

# WATER METER CODE OF PRACTICE



# Water Meter Code of Practice

September 2003

# ACKNOWLEDGEMENTS

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ISBN 1-877134-47-3

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# FOREWORD

Although water is one of the world's natural resources, the job of distributing and making it clean and safe to drink involves sophisticated technology and extensive capital infrastructure.

The use of water meters in New Zealand is increasing as charging for water and, in some cases, wastewater becomes more prevalent. Consumption on the basis of water meter readings in New Zealand directly results in customer invoicing in the order of millions of dollars each year. Inaccurate meter reading has the potential to create significant inequities.

Currently there are no New Zealand standards that cover the installation, accuracy and use of water meters, and the use of water meters is currently exempt from the Weights and Measures Act 1987.

The Water Meter Code of Practice is intended to prescribe best practice for the supply, use and operation of water meters throughout the country, by a company, authority of organisation. It refers specifically to the delivery of potable water to residential, commercial and industrial customers.



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## **1. Statement of Purpose and Background**

The use of water meters in New Zealand is increasing as volumetric charging for water and, in some cases, wastewater, by water suppliers becomes more prevalent.

Consumption on the basis of water meter readings in New Zealand directly results in customer invoicing in the order of several hundred million dollars annually. Inaccurate meter reading has the potential to create significant inequity.

Currently there are no New Zealand standards covering the installation, accuracy and use of water meters and associated matters as water meters are currently exempted from the Weights and Measures Act 1987.

In the absence of any legal requirements, the Ministry of Consumer Affairs strongly recommends a voluntary Code of Practice be developed by the industry. This Code is intended to address that issue for water supplied through water meters and charged for on the basis of the meter reading.

This Code does not take precedence over the conditions contained in any Customer Contracts or similar documents that water suppliers may use. Those documents may include full or partial reference to this Code.

## 2. Objectives

The objective of this Code is to prescribe industry good practice for the supply, use and operation of water meters throughout New Zealand used for the sale of water by an organisation to its commercial and domestic customers. It refers to the delivery of potable water, usually by local and regional councils and their agents, to individual residential, commercial and industrial customers. It also includes the sale of water from bulk water suppliers to individual councils and other organisations.

It is intended that the Code will be able to be used by all those with an interest in the metering of water, including customers. It is intended that the Code will be voluntarily adopted across New Zealand by organisations that supply metered water to their customers, including private water suppliers.

The content of the Code shall be generally contributed to and agreed with the water industry.

The Code shall contain methods for dealing with disputes.

Procedures to monitor and update the Code shall be covered in the Code.

### 3. Principles

The sale of water through water meters needs to be subject to practices that ensure fairness and equity for both the customer and the supplier. Both parties must understand their rights and responsibilities.

The water supplier must have clear terms of supply that are easily understood by its customers.

All information given to customers relating to their water consumption will be accurate, clearly presented, easily obtainable and up to date.

Meters and their installation must be practical and, where appropriate, consistent with international standards, particularly with Australasia.

Customer's complaints will be handled promptly, fully and fairly.

The Code is not a Standard. Reference to relevant standards is contained in the document. Some parts of relevant standards are reproduced in the Code to assist understanding.

The contents of the Code do not take precedence over any legislative requirements.

The provisions of this Code shall not override the provisions contained within a water supplier's customer agreement or stated policies and procedures. This could include Customer Charters, Customer Agreements, Bylaws, Codes of Practice, Terms of Agreement, etc.

All water meters shall comply with the international OIML R49 standards (as below) by 1 July 2005. Until that time, compliance with OIML standards is encouraged.

To ensure consistency with current practice and international standards, much of this Code is based on ISO 4064-1 to 3 (BS 5728).

Current documents include:

ISO 4064-1:1993	Measurement of water flow in closed conduits <ul style="list-style-type: none"><li>- Meters for cold potable water</li><li>- Part 1: Specifications</li></ul>
ISO 4064-2:2001	Measurement of water flow in closed conduits <ul style="list-style-type: none"><li>- Meters for cold potable water</li><li>- Part 2: Installation requirements and selection</li></ul>
ISO 4064-3:1999	Measurement of water flow in closed conduits <ul style="list-style-type: none"><li>- Meters for cold potable water</li><li>- Part 3: Test methods and equipment</li></ul>

The above documents are collectively referred to as ISO 4064 in this Code. (ISO 4064 does not include the manifold meter pattern which is included in OIML R49 Part 2.)

After 1 July 2005, all new water meters shall comply with the international standard OIML R49 Edition 2003 (E) Parts 1-3.

- |            |   |
|------------|---|
| OIML R49-1 | Water meters intended for the metering of cold potable water<br>Part 1: Metrological and technical requirements   |
| OIML R49-2 | Water meters intended for the metering of cold potable water<br>Part 2: Pattern approval and initial verification |
| OIML R49-3 | Water meters intended for the metering of cold potable water<br>Part 3: Model test report                         |

***Comment***

Australia currently has different threads and body lengths different from the meter specifications currently adopted by New Zealand water suppliers.

## **4. Implementation and Administration**

In order to achieve the objectives of the Code, it will be necessary for water suppliers to formally adopt the Code. This would be done through incorporating it in individual Water Supply Bylaws where the supplier is a regional, district or local council. Other suppliers would incorporate the Code in their customer agreements or contracts.

Customers would be advised that their water meter, and matters associated with its installation and use, complied with the Code and where to obtain copies of the Code. This shall be done in customer agreements or contracts in which the main points are included.

This Code will be maintained by NZWWA, who would ensure that it was readily available to all water suppliers and those who supply meters, equipment and services to water suppliers. It would be reviewed at periodic intervals as deemed appropriate by the Water Supply Manager's Group of NZWWA.

## 5. Definitions

**Actual volume  $V_a$ :** total volume of water passing through the water meter, disregarding the time taken.

**Adjustment** refers to the practice of adjusting the volume as indicated by the meter to another value, primarily for the purpose of charging, usually where specific circumstances exist and the **indicated volume** is not fairly indicative of the **actual volume**.

**Approved test house** means a meter testing laboratory approved by the **water supplier**. After 1 July 2005, all **approved test houses** shall be ISO 17025 registered for the purpose of testing **water meters** of a specific type within a particular nominal diameter range.

**Calibration** means a set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a meter or measuring system and the corresponding values realised by standards.

**Customer** refers to the owner or occupier of the property who is responsible for the purchasing and use of water supplied.

**Indicated volume,  $V_i$ :** volume of water indicated by the meter, corresponding to the actual volume.

**Meter Installation** means the meter and associated fittings from the public mains up to and including the downstream side of the meter box.

**NZWWA** is the New Zealand Water and Wastes Association.

**Percentage error** is the difference between the meter **indicated volume** and the **actual volume** expressed as a percentage of the **actual volume**.

**Water meter** is an instrument intended to measure continuously, memorise and display the volume of water passing through the measurement transducer at metering conditions.

### **Comment**

A water meter includes at least a measurement transducer, a calculator (including adjustment or correction devices if present) and an indicating device. These three devices may be in different housings.

**Water Supplier** means any organisation that supplies water to another organisation or individual **customers**.

### **Comment**

This code is intended to primarily be used by water suppliers that supply water to customers through meters and charge for water consumption and/or wastewater on the basis of volumes as measured by water meter.

Some water suppliers also use the size of the meter as a basis of charging developer's contributions.

**Working days** refers to the ordinary days of work for the general community and excludes weekends and public holidays.

## 6. Scope

The scope of this Code of Practice is to cover water meters that measure cold, potable water for the purposes of sale. It is currently based on ISO 4064 as discussed in Section 3.

This Code will refer to, but generally not repeat, that standard.

The following is not covered by this Code.

- Water quality issues. It is assumed that the water generally complies with the New Zealand Drinking Water Standards.
- Pricing issues. Fair pricing needs to be based on accurate consumption, which is addressed in this Code. How consumption relates to charging is outside the scope of this Code.
- Method of payment issues.
- Disconnection of meter issues or restriction of supply.
- High pressure water meters (>1,400kPa)
- Metering of hot water (>40°C) or other liquids.
- Special requirements where the water temperature can be expected to fall below 0.3°C.
- Specific backflow requirements. These are subject to the Backflow Code of Practice currently being developed.

All mechanical (inferential or positive displacement) and electronic water meters are included.

**Comment**

Electronic meters include Magflow, Doppler and sonic meters.

## 7. Customer Issues

### 7.1 Application for a Meter

Where water is available from water supply mains near a customer's property, customers can request to have a meter connection. Where that connection is not contrary to its stated policies, the water supplier shall provide the customer with a connection in accordance with the provisions of this Code.

Where a bulk distribution main passes near a customer's property, connections to it will only be allowed where specifically approved by the water supplier. The water supplier shall determine what mains are bulk distribution mains.

**Comment**

Connections to bulk distribution mains are generally discouraged for operational reasons.

Where the water supply mains are not near a customer's property, the water supplier may consider the provision of a meter connection, subject to specific conditions.

Only one meter per property served is permitted unless specifically authorised by the water supplier. Shared meters are not permitted unless specifically approved by the water supplier where it is extremely impractical to install separate meters.

**Comment**

Shared water meters can result in conflict when one party uses considerably more water than another party, requiring the water supplier to resolve the situation. Historically, resolving shared meters disputes has been a significant problem with some water suppliers electing to provide additional meters so that customers can be individually metered.

Where properties, such as those down rights of way, are set back from street frontages, the water supplier shall have a clear and easily obtainable policy covering the location of water meters and the use of common meter pits. Customers shall be clear as to their responsibilities and those of the water supplier.

For a meter supplying premises other than a single residential dwelling, the applicant shall supply the following information:

- normal flow patterns
- maximum flows
- minimum flows
- expected minimum and maximum daily volumes
- what the water will be used for
- suggested meter location to ensure ease of access for both customer and supplier.

The water supplier shall determine the appropriate meter and size based on the above information. The water supplier shall also determine the location of the meter after consultation with the customer.

Once the meter is installed, it is owned by the water supplier.

The water supplier shall publish a list of standard connection charges.

**Comment**

The flow information is needed in order to select an appropriate meter or combination meter to cover the expected flow rate.

The water supplier needs to know what use the water will be put to in order to decide what backflow prevention measures may be required. Trade waste consents may also be necessary.

The customer would normally pay for the cost of a meter installation. Water suppliers would normally have an annually published list of standard connection fees for smaller meter sizes.

**7.2 Customer Meter Requirements**

The water supplier shall ensure that customers shall be able to easily and safely read their water meter without requiring special equipment to access or to read it.

Advice on meter reading and determining measured volumes shall be freely available, if required, from the water supplier.

Customers should be encouraged to check their water supply system for leaks by reading their meters. Advice on how to do this shall be freely available from the water supplier.

**7.3 Installation of Additional Equipment on Meter**

Customers can not install additional equipment on the meter without the consent of the water supplier. Consent shall not be unreasonably withheld.

The water supplier may require the equipment to be installed by themselves at the expense of the customer. Such equipment includes data loggers to monitor instantaneous peak flows and pressures and similar equipment.

**7.4 Customer Responsibilities**

Customers shall ensure that the water meter is accessible at all times for reading and maintenance purposes. The water supplier reserves the right to charge customers for time spent making a meter accessible.

The customer shall not interfere with the meter in any way.

The customer should be encouraged to report suspected leaks, seepage or breaks in the water supplier's system as soon as they become evident.

The customer shall advise the water supplier of any significant change in planned usage or activity at the earliest opportunity.

**Comment**

A change in consumption may require a different meter arrangement.

A change in usage may require a change in the level of backflow protection immediately downstream of the meter and may require a trade waste consent if trade wastes are to be generated.

Interference with a meter is an offence under the Local Government Act where the water supplier is a Council department. In other situations where the water supplier is not a Council department, customer interference with meters is usually contrary to conditions contained in a customer contract.

The Building Act requires customers to advise of any change in water use.

**7.5 Meter Relocation**

The customer may request that the meter be relocated to a more convenient area. The water supplier shall approve the new location of the meter and carry out the work at the customer's cost.

Where there is mutual benefit for a meter relocation, in the opinion of the water supplier, the costs may be shared.

Where the meter is relocated at the water supplier's request, the water supplier shall bear the costs of the relocation.

Meter relocation includes reconnecting to the customer's supply pipe.

## 8. Requests for Water Meter Tests

### 8.1 Customer Initiated Accuracy Tests

Customers may request a meter accuracy test at any time.

Tests shall be carried out at an approved test house or, where onsite testing is appropriate, by a person approved by an approved test house. The testing procedures are discussed in Section 9 of this Code.

Customers shall be formally advised in writing of the test result and the water supplier shall keep the records of the test for no less than three years.

A sample Water Meter Test Certificate is included as Attachment 3.

### 8.2 Procedures

On receiving a customer's request, the water supplier shall firstly discuss options for self-assessment of water usage with the customer. If, in the opinion of the water supplier, the customer's circumstances suggest that an accuracy test is not warranted, the customer shall be advised accordingly and given the option of going ahead with the accuracy test.

Before the water supplier agrees to carry out the test, the customer shall be advised, in writing, of any costs they will be expected to meet in relation to the test and accept meeting those costs. The customer's acceptance of those costs may be done verbally or in writing.

Unless otherwise stated in other documents specific to the individual water supplier, the test shall be carried out within five working days of receipt of the request.

Costs for meter accuracy tests shall be published for all meter sizes in common use.

Accuracy tests should be based on:

- individual flow tests at  $Q_t$ ,  $Q_n$  and  $Q_{max}$  (ISO 4064) meeting the required accuracies; and
- flows specified within the meter manufacturer's pattern approval certification for the meter under test.

#### **Comment**

Some testing could be subsidised or carried out at no charge as part of a water conservation strategy or similar strategy.

The water supplier should have literature available for customers on:

- how to read their meter; and
- how to detect leaks.

### 8.3 Accuracy Test Costs

Unless otherwise agreed or specified by the water supplier, the customer shall meet the full cost of the test should the meter prove to be operating inside acceptable accuracy limits.

Should the meter prove to be reading outside the acceptable accuracy limits, the water supplier shall pay for the testing costs and any meter replacement/repair costs.

**Comment**

The water supplier shall have a schedule of costs for water meter tests.

**8.4 Adjustments to the Customer's Invoice**

Where a meter is under reading by more than 20% or stopped, the water supplier reserves the right to charge for the amount of water assessed as having been used over the past billing period, and taking into account any seasonal variations in demand.

Where a meter is over reading, the water supplier shall make appropriate adjustments to the customer's invoice(s), based on a period of similar use and backdated to when it is agreed the over reading is likely to have occurred.

## 9. Standards and Procedures

### 9.1 Meter Manufacturing Standards

Meters shall comply with ISO 4064 Class C for threaded meters 40 mm nominal diameter or less and Class B or C for flanged meters of 40 mm nominal diameter or greater.

After July 2005, only meters that have been pattern approved to the requirements of R49-1, 2 and 3 shall be installed.

This includes manifold meters complying with BS 5728 and OIML R49-2.

#### **Comment**

Threaded meters currently range in size up to 40 mm diameter. Flange meters commence at 40 mm diameter.

Class C meters are more sensitive at lower ranges than Class B meters.

Bypass meters and meters used in combination meters shall be classed as above according to their nominal diameter.

All new meters, including domestic meters, should have remote reading capability to enable remote reading/recording devices to be installed.

Where remote reading devices, such as pulsing units and pulsing totalisers, are installed, the remote reading shall be checked with the meter reading at least annually.

The length of the meter shall conform to standard meter lengths currently in use in the New Zealand market. These are listed in Attachment 5.

#### **Comment**

Meter lengths are generally different in Australia than in Europe. Ideally they should be standardised internationally, especially for the smaller meters.

This issue should be addressed in light of the comments made about the international OIML standard in future reviews of this document.

The following shall be permanently marked on, or affixed to, the meter:

- the name or trademark of the manufacturer
- unit of measurement – cubic metre
- the accuracy class and the nominal flowrate  $Q_n$  or  $Q_3$
- the year of manufacture and unique serial number (as near as possible to the indicating device)
- arrow(s) showing flow direction (not applicable for manifold meters)
- pattern approval symbol and compliance number
- the maximum operating pressure in bars if this can exceed 1 MPa (10 bar)
- the letter “V” or “H” if the meter can operate properly only in the vertical or horizontal position.

The water supplier shall be supplied with appropriate documentation to certify that all meters are manufactured and individually tested in accordance with the standards contained in or referred to in ISO 4064. This shall include the relevant ISO 9000 certification number of the

manufacturer. After July 2005, the water supplier shall have documented proof that meters are pattern approved to OIML R49 and they have been verified before installation.

The water supplier may elect not to request individual test certification for meters 25 mm nominal diameter or less.

The meter supplier shall keep records of all meters supplied, including testing clarification, for 10 years from the time of supply.

The meter supplier shall make available ISO 4064 compliance test certificates for each meter supplied for sizes of 40 mm nominal diameter and larger for a period of not less than six years.

The meter supplier shall ensure each meter 40 mm and less nominal diameter shall carry, in a legible and indelible manner on the meter casing or register, the information in compliance with ISO 4064, including the pattern approval number for that meter. Compliance certificates in support of the meters pattern approval number should be available upon request during the operational life of the meter.

Water meters shall be constructed so that they will be easily readable, including being able to be read by torchlight. The design shall not prevent the reading of the meter register over the installed life of the meter.

Water meters shall be protective covers and seals to prevent tampering.

**Comment**

Historically, there have been problems with meters being unable to be read because of fogging, particularly with register casings.

## 9.2 Approved Test House Requirements

**Comment**

Note earlier comments about all testing and certification required to be carried out in accordance with ISO 17025 standard by July 2005.

Approved test houses measure and certify the accuracy of water meters. Accuracy shall be certified on the basis of comparing the indicated volume recorded by the meter against actual volume recorded by test house volume recording devices, such as calibrated tanks.

Meter accuracies shall be determined by placing a meter in a test rig that geometrically complies with the manufacturer's recommendations to avoid turbulence causing inaccurate measurement. The meter shall be purged of air by flowing water through it before it is ready to test.

Approved test house volume recording devices shall be certified at no more than 12 monthly intervals. The calibration shall be traceable to the New Zealand National standard. This certification shall be made freely available to those requesting tests.

Flow measuring equipment shall be checked and calibrated at not more than 12 monthly intervals by the test house. This certification shall be made freely available to those requesting tests.

Water Meter Test Certificates shall be issued for all meters tested. The certificates shall have, as a minimum:

- approved test house name, address and contact phone numbers
- unique certificate number
- date tested
- meter serial number
- make and model
- customer information and details as agreed with water supplier
- circumstances under which meter is being tested
- initial and final readings
- flow rate tested and individual accuracies for each flow
- conformation whether meter complies with ISO or OIML accuracy standards
- confirmation that volume measuring equipment is currently certified and is available on request
- space for any additional comments, eg mode of failure
- the signature of the tester who shall be certified by their organisation as having been trained and approved to carry out the type of testing they are certifying.

Approved test houses shall have ISO 17025 registration after 1 July 2005.

A sample Water Meter Test Certificate is included as Attachment 3.

### **9.3 Preliminary Accuracy Assessments**

This shall normally apply to standard residential connection of 15 and 20 mm nominal diameter.

Water suppliers may elect to carry out on-site preliminary accuracy assessments of the meter by a suitable competent person, with appropriate equipment. Flow will be measured by a test meter connected to an outside hose tap and compared to the before and after customer meter reading as per Attachment 3 of this Code, which is regarded as the minimum requirement for testing. Alternatively, a test measure may be used to compare the indicated volume to a known reference volume.

#### ***Comment***

On-site preliminary assessments are a check for gross inaccuracies, which is simpler and cheaper for the customer. Removing a meter for testing and replacing it with a new meter is considerably more expensive and involves additional administration costs to record the details of the new meter.

The results of preliminary accuracy assessments should not be used in a statistical sampling programme.

## 10. Water Meter Calibration

### 10.1 Levels of Accuracy

Water meter accuracy shall be as per ISO 4064 for Class B and C meters. Meters installed after 1 July 2005 shall be accurate to OIML R49.

### 10.2 Verification

Water meters shall be individually tested, calibrated and certified in accordance with ISO 4064 until July 2005. After July 2005, meters shall meet the requirement of OIML R49. This is usually done by the meter manufacturer. This information shall be made available to the water supplier upon purchase. The ISO certification number of the manufacturer shall be included on the certification if not permanently marked on the meter. The pattern approval certification number of the manufacturer shall be included on the certification and indelibly marked on the meter.

The water supplier shall, when requested, give customers copies of meter certificates.

### 10.3 Recalibration and Inspection

Water meters shall be tested and recalibrated by an approved test house. Refurbished and/or recalibrated meters or new pattern approved measuring elements, shall be issued with a new test certificate certifying that they comply with the accuracy requirements of ISO 4064 and each meter shall carry, in a legible and indelible manner on the meter casing or register, the information in compliance with ISO 4064.

Alternatively, if a measuring element is to be replaced, it shall be certified by an ISO process consistent with ISO 4064.

Meters shall be tested over at least the three flows of  $Q_{min}$ ,  $Q_t$  and  $Q_{max}$  (as required under ISO 4064) for each size of meter, pattern approval flow performance to ensure accuracy over the full range of expected flows through the meter. This shall include the low minimum flow where an accuracy of  $\pm 5\%$  is allowable, and the slightly higher transition flow at which point the meter must measure at  $\pm 2\%$  accuracy. A recommended table of test flow is attached as Attachment 1.

This information shall be made available to customers on request.

#### **Comment**

Due to the linear to turbulent flow profiles of meters, it is found that if the accuracy at the meters  $Q_t$  and  $Q_{max}$  can be verified (being the two extreme flows of the meters  $\pm 2\%$  measuring range), then the flow points between  $Q_t$  and  $Q_{max}$  are also found to be within  $\pm 2\%$  accuracy.

Where the meter design has received the additional pattern approval certification for "pre-calibrated measuring elements" to ISO 4064, an existing meter installation can have the body fitted in the field with a new "measuring element". This is an acceptable alternative method of verifying an existing meter installation is correctly calibrated. All measuring elements must comply with the relevant ISO 4064 requirements with the same indelible markings and certification requirements as required for new meters. In addition, each pre-calibrated measuring element must be supplied with fitting instructions.

## 10.4 Meter Replacement or Meter Refurbishment / Recalibration Programme

The water supplier shall have a meter replacement or meter refurbishment/recalibration programme that ensures that all meters remain within their required accuracy limits. This should take into account:

- total volume passed by the meter
- exposure to high flows ( $Q_{max}$ ) through the meter
- expected life of the meter (as recommended by the manufacturer)
- the age of the meter
- quality of water passed through the meter
- results of statistical sampling programmes.

Meters 32 mm and larger shall be tested at an approved test house no less frequently than every six years or a lesser frequency based on the manufacturer's recommendations relating to volume, exposure to high flows and quality of water passed by the meter.

Combination meters shall be tested at a frequency no more than every six years or a lesser frequency based on the manufacturer's recommendations relating to the volume and quality of water passed by the meter.

### **Comment**

Smaller meters, typically 25 mm nominal diameter, are commonly discarded following accuracy testing because of overall cost considerations.

When fitting a pattern approved pre-calibrated internal, it is important to ensure the body is compatible with the element supplied and that the body is free of debris and/or corrosion that could cause turbulence, which can affect accuracy.

See Clause 11.9 – Asset Management.

## 10.5 Electronic Meter Recalibration

Electronic meters shall have their electronic components tested at least annually and, where necessary, recalibrated or repaired by equipment especially designed for that purpose and by persons specifically trained to carry out that work. The meters shall be tested by persons certified by the meter supplier as being competent in testing the particular make and size of the meter or by an organisation with ISO 17025 certification for this type of work.

The meters shall be physically inspected at no more than three yearly intervals for signs of external deterioration.

Meters 32 mm and larger shall be tested at an approved test house at least every six years or greater if required, based on the manufacturer's recommendations relating to the volume, exposure to high flows and quality of water passed by the meter.

## 10.6 ISO Process Testing of Meters

Meters requiring certification by an ISO certified process shall be sent to an approved test house with ISO 17025 certification.

### **Comment**

There is currently only one ISO test house with ISO 17025 certification in New Zealand. It is unable to certify meters less than 50 mm nominal diameter.

## 11. Metering Installations

### 11.1 Meter Ownership

The meter is usually the property of the water supplier, who will have procedures in place to ensure the overall reliability of water meters while in service. Where a water meter fails to perform within the required accuracy limits or has stopped registering volume consumed, customer's invoices shall be adjusted as per clause 8.3.

The water supplier shall be responsible for the replacement of water meters at its own cost where it owns the meter.

Where a water meter is not owned by the water supplier, the requirements of this Code shall apply.

### 11.2 Compliance with Code of Practice

Both the water supplier and the customer are responsible for complying with this Code of Practice. The supply of water to a customer is dependent on the customer agreeing to abide by this Code and other terms and conditions contained within a water supply agreement.

Copies of the Code shall be made freely available to customers by the water supplier.

#### **Comment**

Reference to the Code would be included in water supply bylaws, customer agreements, charters, contracts, etc.

Customer charters/contracts are the primary means of conveying the terms, conditions, responsibilities, etc for water supply between a water supplier and its customers. The key points of the code shall be included in these documents with customers able to obtain copies of the Code, electronically or otherwise, should they wish.

### 11.3 Design Standards

The water supplier shall be responsible for the location, geometry and size of all water meter installations.

Water meters shall be sited in a position:

- where they can be safely and easily reached by the customer and the water supplier; and
- where the meter installation is unlikely to be obstructed or subject to heavy vehicular or other loads.

Prior to physically installing the meter, the connection to the water supplier's system shall be purged of air and debris.

Meters shall be installed so that it is completely filled with water and will remain so under normal operating conditions.

Meters shall be installed in accordance with the manufacturer's recommendations, paying particular attention to the installation of fittings close to the meter that could create turbulence in the flow and lead to inaccurate reading.

**Comment**

It is particularly important for electronic meters to comply with the manufacturer's recommendations on earthing, running cables alongside other cables, proximity to high tension power lines, and other matters. Qualified advice specific to individual installations may be required in order to install an electronic meter and to ensure its accuracy.

Historical problems have highlighted the need to take the manufacturer's recommendations into account.

Meters shall be installed with a stop valve on the water supplier's side of the meter and a non-testable dual check valve or testable double check valves as part of the meter assembly immediately downstream of the meter as a minimum requirement, or within the body of the manifold for manifold meters.

The meter supplier shall ensure that, where appropriate, backflow prevention requirements in accordance with current legislation and codes of practice are addressed at the time of meter installation.

**Comment**

Backflow prevention is currently subject to the 1961/86 Water Supply Protection Regulations.

A Code of Practice for Backflow Prevention based on the *Public Health Risk Management Guide – Distribution System – Backflow Prevention version 1 Ref D2.4 June 2001* is being prepared. The minimum requirement above is taken from those guidelines.

Failure to comply with the guide may result in the downgrading of a water supply.

Non-testable dual check valves are not readily available for diameters above 25 mm.

The water supplier shall determine what other fittings need to be installed on each meter installation. This may include a flow control valve.

Meters shall be installed in a meter box or meter pit of appropriate size to allow future maintenance and meter replacement.

Meter installations 32 mm nominal diameter and above shall be designed so that the normal flow to the premise will not be significantly interrupted when the meter is removed for accuracy testing unless otherwise agreed with the customer.

**Comment**

Customers, particularly large customers, need water on a continuous basis and stopping the supply of water for more than a few minutes in order to test a meter could have a significant effect on their operations.

**11.4 Installation Records**

The water supplier shall keep records of the location of the installed meter and details of the meter including type/model, size, serial number, initial reading and any other relevant information.

**11.5 Application of Seals**

All meters shall be sealed. Seals shall not be broken unless specifically authorised by the water supplier or its agents.

If a seal is found to be broken, the water supplier shall investigate the reason for the break and have the seal replaced. The water supplier must be satisfied that the meter is accurate before replacing the seal.

## 11.6 Meter Sizing and Selection

The size and type of the supply meter shall be chosen by the water supplier based on information supplied by the customer. The size shall be chosen having due regard for:

- its pattern approval operational parameters
- the anticipated flow rates
  - highest expected flow rate ( $Q_n$ )
  - overload flow rate ( $Q_{max}$ )
  - transitional flow rate ( $Q_t$ )
  - minimum flow rate ( $Q_{min}$ )
- the organisation's water conservation policies
- the use the water is to be put to
- fire fighting and/or sprinkler requirements
- overall cost
- the quality/abrasiveness of the water
- overall head loss through the meter assembly
- expected meter life.

A combination meter should be installed where flow conditions are not able to be satisfactorily measured by a single meter.

A water supplier may install a flow control valve to limit maximum flow rates.

Filters should be installed upstream of the meter where there could be particulate matter in the water supply that could interfere with the accurate reading or the life of the meter.

### **Comment**

Unnecessarily large meters can result in excessive demands being placed on the local reticulation system. Often peak flows can be reduced and costs to both the water supplier and customers minimised by better water use methodology.

Reducing peak flows ultimately reduces costs to both the water supplier and the customer.

## 11.7 Health and Safety

The meter installation shall be sited so that it can be easily read by both the customers and the water suppliers and their agents, without compromising the health or safety of the individual.

No meter shall be installed in such a position that the reader needs to enter a confined space in order to read it unless under special circumstances approved by the water supplier. In these cases, only persons appropriately trained in the appropriate health and safety requirements shall have access to read, repair or replace the meter.

### **Comment**

Meters with remote reading capability can be connected to remote reading totaliser units near the meter assembly to enable customers to safely read their consumption without requiring special health and safety precautions.

Telemetry system, eg Scada, can also be used.

### **11.8 Measurement Units**

All meters shall record the volume consumed in cubic meters in accordance with ISO 4064/OIML R49. Domestic meters shall have the ability to read the throughput down to four decimal places of a cubic meter. Cubic meters are the same as kilolitres.

Existing imperial meters shall be replaced with metric meters by 31 December 2003.

### **11.9 Asset Management**

The water supplier shall have systems in place to monitor the age and throughput of all meters and have a statistically and scientifically based meter replacement programme, taking into account the requirements of clause 10.4 of this Code, to ensure meter accuracy is maintained throughout the life of the meter.

Meter replacement shall be at the water supplier's cost.

### **11.10 Remote Readers**

A testing regime should be implemented to ensure that no discrepancy exists between the remote reader and the meter counter.

If remote readers are retrofitted to meter installations (ie, not installed as part of the original installation), the installation date shall be separately recorded.

## 12. Meter Reading

### 12.1 Ordinary Meter Reading

Meter reading is the responsibility of the water supplier unless alternative arrangements are specifically made.

The meter shall be read at specified intervals depending on the volume consumed and the needs of the customer. The information should be given to customers along with other information when new accounts are established.

#### **Comment**

When properties are sold, it is normal practice to leave information about water supply matters for the new owners. This could include advice about the water meter, frequency of readings, etc. Some organisations include this advice in a customer charter or customer agreement. Other organisations have information packs for new owners.

Residential meters serving one individual dwelling or apartment shall be read at appropriate intervals, having due regard for the amount of the invoice, and should be read at least once per year.

Industrial and commercial meters should be read between one and six-monthly, depending on volume consumed.

Customers can request past meter readings for the purpose of comparing current consumption. Where such requests are infrequent, no charge should be made. Where charged are made, the customer shall be advised beforehand.

Meters can be read remotely using Scada and similar systems.

### 12.2 Special Meter Readings

Customers can request a special meter reading for a given date.

Customers should give the water supplier at least five working days notice of a special reading being required. Shorter periods of notice may be accepted by the water supplier.

Customers shall meet the cost of special meter readings.

#### **Comment**

Special meter readings would normally be charged at a standard rate, irrespective of meter size. Usually organisations would set and publish their charges on an annual basis.

The water supplier may elect to charge more for special readings at shorter periods of notice.

### 12.3 Remote Readers

Remote readers used for charging purposes shall be checked at least annually against the meter counter. The water supplier shall keep this information for a minimum of three years.

The device on which consumption is measured shall be indicated on the invoice.

***Comment***

Remote readers may be influenced by stray electrical fields, poor earthing contacts, proximity to power cables and other factors.

### **13. Damage and Tampering**

The only persons authorised to carry out work on a water meter are the water supplier's staff and those persons specifically authorised by the water supplier.

Customers shall not touch or tamper with a water meter or its fittings other than for the purpose of reading the meter or turning off the private supply from the meter stopcock. This includes the unauthorised removal of meters seals.

Seals shall not be able to be opened without being clearly broken, and shall not be able to be refastened or reassembled in such a way that they appear intact.

## 14. Public Information

Water suppliers shall provide metering information as public handouts available from the office(s) and other suitable facilities. They should include, but not be limited to, the following advice.

- How to read a meter.
- What to do if you think your water bill/consumption is too high.
- Advice on who to contact for historical consumption advice.
- How to check for leaks.
- How do you get your meter checked and what options are available?
- What services customers have to pay for and what services are provided free by the water supplier.
- Current standard costs for the above services.
- How do you get a special meter reading?
- Reference to further information.
- Dispute resolution procedures.

## 15. Disputes Resolution

Each water supplier shall have a published and readily available disputes resolution process for disputes of any nature between the customer and the water supplier.

Customers should be encouraged to put their complaints in writing and have the letter/email acknowledged with an interim reply typically within 3-5 working days, and a full response within 10-20 working days, in accordance with the organisations stated policies.

The water supplier should have a senior position within the organisation specifically tasked with receiving and resolution of customer complaints.

This Code does not take precedence over any legislation or any rights that customers may have under that legislation.

### **Comment**

In July 2003 the Fair Trading Act and Consumers Guarantees Act were amended to include water supply as a service covered by these Acts.

To enable compliance with these Acts, each water supplier shall have a published and readily available customer complaint resolution for disputes of any nature between the customer and the water supplier.

Water suppliers will ensure that internal disputes resolution processes are free, accessible, fair and effective.

### **Water suppliers must:**

- provide customers with information about how their complaints will be dealt with, and by when; and
- provide written information about their customer complaints handling process.

### **Water suppliers will:**

- train their staff about their customer complaints handling process;
- use processes that are easy to understand, easy to use and free to customers;
- provide adequate resources for their customer complaints handling processes; and
- review their customer complaints handling processes regularly.

### **Other Forms of Legal Redress**

In cases where the water supplier cannot reach agreement with a customer, a customer may have the legal right to refer a problem to the Courts or arbitration for determination. In such cases, the water supplier will ensure it notifies the customer of their right to refer the matter to another party.

A generic example of a dispute resolution procedure follows.

Where a customer wishes to dispute an issue with the water supplier, the customer may formally take the issue to a specifically nominated senior person within the water supplier's organisation especially tasked to resolve such disputes. That person shall, individually or with the assistance of others, attempt to resolve the issue to the customer's satisfaction.

Should the customer not accept the outcome, they can resubmit the dispute to the water supplier's nominated person for further consideration, or an independent mediatory or, with

the written agreement of both parties, arbitration to hear the dispute and recommend a solution.

The Disputes Tribunal may be used to resolve issues where the disputed amount is below the Tribunal's limits.

In 2002, the Tribunal's limit was \$7,500 and where both parties agree, \$12,000.

## **16. Administration**

This Code of Practice will be administered by the New Zealand Water and Wastes Association (NZWWA) who, through the Association's Water Supply Manager's Group, will be responsible for ensuring that the Code is reviewed and updated at appropriate intervals. Prior to each review, the Water Supply Manager's Group shall seek submissions from all interested parties. Where appropriate, the Water Supply Manager's Group may request independent peer review to strengthen the robustness of the Code. This will include consideration of the implications of new Australian and European standards.

## 17. Transition

Water suppliers, in adopting this voluntary Code, shall produce a transition plan to ensure that all meter and metering procedures are in compliance with the Code by nominated future dates. All new installations shall be in compliance with this Code once adopted.

This plan shall include, but not be limited to:

- phasing out of imperial meters (refer clause 11.8)
- meter replacement programmes, which takes into account failure rates
- production of public information and advice
- development of a meter replacement programme for 15, 20 and 25 mm meters
- not purchasing meters outside the requirements of the Code.

# Attachments

## Attachment 1

### Water Meter Code of Practice Test Flows

#### ISO 4064 CLASS B FLOW RATES, M<sup>3</sup> / HR

	40 mm	50 mm	80 mm	100 mm	150 mm
<b>Q max ± 2%</b>	20	30	80	120	300
<b>Q n ± 2%</b>	10	15	40	60	150
<b>Q t ± 2%</b>	0.8	3	8	12	30
<b>Q min ± 5%</b>	0.2	0.45	1.2	1.8	4.5

#### ISO 4064 CLASS C FLOW RATES, LITRES / HR

	15 mm	20 mm	25 mm	32 mm	40 mm
<b>Q max ± 2%</b>	3000	5040	6960	12000	20000
<b>Q n ± 2%</b>	1500	2540	3480	6000	10000
<b>Q t ± 2%</b>	22.5	37.5	52.5	90	150
<b>Q min ± 5%</b>	15	25.2	34.8	60	100

#### **Comment**

These flows are different from the OIML standard, which has test flows at  $Q_{min}$  (OIML Q<sub>1</sub>),  $Q_t$  (OIML Q<sub>2</sub>),  $Q_{min}$  (OIML Q<sub>3</sub>), rather than  $Q_{max}$  (OIML Q<sub>4</sub>).

## Attachment 2

### Water Meter Code of Practice Sample Test Certificate

Approved test house name  
Logo  
Address  
Phone number  
Email address

#### Water Meter Test Certificate No 9999

Test Date: \_\_\_\_\_ Customer: \_\_\_\_\_  
Meter Serial Number: \_\_\_\_\_ Customer Information/details: \_\_\_\_\_

#### as agreed with water supplier

Make and model: \_\_\_\_\_  
Address of meter: \_\_\_\_\_  
Final reading: \_\_\_\_\_  
Initial reading: \_\_\_\_\_  
Reason for testing: \_\_\_\_\_  
(eg, as received, calibration, repair and test, repair and calibrate)

Manufacturer's meter model, ISO 4064 Pattern Approval Certification number: \_\_\_\_\_

#### Results

	Flow Rate	Actual volume recorded by test house (m <sup>3</sup> )	Indicated volume recorded by customer meter (m <sup>3</sup> )	Percentage error (%)
Q <sub>min</sub>				
Q <sub>t</sub>				
Q <sub>max</sub>				
etc				

The above meter does/does not conform to the accuracy standards of ISO 4064.

#### Comments

eg, advice on any subsequent actions?

I, \_\_\_\_\_ certify on behalf of (the above company), that the above meter has been tested in accordance with the requirements of the (New Zealand) Water Meter Code of Practice, September 2003.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Attachment 3

### Procedures for On-Site Testing of Water Meters

The following criteria are regarded as minimum requirements.

Before carrying out a preliminary accuracy assessment, water shall be flowed for at least one minute from the connected test apparatus to remove any air from the test system. Occupants of the house shall be advised not to use any water until further notice.

Before the assessment commences, the operator shall observe the meter twice over a period of not less than three minutes to look for any leakage in the private system. Should the meter remain on the initial reading for the duration of the observation, the system is deemed to be free of significant leaks and the customer's systems are assumed to be closed.

Should the meter indicate signs of leakage, the test should not proceed and the water supplier and customer advised accordingly.

Where leakage in the customer's system is observed at the meter, the water supplier may elect to record the meter accuracy by disconnecting the customer's system and connecting the test apparatus directly to the meter.

The standard assessment shall be carried using a fully opened tap, limited, if necessary, to a maximum flow of 35 litres/minute. The assessment shall be undertaken over not less than a three minute period.

The assessment meter shall have been calibrated within the past 12 months or after no more than every 200 tests, whichever is the lesser. Assessment results shall include an accuracy curve over the range of the meter derived from the testing procedures. The meter shall be certified as being accurate in accordance with the accuracy standards required by ISO 4064 and test records kept. The accuracy curve shall be used to convert measured volume of the test meter to a corrected actual volume. The corrected reading shall be compared to the observed customer measured volume and percentage error determined by direct reference to volume standards with appropriate calibration.

Customers shall be clearly advised of the result, any appropriate subsequent actions and an On-site Water Meter Preliminary Accuracy Assessment Certificate issued. The certificate shall have, as a minimum:

- tester's organisation and name, address and contact phone numbers
- unique certificate number
- date assessed
- meter serial number
- make and model
- customer information, property address and details as agreed with water supplier
- circumstances under which meter is being tested
- initial customer meter reading
- test flow rate
- static test pressure
- percentage error at test flow rate
- confirmation whether meter complies with ISO accuracy standards (Class C)
- confirmation that the on-site meter is currently certified (details available on request)
- space for any additional comments
- the signature of the tester.

## Attachment 4

### Currently used meter body lengths in New Zealand

Nominal diameter mm	<b>15</b>	<b>20</b>	<b>25</b>	<b>30</b>	<b>40</b>
Meter length over connectors mm	134	165	260	260	300