary meter does not measure a flow less than its designed minimum and the secondary meter cannot be subjected to a flow greater than its nominal flow.

5.15.3 Alternatively, where combination meters allow flows through both meters over a narrow change-over range then the supplier of the combination water meter should state the change-over flowrates  $Q_{x1}$  and  $Q_{x2}$  as per Clause 2.3.6 of NMI R 49-1.

### 5.16. Electromagnetic Flow Meters

5.16.1 Electromagnetic flow meters must conform to NMI R 49 (Class 2) and ISO4064. The device must have drinking water approvals (AS4020) and be highly resistant to a wide range of water impurities. The device must have integrated earthing electrodes and come complete with earthing rings.

5.16.2 Where the transmitter is mounted directly to the body and is of AC voltage, the device must have DC backup and there must be 3 metres of AC cable provided. Where the transmitter is mounted remotely from the body, there must be 10 metres of connection cabling and a minimum 3 metres of AC cable provided and the device must have DC backup.

5.16.3 The electromagnetic flow meters must be capable of being data logged.

5.16.4 Where electromagnetic flow meters are proposed it is a requirement that Unitywater shall confirm that the proposed meter is appropriate for the particular site.

### 5.17. Automatic Meter Reading

5.17.1 All meters are to be pulse capable and in compliance with AS 4141.

### 5.18. Serial Numbers and other distinguishing markings

5.18.1 Each water meter shall be delivered to Unitywater with an individual serial number specific to that meter that is not to be repeated.

5.18.2 The serial number for new meters shall be 11 characters in length and 12 characters for refurbished meters. It shall conform to the following convention:

Example new meter: UWY1321387C

Example refurbished meter: UWV1400376AR

Where:

Characters 1 and 2 always "UW" (representing Unitywater)

Character 3 supplier code "V, W, X, Y or Z" (to be nominated by Unitywater)

Characters 4 & 5 last two digits of the year of manufacture

## Pr10068 - Specification for Water Meters

---

Characters 6 to 10 unique sequential 5 digit serial number (starting at 00001)

Character 11 meter size code (“A =15mm, C = 20mm, D = 25mm, F = 32mm, G = 40mm, H = 50mm, J = 65mm, K = 80mm, M = 100mm, N = 150mm, P = 200mm”)

Character 12 “R” for refurbished meters only, otherwise blank.

- 5.18.3 The depth of stamping or engraving of the serial number must be of a minimum of 1 mm.
- 5.18.4 The serial number must be clearly legible and will be typically a minimum of 8 mm in height.
- 5.18.5 The serial number and the registration shall be oriented so as to be read from an upstream position (normally the street side) of the meter.
- 5.18.6 Other distinguishing markings on the water meter shall include the following.
- Manufacturer’s name
  - Flow direction
  - Nominal size
  - Q<sub>3</sub>/Q<sub>1</sub> ratio
  - Maximum working pressure
  - Certifying body (e.g. JASANZ)
  - Scannable bar code of the serial number placed in a prominent position to each meter.

### 5.19. Initial Readings

- 5.19.1 Supplied meters shall have an initial reading that does not exceed 1kL above or below zero.

### 5.20. Security Sealing

- 5.20.1 All water meters must be manufactured with a suitable system for adequately sealing the top cover, body joint and calibration ports to deter unauthorised interference or tampering with the meter.
- 5.20.2 Details of the security sealing system shall be provided for Unitywater’s consideration.

### 5.21. Additional Testing

- 5.21.1 In addition to the inspection and testing of water meters in compliance with the relevant standards, the supplier shall provide evidence of the testing of one water meter per manufacturing batch (but not less than 1 per 2,500 meters) to be tested for pressure loss and accuracy.
- 5.21.2 The testing shall be carried out by a NATA accredited laboratory.

### 5.22. Quality Assurance

- 5.22.1 The suppliers of water meters shall provide copies of product certification to ISO9001 for the manufacture, delivery and servicing of the water meters.

## Pr10068 - Specification for Water Meters

---

### 5.23. Performance Guarantee

- 5.23.1 The supplier of water meters shall submit to Unitywater a written guarantee signed by an authorised executive of the company that provides the supply of replacement water meters at no cost to Unitywater should the water meter:
- a. Not comply with the service life guaranteed in the tender, and/or
  - b. Fails to remain readable at any time (or weather condition) within its service life, and/or
  - c. Fail to retain its accuracy within the maximum permissible error parameters when tested in accordance with NMI R 49.

### 5.24. Training and Product Support

- 5.24.1 If requested by Unitywater the supplier of water meters shall provide complimentary training on the installation and maintenance of the water meters.