

Water efficiency labelling programmes – requirements with guidance for implementation

CD stage

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Project Committee ISO/PC 316, Water efficient products – Rating.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The purpose of ISO 31600 *Water Efficiency Labelling Programmes – requirements with guidance for implementation* is to provide a set of best practices and guidance for the preparation and implementation of a water efficiency labelling programme for plumbing products and water consuming appliances. A key focus of the committee has been to provide the criteria for developing countries to establish an effective water efficiency labelling standard that will save water resources.

This project was approved on the basis that consumer empowerment through the communication of a product's water efficiency is a proven way of saving both water and energy. Several countries around the world already have well-established and effective water efficiency labelling programmes which empower consumers to make choices favouring more water efficient fixtures and appliances without compromising on human hygiene and sanitation. These existing labelling programmes were consulted in the development of this standard.

ISO 31600 will globally encourage the development of national standards for water efficiency labelling, which will further lead to development and marketing of water efficient products, and enable consumers to make an informed choice, positively influencing manufacturers to improve the performance of their products through consumer demand. This standard does not seek to establish ways to use water efficiency labelling in policies or programmes. The intention is to provide an understanding of the essential requirements for the development of an effective water efficiency labelling programme.

To demonstrate conformance to ISO 31600, a water efficiency labelling programme will need to conform with the requirements given in Clause 4.

This Standard refers to existing national product standards and regulations for the determination of water consumption and other important test procedures and requirements that form the critical underpinnings of a water efficiency labelling programme. Countries without national product standards may formulate their own national product standard either by adopting a national product standard from a supporting country or by preparing an indigenous standard, to meet the requirements in Clause 4 of this Standard.

This Standard contains informative annexures that provide suggested universal tests for the determination of water consumption, and provide descriptions of a number of existing schemes/programmes. Countries that do not have an existing water efficiency labelling programme may consider these examples to select and adopt those best suited for their markets and conditions when developing their own water efficiency labelling programme.

Readers of this standard should refer to their countries water efficiency programmes and regulatory requirements prior to utilising this Standard.

An overview of how to use this Standard, including the pathway to demonstrate conformance, is provided in Figure 1.

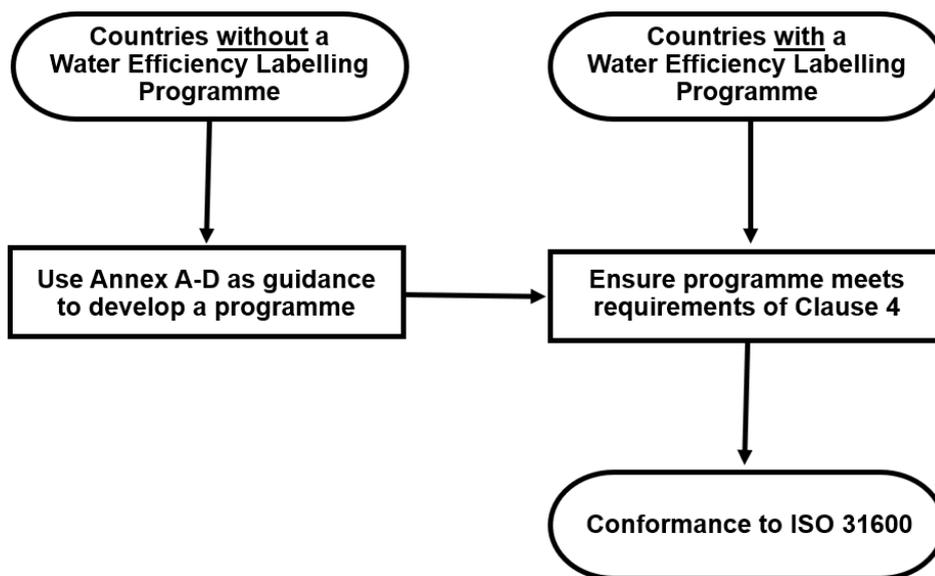


Figure 1 — Pathway to ISO 31600 conformance

ISO 31600 Water efficiency labelling programmes – requirements with guidance for implementation

1 Scope

This International Standard specifies requirements for a water efficiency labelling programme for plumbing products and water consuming appliances along with guidance for their implementation.

This International Standard applies to the following products:

- (a) Showers.
- (b) Tap (faucet) equipment.
- (c) Flow controllers.
- (d) Lavatory equipment.
- (e) Urinal equipment.
- (f) Dishwashers.
- (g) Clothes washing machines.
- (h) The dryer function of combination washer/dryers, where they use water to dry a load.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

basin

lavatory

fixture for holding water for washing the hands or face, whether with one tap (faucet) to allow a single user or a number of taps (faucets) spaced to allow simultaneous users

Note 1 to entry: the term lavatory is used in some countries, but can also refer to the room in which toilets or urinals may be positioned, along with a basin for washing of hands.

3.2

flow controller

flow control device which can be located within (upstream of the outlet) or at the very end (forming part of the outlet) of the water flow passage through a product

3.3

flushometer valve

flush valves

device that controls the release of water to flush a urinal or water closet

3.4

national regulations

legislation that specifies requirements to be fulfilled by a product or group of products in the country of intended installation

3.5

national Standard(s)

product standard

standard that specifies requirements to be fulfilled by a product or group of products in the country of intended installation

NOTE 1 TO ENTRY: A country may formulate their own national product standard either by adopting a national product standard from a supporting country or by preparing an indigenous standard.

3.6 Pressure

3.6.1

pressure

difference of pressure between two levels, determined by the product of the difference of height, the density and velocity

NOTE 1 TO ENTRY: Countries plumbing system water supply will determine the amount of pressure delivered to a water using outlet or fixture.

3.6.2

high pressure

heated water and cold water static supply pressures at or above a stated pressure for the country of intended installation

NOTE 1 TO ENTRY: This is typically in a fully pumped plumbing system installation.

3.6.3

low pressure

heated water and cold water static supply pressures below a stated pressure for the country of intended installation

NOTE 1 TO ENTRY: This is typically in gravity fed plumbing system installations.

3.6.4

static pressure

measure of the at rest pressure in a plumbing system

3.6.5**dynamic pressure**

pressure in a plumbing system under flow conditions

3.7**shall**

indicates that a statement is mandatory

3.8**shower assembly solutions**

shower systems

combination of a shower control (valve) complete with shower hose (flexible or rigid) and shower outlet

3.9**shower outlet devices**

showerheads, handheld showerheads and other shower outlet devices such as body sprays and rain shower outlet devices

3.10**tap (faucet)**

part of a tap or lavatory or of a tap or lavatory assembly that includes the inlet and outlet connections

3.11**water closet**

toilet

combination of a water closet (WC) pan or bowl and a flushing control mechanism, intended to be supplied or installed as a unit

3.12**urinal**

combination of a water-using urinal and flushometer valve that is intended to be supplied or installed as a unit

3.13**water efficiency**

accomplishment of a function, task, process, service or result, with the minimum amount of water practicable

[SOURCE: ISO 24513:2019, 3.4.7]

4 Water efficiency labelling programme requirements

A water efficiency labelling programme shall:

a) For the product, include or reference –

i) a **national Standard(s)**; and/or

ii) **national regulations**.

NOTE 1 A **national Standard(s)** provides the foundation for enabling a water efficiency labelling programme and may cover requirements for inherent product characteristics such as public health and safety, material

requirements, interchangeability, durability (life testing), performance requirements, and minimum compliance marking and/or labelling requirements.

b) Include aspects of **water efficiency** test(s) requirements for the product or reference the applicable water efficiency test in the **national Standard(s)**;

c) Have a method to evaluate and determine a product's **water efficiency** or water efficiency rating based on the results of the water efficiency test(s) as per Clause 4.1(b); and

d) Have a labelling method that identifies the product as being water efficient based on the assessment provided as per Clause 4.1(c). The label may or may not include the product's water efficiency rating.

NOTE 2 For guidance on the requirements for setting up a complete programme, see Annex A.

NOTE 3 For information and guidance on the above requirements and water efficiency tests as applied to existing water efficiency labelling programmes, see Annex B for plumbing products and Annex C for water using appliances.

NOTE 4 For information on conformity assessment procedures for products of a water efficiency labelling programme, see Annex D.

Annex A (Informative)

Universal requirements for a water efficiency labelling programme

A.1 Scope

This annex provides the aspects of water efficiency tests for plumbing products and water consuming appliances. Best practice options are provided, including existing test methodologies and test methods based on parameters as specified in this annex. This annex allows a country to evaluate the most suitable water efficiency labelling programme criteria for that country.

A.2 How to use this annex

This annex sets the basic principles for what is required for a water efficiency labelling programme that meets the requirements of this Standard. The use of this annex will provide the necessary criteria for the development a water efficiency labelling programme based on best practices. It provides the methodology parameters to achieve determination of a product/appliance's of water efficiency. Water efficiency testing criteria are provided for guidance and use in this annex.

A.3 Generic labelling guidelines

A.3.1 Water efficiency rating

A.3.1.1 Objective

A rating system in a water efficiency labelling programme is intended to differentiate the more water efficient product/appliance from less efficient model and to provide water efficiency information of the model.

NOTE: As mentioned in Clause 4(d), the label may or may not include the product's water efficiency rating. The clauses in this Annex serves as a guidance for other nations that intend to develop their own rating system and labelling system. Water efficiency labelling programme as prevalent in some countries are also given in Annex B and Annex C which may be suitably considered by other nations for adoption or developing their own water efficiency labelling Standard.

A.3.1.2 Rating system

A rating system may consist of the following:

- a) Water consumption units, e.g. litres per flush for water closets, litres per minute (L/min) for taps (faucets), etc.
- b) Maximum rating
- c) Maximum water consumption
- d) Lowest water consumption, if applicable.

e) Number of ratings within the range

f) Water consumption range for each rating

An example of a rating system for basin taps (faucets) is illustrated in Table A.1.

Table A.1 — Basin taps (faucets) rating system example

Rating	Flow rate (L/min)
1	$\geq 7.5 < 9.0$
2	$\geq 6.0 < 7.5$
3	$\geq 4.5 < 6.0$
4	$\geq 1.5 < 4.5$
NOTE 1 'Rating 4' is the most water efficient NOTE 2 'Rating 1' is the least water efficient NOTE 3 '9.0 L/min' is the maximum water consumption NOTE 4 '1.5 L/min' is the lowest water consumption NOTE 5 'L/min' is the water consumption unit NOTE 6 ' $\geq 4.5 < 6.0$ ' is the water consumption range	

A.3.2 Water consumption

A.3.2.1 Determination of water consumption

The water consumption on the label should be determined in accordance with the following clauses:

- A.4.2 Shower Outlet Devices and Shower Assembly Solutions
- A.4.3 Taps (faucets)
- A.4.4 Flow regulators
- A.4.5 Water closets (toilets)
- A.4.6 Urinals
- A.5.1 Dishwashers
- A.5.2 Clothes washers
- A.5.3 Combination washers / dryers

A.3.2.2 Expression of results

The water consumption number on the label should be rounded off to the nearest figure, e.g. the nominal flow rate of taps (faucets) rounded off to the nearest 0.1 L/min or 0.5 L/min.

A.3.2.3 Rating of product/appliance

The rating of a product/appliance should be determined in accordance with the rating system specified in A.3.1.2.

A.3.3 Labelling guidelines

A.3.3.1 Labels

Every model should be issued with a water efficiency label. Every label should meet the minimum requirements as specified in Clause A.3.3.2 and A.3.3.3.

A.3.3.2 Label specifications

The specifications of a label should consist of the following:

- a) Rating representation, e.g. Star rating, tick rating, etc.;
- b) Label dimensions;
- c) Colour specifications and minimum resolutions, e.g. pantone codes;
- d) Design of label;
- e) Font type e.g. Arial;
- f) Font size;
- g) Language, e.g. all information in English; and
- h) Water efficiency label information (see clause A.3.3.3).

A.3.3.3 Label information

A label should contain the following information:

- a) Water efficiency rating;
- b) Product brand;
- c) Product model number;
- d) Water consumption;
- e) Type of product; and
- f) Registration number or unique number issued to the model or its equivalent.

A.3.3.4 Additional label information

The following additional information may be included on the label:

- a) Standard number (e.g. AS/NZS, BS EN, ISO, etc.);

- b) Name of supplier;
- c) Recommended wash programme (applicable for clothes washing machines);
- d) Number of place settings (applicable for dishwashers);
- e) Intended application, e.g. shower outlet; or
- f) Any other information

NOTE: Water efficiency labelling programme as prevalent in some countries are given in Annex B and Annex C which may be suitably considered by other nations for adoption or developing their own water efficiency labelling Standard.

A.3.3.5 Printed labels

The label should be produced or printed in full or proportionately larger, in accordance with any applicable national label specifications, or in any case of a size such that it can be reasonably be read and comprehended by consumers.

A.3.3.6 Display of label

The water efficiency labelling programme should detail the appropriate manner the label is displayed at the point of sale. The label may be affixed securely on the physical model or placed near to the product/appliance or on its packaging at point of sale. The label should be affixed in a prominent position for consumers to view the water efficiency information and compare with ease.

A.3.3.7 Use of label in advertisements

The water efficiency labelling programme should detail the appropriate manner for the use of the label in product advertisements or marketing.

Where it is not feasible to place all water efficiency information as specified in A.3.3.3 for each model in a printed advertisement, for example, due to space constraints, the advertisement for the model should contain the following:

- a) Water efficiency rating;
- b) Product brand;
- c) Product model number; and

A.3.3.8 Modification of a labelled product/appliance

Where there is any change to the critical components of the product that affects its performance and water efficiency, the model should be deemed as a new model and the existing label as invalid. A new label is required for the product.

NOTE: Water efficiency labelling programme as prevalent in some countries are given in Annex B and Annex C which may be suitably considered by other nations for adoption or developing their own system in their own water efficiency rating and labelling Standard.

A.3.4 Additional guidance on labelling

Countries that intend to develop their own water efficiency labelling programme are recommended to include the following provisions:

- a) requirements to maintain a proper record system of the labels issued to the products for traceability and for review of the water efficiency labelling programme.
- b) rules and requirements regarding changes of ownership of the manufacturer, supplier or importer of the labelled product/appliance.
- c) rules and requirements on modifications of labelled products that can affect the validity of the label.
- d) rules and requirements on altering, falsifying or forging of the label.

A.4 Plumbing products

A.4.1 General requirements

A.4.1.1 Conformance to national regulations and national Standard(s)

As a prerequisite, all labelled plumbing products and all components included as part of a labelled product assembly should conform to all the requirements contained in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.1.2 Instructions

The water efficiency labelling programme should require that all labelled products not be packaged, marked, nor provided with instructions directing the user to an alternative water use setting that would override the rated flow rate or water consumption volume, as established by the water efficiency labelling programme. All included instructions related to the maintenance of the product should direct the user on ways to maintain the labelled product back at the rated flow rate or water consumption volume of the product.

A.4.2 Shower outlet devices and shower assembly solutions

A.4.2.1 General

This clause applies to:

- **Shower outlet devices** and;
- **Shower assembly solutions**

A.4.2.2 Included components

Shower assembly solutions should include a shower control valve (tap) and a **shower outlet device**. Where handheld **shower outlet devices** are supplied, a compatible flexible hose should also be supplied.

All components included with the shower assembly should be installed according to the manufacturer's instructions.

A.4.2.3 Essential testing

A.4.2.3.1 General

The following test is considered essential for **shower outlet devices** and should be included in a water efficiency labelling programme.

A.4.2.3.2 Determination of shower outlet device flow rate

A.4.2.3.2.1 Flow rate test

The flow rate of the **shower outlet device** should be determined by the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. Flow rates should be expressed in terms of litres per minute (L/min).

A.4.2.4 Additional suggested testing

A.4.2.4.1 General

The following tests are offered for consideration for inclusion in a water efficiency labelling programme. They may not be appropriate in all regions.

NOTE: The following Determination of Spray Coverage and Spray Force tests are only recommended for regions having predominately pressurized (e.g. water utility supplied) plumbing systems. It may not be appropriate for regions that have predominately low pressure (e.g. roof cistern supplied) plumbing systems.

A.4.2.4.2 Determination of spray coverage

A spray coverage performance test for **shower outlet devices** should be determined when tested in accordance with the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

NOTE: The intent of this test is to ensure that the **shower outlet device** provides an effective spray coverage pattern to facilitate bathing. Performance will be recorded and expressed in terms of coverage over a defined area.

A.4.2.4.3 Determination of spray force test

A spray force test for **shower outlet devices** should be determined when tested in accordance with the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. Performance should be expressed in terms of newtons (N).

NOTE: The intent of this test is to ensure that the **shower outlet device** provides adequate force to facilitate bathing.

A.4.2.4.4 Pressure independency (minimum flow rate) test

A means to measure the pressure independency of **shower outlet devices** should be determined when tested in accordance with the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

NOTE: The intent of this test is to ensure that low water supply pressures do not adversely affect the performance of the **shower outlet device**.

A.4.3 Taps (faucets)

A.4.3.1 General

This clause applies to:

- Manually and electronically operated bathroom taps (faucets) and bathroom tap (faucet) assemblies;
- Manually and electronically operated kitchen taps (faucets) and kitchen tap (faucet) assemblies and;
- Manually and electronically operated bar sink taps (faucets) and bar sink tap (faucet) assemblies.

A.4.3.2 Included components

Where flow controls are supplied, they should be included in the tested assembly. All components included with the tap (faucet) assembly should be installed according to the manufacturer's instructions.

A.4.3.3 Essential testing

A.4.3.3.1 General

The following tests are considered essential for taps (faucets) devices and should be included in a water efficiency labelling programme.

NOTE: This test is only recommended for regions having predominately pressurized (e.g. water utility supplied) plumbing systems. It may not be appropriate for regions that have predominately low pressure (e.g. roof cistern supplied) plumbing systems.

A.4.3.3.2 Determination of tap (faucet) flow rate

A.4.3.3.2.1 Flow rate test – taps (faucets)

The flow rate of taps (faucets) should be determined by the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. Flow rates shall be expressed in terms of litres per minute (L/min).

Consumption test – metering faucet

A.4.3.3.3 Pressure independency (minimum flow rate test)

A means to measure the pressure independency of taps (faucets) should be determined in accordance with the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

NOTE: The intent of this test is to ensure that low water supply pressures do not adversely affect the performance of the tap (faucet).

A.4.4 Flow regulators

A.4.4.1 General

This clause applies to:

- Separately sold flow regulators used to control the rate of water flow of water in a **tap (faucet), shower outlet device or shower assembly solutions**, fitted per the manufacturer's instructions.

NOTE: Where local markets allow flow control devices to be sold separately, they are typically sold as part of an aerator sub-assembly for use on taps (faucets), or as a stand-alone component intended to be installed in a shower assembly solution. When fitting a flow regulator to a terminal fitting or any part of a system, it must be compatible with such a system, any fitting within the system such that the addition of the flow regulator does not adversely affect the safety or performance of the fitting or system for the purpose for which it was originally intended. It is recommended that installation instructions be included with separately sold flow control devices.

A.4.4.2 Essential testing

A.4.4.2.1 General

The following test is considered essential for flow regulators and should be included in a water efficiency labelling programme.

A.4.4.2.2 Determination of flow regulator flow rate

A.4.4.2.2.1 Flow rate test

The flow rate of flow regulators should be determined by the test procedures detailed the applicable **national regulations or national Standard(s)** of the nation of intended installation. Flow rates shall be expressed in terms of litres per minute (L/min).

A.4.5 Water closets (toilets)

A.4.5.1 General

This clause applies to:

- “Western-style” and “squat-type” water closets and water closet pans
- Single and dual-flush volume cistern-type (tank-type) gravity water closets
- Single and dual-flush volume cistern-type (tank-type) flushometer-tank (pressure-assist) water closets
- Single and dual-flush volume **flushometer-valve** (flush valves) operated water closets
- Electro-hydraulic water closets;
- Separately sold water closet **flushometer-valves** (flush valves);
- Separately sold cisterns (tanks) and water closet pans (bowls); and
- Any other water closet technology that meets the intent of this standard

A.4.5.2 Included components

All included components, including fill (inlet) valves, flush (outlet) valves, water closet **flushometer-valves** (flush valves) and other components whether sold separately or as a combined system, should conform to all requirements contained in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.5.3 Essential testing

A.4.5.3.1 General

The following test is considered essential for all water closet types and should be included in a water efficiency labelling programme.

A.4.5.3.2 Determination of water consumption (flush volume)

A.4.5.3.2.1 Water consumption test

The water consumption level of the water closet or water closet flushometer-valve should be determined by the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. The water consumption (flush volume) should be expressed in terms of litres per flush (Lpf). All components included with the water closet or water closet **flushometer-valve** (flush valve) assembly should be installed according to the manufacturer's instructions.

A.4.5.3.2.2 Determination of dual flush water closet effective flush volume

For dual-flush water closets, an effective flush volume should be determined based on a ratio of reduced flushes to full flushes. The ratio of reduced flushes to full flushes should be determined by the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

NOTE: Some **national regulations** or **national Standard(s)** do not provide a ratio for determining the effective flush volume of a dual flush toilet and leave this requirement to the developers of the Water Efficiency Labelling Programme.

A.4.5.3.2.3 Independent testing of separately sold water closet bowls (pans), cisterns (tanks), and water closet flushometer-valves (flush valves)

Testing of separately sold water closets, bowls (pans), cisterns (tanks) and water closet flushometer-valves (flush valves) should be tested as a complete system or tested separately in accordance with the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.5.3.2.4 Product documentation for separately sold toilet bowls (pans), cisterns (tanks) and flushometer-valves (flush valves)

If sold separately, it is recommended that the water efficiency labelling programme require the manufacturer of each separately sold component to clearly indicate on product documentation that the part should be used with a labelled counterpart that has a compatible flush performance in order to ensure that the complete system meets the requirements of the water efficiency labelling programme.

A.4.5.4 Suggested flush volume tolerance

It is recommended that the water efficiency labelling programme allow a tolerance of +0.25 Lpf in order to avoid excessive testing due to minor flush volume overages except where such a tolerance conflicts with requirements contained in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.6 Urinals

A.4.6.1 General

This clause applies to:

- Wall mounted and Floor Mounted Urinals;
- Pressurized flushing devices that deliver water to urinals;
- Flush cistern (tank) flushing devices (gravity type) that deliver water to urinals;
- Separately sold urinal **flushometer-valves** (flush valves); and
- Any other urinal technology that meets the intent of this standard.

A.4.6.2 Included components

All included components, including urinal **flushometer-valves** (flush valves) and other components whether sold separately or as a combined system, should conform to all requirements contained in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.6.3 Essential testing

A.4.6.3.1 General

The following test is considered essential for all urinal types and should be included in a water efficiency labelling programme.

A.4.6.3.2 Determination of urinal water consumption (flush volume)

A.4.6.3.2.1 Water consumption test

The water consumption level of the urinal or urinal flushometer-valve should be determined by the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. The water consumption (flush volume) should be expressed in terms of litres per flush (Lpf). All components included with the urinal or urinal **flushometer-valve** (flush valve) assembly should be installed according to the manufacturer's instructions.

A.4.6.3.2.2 Independent testing of separately sold urinals and urinal flushometer-valves

Testing of urinals and urinal **flushometer-valves** (flush valves) should be tested as a complete system or separately in accordance with the test procedures detailed in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.4.6.3.2.3 Product documentation for separately sold urinals and flushometer-valves (flush valves)

If sold separately, it is recommended that the water efficiency labelling programme require the manufacturer of each separately sold component to clearly indicate on product documentation that the part should be used with a labelled counterpart that has a compatible flush performance in order to ensure that the complete system meets the requirements of the water efficiency labelling programme.

A.4.6.4 Suggested flush volume tolerance

It is recommended that the water efficiency labelling programme allow a tolerance of +0.1 Lpf in order to avoid excessive testing due to minor flush volume overages except where such a tolerance conflicts with requirements contained in the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5 Water using appliances

A.5.1 Dishwashers

A.5.1.1 Scope

This Clause should apply to dishwashers as described in IEC 60436 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.1.2 General

Water consumption and the water efficiency rating should be determined in accordance with Clause A.5.1.3 and Clause A.5.1.4 respectively.

A.5.1.3 Determination of specific water efficiency

The water consumption of a dishwasher should be determined under the same conditions used for the energy consumption tests as those specified in IEC 60436 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.1.4 Rating

The water efficiency rating of a dishwasher is determined using the following formula for the water consumption determined under Clause A.5.1.3:

$$\text{Water efficiency rating} = 1 + \frac{\log_e \left(\frac{WC}{BWC} \right)}{\log_e (1 - WRF)}$$

where

Water efficiency= fractional rating used to determine the efficiency indicator, rounded down to the nearest half rating increment

WC = water consumption of the model in litres, determined in accordance with Clause A.5.1.3

BWC = base water consumption = $2.5 + P \times 1.6$
 P = Maximum number of place settings of the dishwasher as specified by the manufacturer

WRF = water reduction factor per additional increment eg (17.5%) = 0.175

If a dishwasher achieves less than 1 on the water efficiency rating, the rating of the dishwasher is null.

A.5.1.5 Determination of results

A graphical representation of the algorithm for dishwashers is shown in Figure A.1. This is for information only.

The maximum water consumption by efficiency rating and place setting for the algorithm is set out in Table A.2. This is for information only.

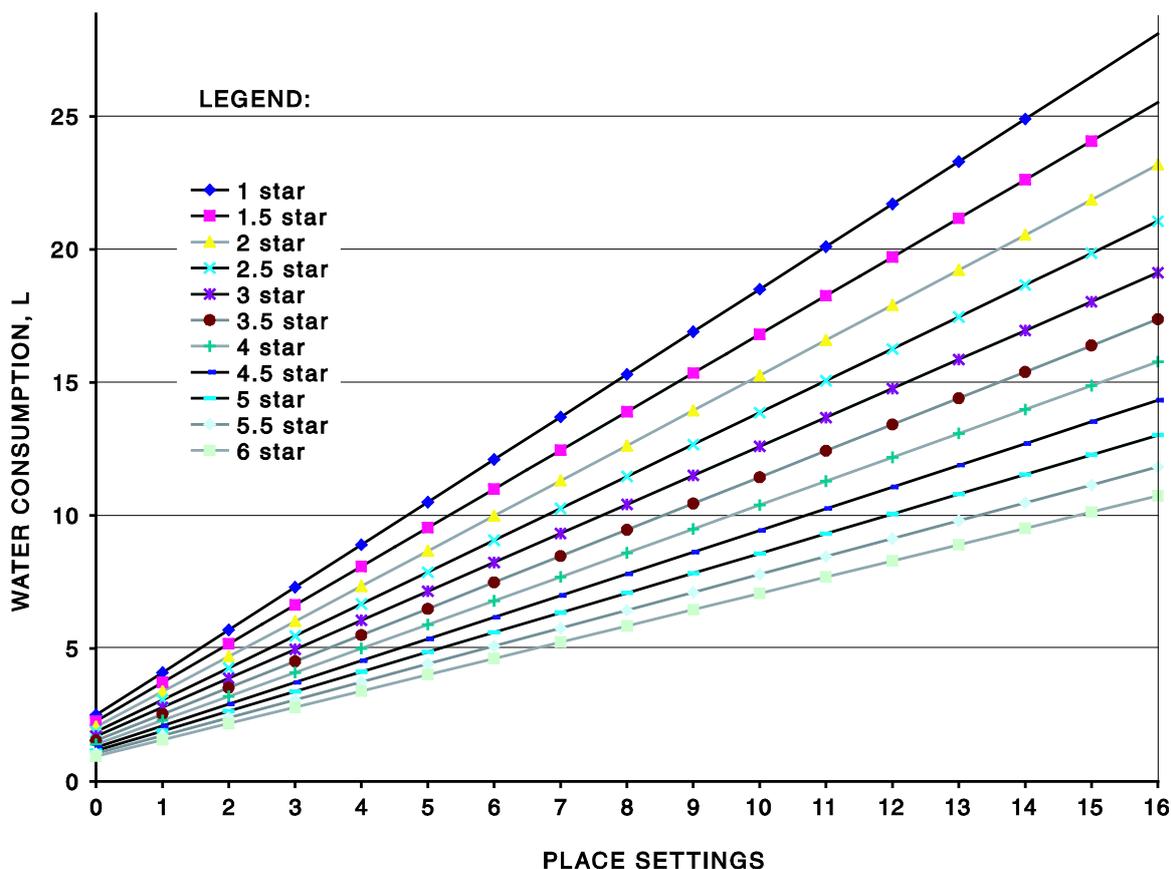


Figure A.1 — Chart of star ratings for dishwashers

Table A.2 — Dishwasher water consumption by star rating

Place setting	Maximum water consumption by place setting for a specified Star rating										
	1 Star	1.5 Star	2 Star	2.5 Star	3 Star	3.5 Star	4 Star	4.5 Star	5 Star	5.5 Star	6 Star
Baseline	2.50	2.27	2.06	1.87	1.70	1.55	1.40	1.28	1.16	1.05	0.96
1	4.10	3.72	3.38	3.07	2.79	2.53	2.30	2.09	1.90	1.73	1.57
2	5.70	5.18	4.70	4.27	3.88	3.52	3.20	2.91	2.64	2.40	2.18
3	7.30	6.63	6.02	5.47	4.97	4.51	4.10	3.72	3.38	3.07	2.79
4	8.90	8.08	7.34	6.67	6.06	5.50	5.00	4.54	4.12	3.74	3.40
5	10.50	9.54	8.66	7.87	7.15	6.49	5.90	5.36	4.86	4.42	4.01
6	12.10	10.99	9.98	9.07	8.24	7.48	6.79	6.17	5.61	5.09	4.62
7	13.70	12.44	11.30	10.27	9.32	8.47	7.69	6.99	6.35	5.76	5.24
8	15.30	13.90	12.62	11.46	10.41	9.46	8.59	7.80	7.09	6.44	5.85
9	16.90	15.35	13.94	12.66	11.50	10.45	9.49	8.62	7.83	7.11	6.46
10	18.50	16.80	15.26	13.86	12.59	11.44	10.39	9.44	8.57	7.78	7.07
11	20.10	18.26	16.58	15.06	13.68	12.43	11.29	10.25	9.31	8.46	7.68
12	21.70	19.71	17.90	16.26	14.77	13.42	12.18	11.07	10.05	9.13	8.29
13	23.30	21.16	19.22	17.46	15.86	14.40	13.08	11.88	10.79	9.80	8.90
14	24.90	22.62	20.54	18.66	16.95	15.39	13.98	12.70	11.53	10.48	9.52
15	26.50	24.07	21.86	19.86	18.04	16.38	14.88	13.52	12.28	11.15	10.13
16	28.10	25.52	23.18	21.06	19.13	17.37	15.78	14.33	13.02	11.82	10.74

NOTE: If a dishwasher achieves a water efficiency rating of less than 1.0 then the Star Rating of the dishwasher is Zero Star (refer to Clause A.5.1.4).

A.5.2 Clothes washers

A.5.2.1 Scope

This Clause should apply to clothes washing machines as described in IEC 60456 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation. See Clause A.5.3 for combination washer/dryers.

A.5.2.2 General

Where a clothes washing machine has only a cold wash capability, the programme for testing should be the same as that used for energy consumption other than the minimum wash water temperature requirement.

A.5.2.3 Determination of specific water efficiency

The water consumption of a clothes washing machine may vary according to whether the wash water is heated or is taken straight from the supply, and should be taken to be the higher of—

- (a) the claimed total water consumption of the warm wash; and
- (b) the claimed total water consumption of the cold wash.

When each is determined under the conditions used for the energy consumption tests as specified in IEC 60456 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

Where the water consumption of a washing machine is the same on the cold wash as the warm wash cycle, the determination of water consumption on the cold wash is not required if a registrant declaration to that effect is provided.

Even if a registrant elects not to include a cold wash energy consumption value on the energy label, both the claimed total water consumption of the warm wash and the claimed total water consumption of the cold wash should be reported, so that the use of the higher water consumption value can be confirmed.

If a washing machine does not have a normal cold wash programme, then the water consumption is the claimed total water consumption of the warm wash.

Where a clothes washing machine has only a cold wash capability, then the water consumption is the claimed total water consumption of the cold wash.

A.5.2.4 Rating

The water efficiency rating of a clothes washing machine is determined using the following formula for the water consumption determined in accordance with Clause A.5.2.3:

$$\text{Water efficiency rating} = 1 + \frac{\log_e \left(\frac{WC}{BWC} \right)}{\log_e (1 - WRF)}$$

where

Water efficiency rating = fractional rating used to determine the efficiency indicator, rounded down to the nearest half rating increment

BWC = base water consumption = 30 × C

C = rated load capacity of clothes washer (kg) as determined under IEC 60456 or local equivalent

WC = water consumption of the model in litres, determined under Clause A.5.2.3

WRF = water reduction factor per additional increment (30%) = 0.30

A.5.2.5 Determination of results

A graphical representation of the algorithm for clothes washing machines is shown in Figure A.2. This is for information only.

The maximum water consumption by Star rating for the algorithm is also set out in Table A.3. This is for information only.

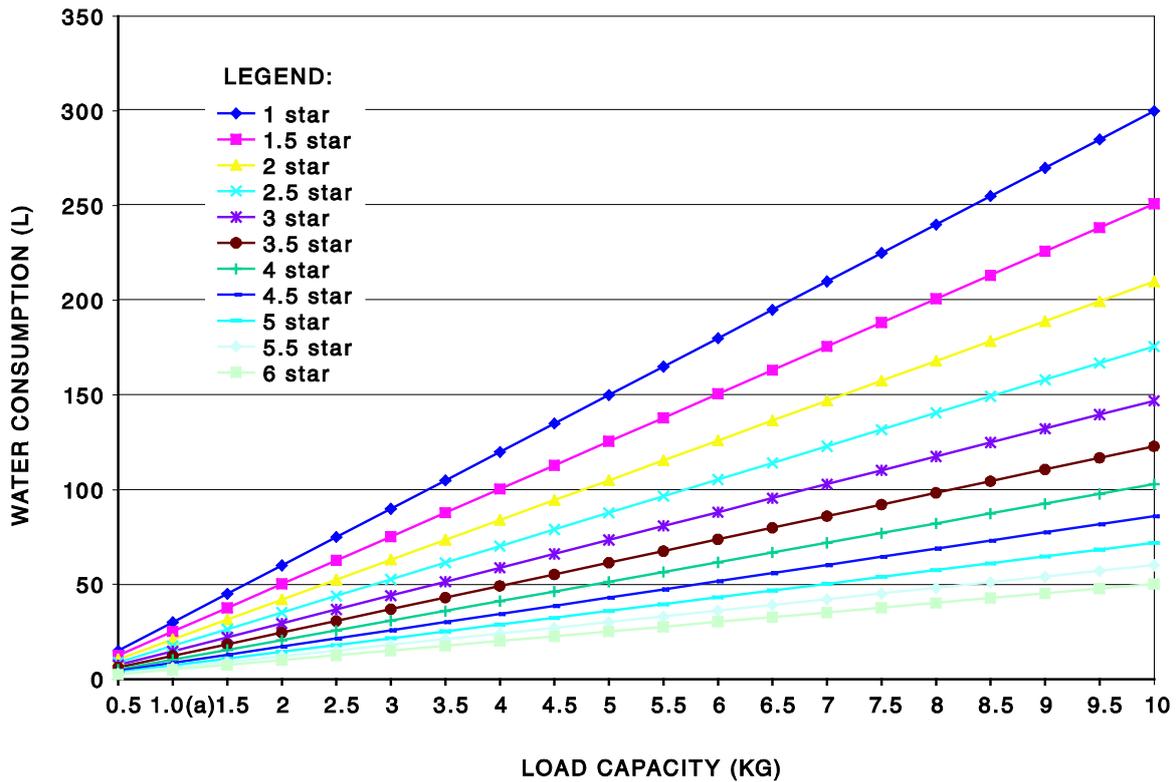


Figure A.2 — Chart of star rating for clothes washing machines

Table A.3 — Clothes washing machines water consumption by star rating (For information only)

Load capacity (kg)	Maximum water consumption by load capacity for a specified Star rating										
	1 Star	1.5 Star	2 Star	2.5 Star	3 Star	3.5 Star	4 Star	4.5 Star	5 Star	5.5 Star	6 Star
1.0	30.0	25.1	21.0	17.6	14.7	12.3	10.3	8.6	7.2	6.0	5.0
1.5	45.0	37.6	31.5	26.4	22.1	18.4	15.4	12.9	10.8	9.0	7.6
2.0	60.0	50.2	42.0	35.1	29.4	24.6	20.6	17.2	14.4	12.1	10.1
2.5	75.0	62.7	52.5	43.9	36.8	30.7	25.7	21.5	18.0	15.1	12.6
3.0	90.0	75.3	63.0	52.7	44.1	36.9	30.9	25.8	21.6	18.1	15.1
3.5	105.0	87.8	73.5	61.5	51.5	43.0	36.0	30.1	25.2	21.1	17.6
4.0	120.0	100.4	84.0	70.3	58.8	49.2	41.2	34.4	28.8	24.1	20.2
4.5	135.0	112.9	94.5	79.1	66.2	55.3	46.3	38.7	32.4	27.1	22.7
5.0	150.0	125.5	105.0	87.8	73.5	61.5	51.5	43.0	36.0	30.1	25.2
5.5	165.0	138.0	115.5	96.6	80.9	67.6	56.6	47.4	39.6	33.1	27.7
6.0	180.0	150.6	126.0	105.4	88.2	73.8	61.7	51.7	43.2	36.2	30.3
6.5	195.0	163.1	136.5	114.2	95.6	79.9	66.9	56.0	46.8	39.2	32.8
7.0	210.0	175.7	147.0	123.0	102.9	86.1	72.0	60.3	50.4	42.2	35.3
7.5	225.0	188.2	157.5	131.8	110.3	92.2	77.2	64.6	54.0	45.2	37.8
8.0	240.0	200.8	168.0	140.6	117.6	98.4	82.3	68.9	57.6	48.2	40.3
8.5	225.0	213.3	178.5	149.3	125.0	104.5	87.5	73.2	61.2	51.2	42.9
9.0	270.0	225.9	189.0	158.1	132.3	110.7	92.6	77.5	64.8	54.2	45.4
9.5	285.0	238.4	199.5	166.9	139.7	116.8	97.8	81.8	68.4	57.3	47.9
10.0	300.0	251.0	210.0	175.7	147.0	123.0	102.9	86.1	72.0	60.3	50.4

NOTE: The water consumption for a load capacity of 1 kg is used for the base water consumption.

A.5.3 Combination washers / dryers

A.5.3.1 Scope

This Standard should apply to combination washer/dryers as described in IEC 62512 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.3.2 General

In general, due to drum size construction constraints, the maximum drying load is approximately half that of the maximum washing load capacity. A combination washer/dryer may be used and evaluated in 4 principal programme modes.

A.5.3.2.1 A single load washed and dried in a continuous operation

Since the rated drying load capacity is generally approximately half that of the rated washing load capacity, a single continuous combined washing/drying programme will be at a reduced capacity, compared to maximum wash load rating.

Water consumption is the total water consumed in both washing and drying operations as described in IEC 62512 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.3.2.2 A single load washed in 1 operation and dried in 2 operations

Since the rated drying load capacity is generally approximately half that of the rated washing load capacity, a rated wash load must be split after washing and dried in at least 2 drying operations.

Water consumption is the total water consumed in both washing and drying operations as described in IEC 62512 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.3.2.3 A single load washed only

Water consumption is the total water consumed in washing operation as described in IEC 60456 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.3.2.4 A single load dried only

Water consumption is the total water consumed in drying operation as described in IEC 61121 or the applicable **national regulations** or **national Standard(s)** of the nation of intended installation.

A.5.3.3 Determination of specific water efficiency

A.5.3.3.1 A single load washed and dried in a continuous operation

In general, due to drum size construction constraints, the maximum drying load is approximately half that of the maximum washing load capacity. If a continuous wash/dry programme mode is selected, refer to the method for clothes washer in Clause A.5.2.4, using the value of water consumed in the combination programme.

A.5.3.3.2 A single load washed in 1 operation and dried in 2 operations

In general, due to drum size construction constraints, the maximum drying load is approximately half that of the maximum washing load capacity. If the washing load exceeds the rated drying load, the load must be split before drying in 2 operations. Refer to the method for clothes washer in Clause A.5.2.4, using the value of water consumed in the washing and both drying programmes.

A.5.3.3.3 A single load washed only

Refer to the method for clothes washer in Clause A.5.2.3.

A.5.3.3.4 A single load dried only

Refer to the method for clothes washer in Clause A.5.2.3.

A.5.3.4 Rating

Refer to the method for clothes washer in Clause A.5.2.4.

A.5.3.5 Determination of results

Refer to the method for clothes washer in Clause A.5.2.5.

Annex B (Informative)

Existing water efficiency labelling programmes – plumbing products

B.1 General

This Annex provides descriptions of a number of schemes/programmes for existing water efficiency labelling programmes for plumbing products. The following countries and regions have provided an overview of their scheme/programme:

- Australia (Table B.1)
- China (Table B.2)
- Europe (Unified Water Label) (Table B.3)
- Japan (Table B.4)
- Singapore (Table B.5)
- United States (Table B.6)

Countries that do not have an existing water efficiency labelling programme may consider these examples to select and adopt those best suited for their markets and conditions when developing their own water efficiency labelling programme.

NOTE: The information provided in this Annex is a summary of the current requirements at the time this Standard was developed, to provide guidance to users. These requirements may have changed and the current reference documents should be reviewed for the most up-to-date information.

Table B.1 — Australia

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Showers	Nominal flow rate - litres per minute	<p>High pressure shower flow rate is measured twice at each dynamic pressure of 150kPa, 250kPa and 350kPa and an average flow rate calculated at each pressure. The maximum difference between the highest and lowest average flow rate cannot exceed 2.0 litres per minute (L/min). The highest and lowest average flow rate cannot exceed the upper limit or lower limit respectively of the flow range of the determined nominal flow rate by more than 1.0 L/min.</p> <p>Low pressure shower flow rate</p>	<p>High pressure shower nominal flow rate is determined from the sum of the 3 average flow rates (150kPa, 250kPa, 350kPa) divided by 3.</p> <p>Low pressure shower nominal flow rate is determined from the sum of measured flow rate results at 35kPa divided by 2.</p>	<p>High pressure showers with a nominal flow rate greater than 4.5L/min and up to 7.5L/min, compliance with spray force and spray coverage testing is required to achieve a 4 Star rating.</p> <p>Showers with a water consumption of 4.5 L/min or less, or showers that do not comply with the spray force and spray coverage tests are given a 'Not Star Rated' rating.</p>	Water consumption values are divided into ranges with a star rating applied to each range, 0 Stars least efficient to 4 Stars most efficient. Over 90% of showers registered have a 3 Star or higher rating.		AS/NZS 6400 AS/NZS 3662

		is measured twice at a dynamic pressure of 35kPa.					
Taps (faucets)	Nominal flow rate - litres per minute	<p>High pressure shower flow rate is measured twice at each dynamic pressure of 150kPa, 250kPa and 350kPa and an average flow rate calculated at each pressure. The maximum difference between the highest and lowest average flow rate cannot exceed 2.0 L/min. The highest and lowest average flow rate cannot exceed the upper limit or lower limit respectively of the flow range of the determined nominal flow rate by more than 1.0 L/min.</p> <p>Low pressure shower flow rate is measured twice at a</p>	<p>High pressure shower nominal flow rate is determined from the sum of the 3 average flow rates (150kPa, 250kPa, 350kPa) divided by 3.</p> <p>Low pressure shower nominal flow rate is determined from the sum of measured flow rate results at 35kPa divided by 2.</p>	For tap (faucet) equipment with an effective automatic shut-off device, where after the flow of water is turned on, the water flow is automatically shut-off, after a maximum time of 15 seconds or within 2 seconds after the end of user activity, its water efficiency rating is elevated to the next higher rating (if any).	Water consumption values are divided into ranges with a star rating applied to each range, 0 Stars least efficient to 6 Stars most efficient. Over 90% of taps (faucets) registered have a 4 Star or higher rating.		AS/NZS 6400 AS/NZS 3718

		dynamic pressure of 35kPa.					
Flow controllers	Nominal flow rate - litres per minute	The flow rate is measured twice at each dynamic pressure of 150kPa, 250kPa and 350kPa and an average flow rate calculated at each pressure. The maximum difference between the highest and lowest average flow rate cannot exceed 2.0 L/min. The highest and lowest average flow rate cannot exceed the upper limit or lower limit respectively of the flow range of the determined nominal flow rate by more than 1.0 L/min. The nominal flow rate cannot be greater than 16 L/min.	The nominal flow rate is determined from the sum of the 3 average flow rates (150kPa, 250kPa, 350kPa) divided by 3.	Not Applicable	Water consumption values are divided into ranges with a star rating applied to each range, 0 Stars least efficient to 6 Stars most efficient. Over 90% of flow controllers registered have a 3 Star or higher rating.		AS/NZS 6400 AS 5200.037.2
Water Closet (toilet)	Average Flush volume - litres	Dual flush toilet - Full flush volume is measured three times and an average full flush volume calculated. The	Dual flush toilet - Average flush volume is determined from the sum of 4 reduced flush volumes and the average full flush volume divided by 5.	Where a toilet has an integral basin or a basin directly connected to it, and the water from the basin is used to flush the toilet, the average flush volume for the toilet can be reduced by 0.3 litres.	Water consumption values divided into ranges with star rating applied to each range, 1 Star least efficient to 6 Stars most efficient. Over 90% of toilets registered have a 4 Star or higher rating.		AS/NZS 6400 AS 1172.1 AS 1172.2

		<p>reduced flush volume is measured four times.</p> <p>Single flush toilet volume is measured three times.</p>	<p>Single flush toilet - Average flush volume is determined from the sum of 3 measured full flushes divided by 3.</p>				
Urinal equipment	Flush volume - litres	<p>Slab and stall urinals (of a minimum 600mm length continuous urinal wall) - the flush shall disperse water over the entire back wall from a minimum height of 900mm above the step or floor level. The flush shall extend to cover the corner areas and end returns for a distance of not less than 70mm at 800mm above the step or floor level to a distance not less than 150mm at the step or floor level.</p> <p>wall hung urinals - the flush shall disperse water over the serviced area.</p>	<p>Flush volume is determined from the volume recorded in litres to flush the urinal and meet the performance parameters.</p>	<p>Water discharged cannot exceed more than 2.5L for each single stall or each 600 mm length of continuous urinal wall.</p> <p>A maximum 3 star rating applies for urinals that are operated only by conscious operation (manually operated by the user) or by demand driven operation (automatically flushes each time the sensor is activated).</p>	<p>Water consumption values divided into ranges with star rating applied to each range, 0 Stars least efficient to 6 Stars most efficient. Over 80% of urinals registered have a 3 Star or higher rating.</p>		<p>AS/NZS 6400 AS/NZS 3982</p>

Table B.2 — China

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Showers	Nominal flow rate - litres per minute	The shower flow rate is measured three times at each dynamic pressure of 0.1Mpa,0.2Mpa and 0.3Mpa and an average flow rate calculated at each pressure. The maximum difference between the highest and lowest average flow rate cannot exceed 4.0 L/min. The highest and lowest average flow rate cannot exceed the upper limit or lower limit respectively of the flow range of the determined nominal flow rate.	The shower nominal flow rate is determined of the average flow rates (0.1Mpa).	If the shower has multiple functions of water outlet, the flow of each function of water outlet shall be tested respectively, and the water efficiency grade reached by the maximum flow shall be taken as the water efficiency grade of the shower. The spray force of the hand-held shower shall be more than 0.85N.	Water consumption values are divided into ranges with a grade applied to each range, 3 Grade least efficient to 1 Grade most efficient.		GB 28378 GB/T 23447
Taps (faucets)	Nominal flow rate - litres per minute	The tap (faucet) flow rate is measured three times at each dynamic pressure of 0.1Mpa,0.2Mpa and 0.3Mpa and an average flow rate calculated at each pressure. The maximum	The tap (faucet) nominal flow rate is determined of the average flow rates (0.1Mpa).	Not Applicable for the effective automatic shut-off device.	Water consumption values are divided into ranges with a grade applied to each range, 3 Grade least efficient to 1 Grade most efficient.		GB 25501 GB 18145 QB 1334

		difference between the highest and lowest average flow rate cannot exceed 3.0 L/min. The highest and lowest average flow rate cannot exceed the upper limit or lower limit respectively of the flow range of the determined nominal flow rate.					
Flow controllers	N/A	N/A	N/A	N/A	N/A		N/A
Water Closet (toilet)	Average Flush volume - litres	Dual flush toilet - Full flush volume is measured three times and an average full flush volume calculated. The reduced flush volume is measured three times. Single flush toilet volume is measured three times.	Dual flush toilet - Average flush volume is determined from the sum of 2 reduced flush volumes and 1 average full flush volume divided by 3. Single flush toilet - Average flush volume is determined from the sum of 3 measured full flushes divided by 3.	Flushing functions	Water consumption values are divided into ranges with a grade applied to each range, 3 Grade least efficient to 1 Grade most efficient.		GB 25502 GB/T 6952
Urinal equipment	Average Flush volume - litres	The flush urinal volume is measured six times.	Flush volume is determined from the volume recorded in litres to flush the urinal and meet the performance parameters.	Flushing functions	Water consumption values are divided into ranges with a grade applied to each range, 3 Grade least efficient to 1 Grade most efficient.		GB 28377 GB/T 6952

Table B.3 — Europe (Unified Water Label)

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Showers	Flow rate L/min	<p>Maximum available flow rate is measured at 3 bar.</p> <p>Where a fitting is below 8 L/min it will be verified at 1.5 bar for performance for pressure dependency.</p> <p>For low pressure flow rate will be measured at .02 bar</p>	Flow rate is determined by maximum flow.	Pressure dependency is checked for fittings with a flow rate less than .8 bar 8 L/min must be 60% at 1.5 bar of the max flow rate.	Water use divided into 5 bands from ≤ 6 , ≤ 8 , ≤ 10 , ≤ 13 and greater than 13 L/min.		EN 1111 and EN 1287 EN200 EN 817 EN1112
Taps (faucets)	Flow rate L/min	<p>Maximum available flow rate is measured at 3 bar.</p> <p>Where a fitting is below 8 L/min it will be verified at 1.5 bar for performance for pressure dependency.</p> <p>For low pressure flow rate will be measured at .02 bar</p>	Flow rate is determined by maximum flow.	Pressure dependency is checked for fittings with a flow rate less than .8 bar 8 L/min must be 60% at 1.5 bar of the max flow rate.	Water use divided into 5 bands from ≤ 6 , ≤ 8 , ≤ 10 , ≤ 13 and greater than 13 L/min		EN 1111 and EN 1287 EN 200, EN817

WCs and Independent Cisterns	Flush Volume L	Single flush WCs Flush Volume determined by average of 4 flushes. Dual Flush WCs volume determined by 3 short flushes and 1 full flush.	Flush volume determined after 5 tests	N/A	Water use divided into 5 bands from ≤ 3.5 , ≤ 4.5 , ≤ 5.5 , ≤ 6 and greater than 6 litres		EN 997 & EN 14055
Urinals	Flush Volume L	Urinal Flush will be determined by average of 4 flushes.	Flush volume determined after 5 tests	N/A	Water use divided into 5 bands from ≤ 1 , ≤ 2 , ≤ 3 , ≤ 4 and greater than 4 L/min		EN 14055
Bathtubs	Capacity Litres (40 % Capacity)	Water volume will be measured at the point of overflow. Or at a point 86mm below the spill over where an overflow is not present.	Effective capacity will determine the volume i.e. 40% of the Actual capacity	N/A	40 % of capacity Water use divided into 5 bands from ≤ 62 , ≤ 68 , ≤ 74 , ≤ 80 and greater than 80 litres		EN 14516 and EN 806-5
Flow Regulators	Flow rate L/min	Maximum available flow verified at 3 bar.	Claimed flow rate tested +/- 20% tested at 1.5 and 3 bar	N/A	Water use divided into 5 bands from ≤ 6 , ≤ 8 , ≤ 10 , ≤ 13 and greater than 13 L/min		EN 246

Table B.4 — Japan

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Showers	The spray force F' must satisfy the following conditions.	The recommended water pressure in Japan is from 0.05(MPa)(dyna	Obtain an approximate curve based on Formula A using the relation between all of the measured spray	N/A	The handshowers which are fulfilled the Hot Water Saving norm shall be evaluated the spray force by the method described generally on JIS B 2061 and can be allowed to	NOTE : · the Hot Water Saving Scheme which is aimed at reducing water	JIS B2061

	Type of shower spray Spray force (N) Foamed(aerated) spray 0.55 or more Normal spray 0.6 or more	mic pressure) to 0.75(MPa)(static pressure). But the situation under 0.1(MPa) is not minor condition, then showers with a flow controller is not common in Japan. The Japanese (Hot)Water Saving Handshower is evaluated its spray force generating 8.5(L/min.) which satisfy both of comfortability and low water consumption.	forces and flow rates by the least-square method. The spray force F' at a flow rate of 8.5 L/min of this approximate curve is obtained. $F' = C \times Q^2 \dots A$ Q : flow rate (L/min) C : coefficient		put the JIS(and texts of fulfilled categories) marking in case which evaluated by JIS scheme, or the original marking in case which are evaluated by 3rd. party association.	and energy consumption of showers and taps (faucets) is standardized on JIS B 2061. -The target products of this programme are thermostat shower(and tub)mixer, single lever mixer etc but except 2 handle mixer.	
Taps (faucets)	N/A	N/A	N/A	N/A	N/A	—	N/A
Flow controllers	N/A	N/A	N/A	N/A	N/A	—	N/A
Water Closet (toilet)	Average Flush volume Type I: 8.5L or less Type II: 6.5L or less	There are two bands for water efficiency ratings in JIS A5207 Standard. Both ratings are specified with full flush volume only.	Both Dual and Single flush toilet - Average flush volume is determined from the sum of 3 measured full flushes divided by 3.	N/ A	Water consumption is measured and rated in accordance with specified test methods and criterion. JIS MarK shall be affixed to the product if the product conforms to all requirements.	Followings should be taken into account for water saving (See JIS for details) ▪ Toilet Waste extraction ▪ Toilet surface wash ▪ Drain-line	JIS A5207 (Sanitary Wares) JIS B2061 (Faucets, ball taps and flush valves)

		<p>From the aspects of public health and safety of users, No excessive restriction of water consumption is required for JIS as we aim at higher level of water saving with keeping performances such as transportation performance. (Noting that more than 90% of certificated domestic products are categorised as type II) As stated above, that is the reason why JIS A5207 has higher level of water consumption ratings than other countries' standards have.</p>				<p>transportation <ul style="list-style-type: none"> • Backflow prevention </p>	
Urinal equipment	N/A	N/A	N/A	N/ A	N/A	N/A	N/A

Table B.5 — Singapore

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Taps (faucets) - basin, sink, bib, shower	Average flow rate - litres per minute	Adjust the dynamic pressure to 1.5, 2.5, 3.5, 4.5, 5.0 and 5.5 bar and measure the flow rate at each pressure. Calculate the average flowrate from these readings.	The nominal flow rate is determined from the sum of the 5 average flow rates (1.5, 2.5, 3.5, 4.5, and 5.0 bar) divided by 5.	<p>A)Difference between the highest and lowest flow rates measured at 1.5 and 5.0 bars must not exceed 2 litres per minute;</p> <p>At any of the test pressures: B)Highest flow rate must not exceed the upper limit of the range of flow rates within which the flow rate of the taps (faucets) by more than 0.5 litres per minute.</p> <p>C)Lowest flow rate for sink tap (faucet) specified for 3-tick must not be lower than 2.5 litres per minute.</p> <p>D)Lowest flow rate for sink tap (faucet) specified for 2-tick must not be lower than 3.5 litres per minute.</p> <p>E)Lowest flow rate for basin tap (faucet) specified for 2-tick and 3-tick must not be lower than 1.5 litres per minute.</p> <p>F)Lowest flow rate for bib tap (faucet) specified for 2-tick and 3-tick must not be lower than 3.5 litres per minute.</p> <p>G)Lowest flow rate for</p>	<p>Water consumption values ranges from 2-tick to 3-tick with 3-tick as the highly efficient.</p> <p>Basin taps (faucets) - not more than 4 litres per minute; 2-tick: > 2 to 4 litres per minute 3-tick: 2 litres per minute or less</p> <p>Sink/bib taps (faucets) - not more than 6 litres per minute 2-tick: > 4 to 6 litres per minute 3-tick: 4 litres per minute or less</p> <p>Shower taps (faucets) - not more than 7 litres per minute 2-tick: > 5 to 7 litres per minute 3-tick: 5 litres per minute or less</p>	<p>Taps (faucets) are under Mandatory Water Efficiency Labelling Scheme (MWELS)</p> <p>Summary of additional characteristics that affect water efficiency rating:</p> <p>Basin taps (faucets) 2-tick: higher limit 4.5, lower limit 1.5 3-tick: higher limit 1.5, lower limit 2.5</p> <p>Sink taps (faucets) 2-tick: higher limit 6.5, lower limit 3.5 3-tick: higher limit 4.5, lower limit 2.5</p> <p>Bib taps (faucets) 2-tick: higher limit 6.5, lower limit 3.5 3-tick: higher limit 4.5, lower</p>	<p>PUB Stipulation of Standards & Requirements for Water Fittings for Potable Water Service Installations</p> <p>Public Utilities (Water Supply) Regulations</p> <p>WELS Guidebook</p> <p>BS EN 200 (2008) BS EN 817 (2008) BS EN 1111(2017)</p>

				shower tap (faucet) specified for 2-tick and 3-tick must not be lower than 4.5 litres per minute. See Additional Information for summary of higher and lower limits.		limit 3.5 Shower taps (faucets) 2-tick: higher limit 7.5, lower limit 4.5 3-tick: higher limit 5.5, lower limit 4.5	
Water Closet (toilet)	Average flush volume - litres per flush	Dual flush toilets- Full flush - Paper, ball, towel test - cleared in 4 out of 5 times operations. Sawdust - unflushed area <5000mm ² Reduced flush - Paper -Cleared in 2 out of 3 times operations. Dye test - lighter than control sample	Dual flush toilet - Full flush volume is measured three times and an average full flush volume calculated. Reduced flush volume is measured three times and an average full flush volume calculated.	Additional test is mandatory for water closet with full flush volume of less than 3.5 litres - Laboratory simulation test on waste transportation efficiency in pipes in accordance with Singapore Standard S574: Part 1:2012 Appendix J.	Water consumption values ranges from 2-tick to 3-tick with 3-tick as the highly efficient. 2-tick: > 3.5 to 4 litres (full flush) > 2.5 to 3.0 litres (reduced flush) 3-tick: > 3.5 litres or less (full flush) > 2.5 litres or less (reduced flush)	Water closets are under Mandatory Water Efficiency Labelling Scheme	PUB Stipulation of Standards & Requirements for Water Fittings for Potable Water Service Installations Public Utilities (Water Supply) Regulations WELS Guidebook
Urinal equipment	Average flush volume - litres per flush	Volume of discharge test. The flow regulator is to be set at maximum, flush volume is collected at the following dynamic	The urinal flush valve is tested at dynamic pressure of 3.0 bars. The discharge volume per flush is measured with the following test method: (a) the flush pipe is to be 300 mm long with	Additional test is mandatory for urinal flush valve flush volume of less than 0.5 litres: Dye test as specified in a) Clause 8.5 of ASME A112.19.2 -2008/CSA B45.1-08; or b) Clause 8.5 of ASME A112.19.2 -2013/CSA B45.1-13	Water consumption values ranges from 2-tick to 3-tick with 3-tick as the highly efficient. 2-tick: > 0.5 to 1 litre 3-tick: > 1.0 litre or less	Urinal flush valves are under Mandatory Water Efficiency Labelling Scheme (MWELS)	PUB Stipulation of Standards & Requirements for Water Fittings for Potable Water Service Installations Public Utilities

		pressure: 1.0, 1.5, 2.0 and 3.0 bars. The discharge volume shall not be more than 1.5 litres and less than 0.5 litres.	an internal diameter of at least 13 mm and is to be secured to the outlet of the valve; (b) the pressure gauge and control valve are to be fitted at the inlet of the flush valve; (c) the flush valve is to be connected to a water supply system and the dynamic pressure of the water supply adjusted to 0.7 bars; (d) the flow regulator is to be set at maximum; (e) the operating member must continue to be held actuated until the flow of water ceases; (f) the flush volume is the volume of water that is discharged from the flush pipe from the actuation of the operating member to cessation of flow of water.				(Water Supply) Regulations WELS Guidebook SS 574: Part 1 (2012)
Showerheads	Average flow rate - litres per minute	Flow rates are measured at dynamic flow pressures of 0.5 bar, 1.0 bar, 1.5 bars, 2.0 bars, 2.5 bars, 3.0 bars, 3.5 bars, 4.5 bars, 5.0 bars, and 5.5 bars.	The nominal flow rate is determined from the sum of the 5 average flow rates (1.5, 2.5, 3.5, 4.5, and 5.0 bar) divided by 5.	The following requirements must be complied: (a) the difference between the highest and lowest flow rate (measured at dynamic flow pressures of 1.5 bars, 1.5 bars, 3.5 bars, 4.5 bars, 5.0 bars) must not exceed 2 L/min (b) the highest flow rate must	Water consumption values ranges from 2-tick to 3-tick with 3-tick as the highly efficient. 2-tick: > 5 to 7 litres per minute 3-tick: 5 litres per minute or less	Showerheads are under Voluntary Water Efficiency Labelling Scheme (VWELS) Shower taps (faucets) 2-tick: higher limit 7.5, lower limit 4.5	AS/NZS 3662:2013 Clause 5.1 (Appendix B) AS/NZS 3662:2013 Clause 5.4 (Appendix H) AS/NZS 3662:2013 Clause 5.4

				<p>not exceed the upper limit by more than 0.5 L/min</p> <p>(c) the lowest flow rate must not be lower than the lower limit by more than 0.5 L/min</p> <p>(d) have a flow rate of not more than 9 L/min</p> <p>See Additional information for summary of higher and lower limit.</p> <p>Recommended additional test for 3-tick showerheads: a) spray force test; and b) spray coverage test under AS/NZS 3662:2013</p>		3-tick: higher limit 5.5, lower limit 4.5	(Appendix I) WELS Guidebook
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Table B.6 — United States

Water using plumbing product	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Showers	in Gallons per minute (gpm) and Litres per minute (L/min)	Water sense certified shower heads are required to have a maximum flow rate of 2 gpm (7.6 L/min) @ 80 psi (550 Kpa) and a minimum of 1.5 (5.7 L/min) gpm @45 (310	Flow rate test in ASME A112.18.1/CSA B125.1, Section 5.4 (see attached document)	Spray Force Criteria The minimum spray force for high-efficiency showerheads and hand-held showers shall not be less than 2.0 ounces (0.56 newtons [N]) at a flowing pressure of 20 ± 1 psi (140 ± 7 kPa) at the inlet. The minimum spray force for high-efficiency rain showers shall not be less than 1.4 ounces (0.40 N) at a flowing pressure of 20 ± 1 psi (140 ±	Showerheads and associated packaging shall conform to the applicable marking and packaging requirements in ASME A112.18.1/CSA B125.1. The maximum flow rate shall be specified by the manufacturer, verified through testing, and in compliance with the flow rate requirements. Flow rate marking shall be in gpm and L/min in two or three digit		ASME A112.18.1/CSA B125.1, EPA Water Sense Specification for Showerheads Ver 1.1

		Kpa) and 80 psi (550 Kpa)		7 kPa) at the inlet. Spray Coverage Criteria The total combined maximum volume of water collected in the 2- and 4-inch (50-, 101-millimeter [mm]) annular rings shall not exceed 75 percent of the total volume of water collected, and; The total combined minimum volume of water collected in the 2-, 4-, and 6-inch (50-, 101-, 152-mm) annular rings shall not be less than 25 percent of the total volume of water collected.	resolutions (e.g., 2.0 gpm [7.6 L/min]).		
Lavatory Faucets	in Gallons per minute (gpm) and Liter per minute (L/min)	Water sense certified lavatory faucets are required to have a maximum flow rate of 1.5 gpm (5.7 L/min) @ 60 psi and a minimum of 0.8 gpm (3 L/min) @ 20 psi	Flow rate test in ASME A112.18.1/CSA B125.1, Section 5.4 (see attached document)	Metered faucets shall deliver a maximum of 0.25 gallons per metering cycle (UPC 2021)	The product and/or the product packaging shall be marked in accordance with 16 CFR 305.11(f) with the maximum flow rate in gpm and L/min as determined through testing and compliance with this specification. Marking shall be in gpm and L/min in two digit resolutions (e.g., 1.5 gpm [5.7 L/min]).	The lavatory faucet or lavatory faucet accessory shall not be packaged, marked, or provided with instructions directing the user to an alternative water-use setting that would override the maximum flow rate of 1.5 gpm at 60 psi, as established by this specification. Any instruction related to the maintenance of the product, including changing or	16 CFR 305.11(f), ASME A112.18.1/CSA B125.1, EPA Water Sense High-Efficiency Lavatory Faucet Specification Ver 1.0, UPC 2021

						cleaning faucet accessories, shall direct the user on how to return the product to its intended maximum flow rate.	
Pre-Rinse Spray Valves	in Gallons per minute (gpm) and Liter per minute (L/min)	Water Sense certified pre-rinse spray valves are required to have a maximum of 1.28 gallons per minute (gpm). [4.8 liters per minute (L/min)]. Note: the WaterSense specification for pre-rinse spray valves has been discontinued in lieu of the CFR specification.	The flow rate of the pre-rinse spray valve shall be tested in accordance with the procedures in ASTM F2324 Standard Test Method for Prerinse Spray Valves and shall meet the following criteria: The maximum flow rate shall be the highest value obtained through testing when evaluated in accordance with 10 CFR 429.51. The maximum flow rate shall not exceed the maximum flow rate value of 1.28 gpm (4.8 L/min).	The minimum spray force shall not be less than 4.0 ounces-force (ozf) [113 grams-force (gramf)]. The life cycle of the pre-rinse spray valve shall be tested in accordance with the procedures in ASME A112.18.1/CSA B125.1 and shall meet the following criteria: The pre-rinse spray valves must perform for 250,000 cycles.	The product shall be marked with the maximum flow rate value in gpm and L/min as specified by the manufacturer, verified through testing, and in compliance with this specification. The product packaging and/or product literature shall be marked with the maximum flow rate value in gpm and L/min as specified by the manufacturer, verified through testing, and in compliance with this specification. The product packaging and/or product literature shall be marked with the tested spray force, determined through testing, and in compliance with this specification. The flow rate marking shall be in gpm and L/min in three- and two digit resolutions, respectively [e.g., 1.28 gpm (4.8 L/min)].		10 CFR 429.51, ASTM F2324, EPA Water Sense Specification for Commercial Pre-Rinse Spray Valves Ver 1.0 (discontinued)
Tank Type Water Closet (toilet)	in Gallons per flush (gpf) and Litres per flush (Lpf)	Water sense certified tank type water closets are required to have a maximum of	Single-flush toilets The effective flush volume shall not exceed 1.28 gallons (4.8 litres) when evaluated in accordance with the sampling plan	For single-flush toilets, the effective flush volume is the average flush volume when tested in accordance with ASME A112.19.2/CSA B45.1. For dual-flush toilets,	Toilet fixtures shall be marked in accordance with requirements in ASME A112.19.2/CSA B45.1 with the exception identified below: Toilet bowls intended to be used with tanks of varying consumption levels (e.g., 1.6 and 1.28 gallons	Toilet tanks shall not be packaged, marked, nor provided with instructions directing the user to an alternative water use setting	10 CFR 429.30, ASME A112.19.2/CSA B45.1, ASME A112.19.14, EPA Water Sense

		1.28 gpf (4.8 Lpf).	contained in 10 CFR 429.30. Dual-flush toilets The effective flush volume shall not exceed 1.28 gallons (4.8 litres) when evaluated in accordance with the sampling plan contained in 10 CFR 429.30.	the effective flush volume is the average flush volume of two reduced flushes and one full flush. Flush volumes shall be tested in accordance with ASME A112.19.2/CSA B45.1 and ASME A112.19.14.	per flush) shall be marked with a dual consumption marking or a consumption range, as indicated in ASME A112.19.2/CSA B45.1; however, toilet bowls shall not be marked with the words “or less” to indicate compatibility with tanks of varying consumption levels.	that would override the rated flush volume, as established by this specification. Any instruction related to the maintenance of the product shall direct the user on how to return the product to its rated flush volume.	Specification for Tank-Type Toilets Ver 1.2
Flush Valve Water Closet (toilet)	in Gallons per flush (gpf) and Litres per flush (Lpf)	Water sense certified flush valve water closets are required to have a maximum of 1.28 gpf (4.8 Lpf) and a minimum of 1 gpf (3.8 Lpf).	Water consumption shall be tested in accordance with the following ANSI standards as applicable: ASME A112.19.2/CSA B45.1 Ceramic Plumbing Fixtures, ASME A112.19.3/CSA B45.4 Stainless Steel Plumbing Fixtures, or CSA B45.5/IAPMO Z124 Plastic Plumbing Fixtures	For flushometer valves with dual-flush capabilities, the manufacturer shall specify the rated flush volume of both the full-flush and reduced-flush modes and the water efficiency requirements shall apply to both the full-flush and reduced-flush modes.	Water closet fixtures and associated packaging shall be marked with the rated flush volume and in accordance with requirements in ASME A112.19.2/CSA B45.1 with the exceptions identified below: Water closet fixtures intended to be used with flushometer valves of varying consumption levels (e.g., 1.6 and 1.28 gpf) shall be marked with a dual-consumption or consumption range marking as indicated in ASME A112.19.2/CSA B45.1. The rated flush volume shall be included within this dual-consumption or consumption range marking. Water closet fixtures shall not be marked with the words “or less” to indicate compatibility with flushometer valves of varying consumption levels. The lowest flush volume marked on the water closet fixture shall not be less than the minimum allowable flush volume (i.e., 1.0 gpf [3.8Lpf]).		ASME A112.19.2/CSA B45.1, A112.19.3/CSA B45.4, B45.5/IAPMO Z124, ASSE 1037/ASME A112.1037/CSA B125.37, EPA Water Sense Specification for Flushometer-Valve Water Closets Ver 1.0

					<p>Flushometer valves and associated packaging shall be marked with the rated flush volume and in accordance with requirements in ASSE 1037/ASME A112.1037/CSA B125.37. For flushometer valves with dual-flush capabilities, the flushometer valve and associated packaging shall be marked with the rated flush volume for both the full-flush and reduced-flush modes. Additional marking requirements for flushometer valves are provided below: Product documentation shall be clearly marked with specific maintenance instructions and shall identify replacement parts (e.g., pistons, Water closet fixtures and associated packaging shall be marked with the rated flush volume and in accordance with requirements in ASME A112.19.2/CSA B45.1 with the exceptions below: Water closet fixtures intended to be used with flushometer valves of varying consumption levels (e.g., 1.6 and 1.28 gpf) shall be marked with a dual-consumption or consumption range marking as indicated in ASME A112.19.2/CSA B45.1. The rated flush volume shall be included within this dual-consumption or consumption range marking. Water closet fixtures shall not be marked with the words "or less" to indicate compatibility with flushometer valves of varying consumption levels.</p>	
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					<p>The lowest flush volume marked on the water closet fixture shall not be less than the minimum allowable flush volume (i.e., 1.0 gpf [3.8Lpf]).</p> <p>Flushometer valves and associated packaging shall be marked with the rated flush volume and in accordance with requirements in ASSE 1037/ASME A112.1037/CSA B125.37. For flushometer valves with dual-flush capabilities, the flushometer valve and associated packaging shall be marked with the rated flush volume for both the full-flush and reduced-flush modes. Additional marking requirements for flushometer valves are provided below.</p> <p>Product documentation shall be clearly marked with specific maintenance instructions and shall identify replacement parts (e.g., pistons, diaphragms, repair kits) that should be used to ensure that the device maintains its rated flush volume. The flushometer valve shall not be packaged, marked, or provided with instructions directing the user to an alternative flush volume setting that would override the rated flush volume.</p>		
Urinal equipment	in Gallons per flush (gpf) and Litres per flush (Lpf)	Water sense certified urinals are required to have a maximum of 0.5 gpf (1.9 Lpf).	The average maximum water consumption shall be tested in accordance with the following ANSI standards as applicable: ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA		The urinal fixture and flushing device product and product packaging must be marked with the rated flush volume in gpf and Lpf as specified by the manufacturer, verified through testing and in compliance with this specification. Marking must be in gpf and Lpf in		ASME A112.19.2/CSA B45.1, CSA B45.5/IAPMO Z124, EPA Water sense High-Efficiency

			<p>B45.4, or IAPMO Z124.91, and shall meet the following criteria: The manufacturer shall specify a maximum flush volume (rated flush volume) of the flushing device or urinal fixture, which must be equal to or less than 0.5 gpf (1.9 Lpf).</p>		<p>at least two digit resolutions (e.g., 0.5 gpf [1.9 Lpf]).</p>		<p>Flushing Urinal Specification Ver 1.0</p>
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Annex C (Informative)

Existing water efficiency labelling programmes – water using appliances

C.1 General

This Annex provides descriptions of a number of schemes/programmes for existing water efficiency labelling programmes for water using appliances. The following countries and regions have provided an overview of their scheme/programme:

- Australia (Table C.1)
- China (Table C.2)
- Singapore (Table C.3)

Countries that do not have an existing water efficiency labelling programme may consider these examples to select and adopt those best suited for their markets and conditions when developing their own water efficiency labelling programme.

NOTE: The information provided in this Annex is a summary of the current requirements at the time this Standard was developed, to provide guidance to users. These requirements may have changed and the current reference documents should be reviewed for the most up-to-date information.

Table C.1 — Australia

Water using appliance	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Dishwashers	Total water consumption for complete wash cycle - litres	Programme recommended for dishwasher loaded to the rated capacity for cleaning a normally soiled load.	Average of total water consumption from three dishwasher units tested using recommended program.	Not Applicable	Water consumption values divided into ranges with star rating applied to each range, 1 Star least efficient to 6 Stars most efficient. Over 95% of dishwashers registered have a 3.5 Star or higher rating.		AS/NZS 6400
Clothes washing machines	Total water consumption for complete wash cycle - litres	Programme recommended for clothes washing machine loaded to the rated capacity for washing a normally soiled cotton load.	Average of total water consumption from three clothes washing machine units tested using recommended programme.	"Minimum water efficiency rating of 2.5 stars for machines with a load capacity of less than 5kg.	Clothes washing machines	Total water consumption for complete wash cycle - litres	Programme recommended for clothes washing machine loaded to the rated capacity for washing a normally soiled cotton load.
Combination clothes washer dryers	Total water consumption for complete wash cycle - litres	Programme recommended for clothes washing machine loaded to the rated capacity for washing a normally soiled cotton load.	Average of total water consumption from three clothes washing machine units tested using recommended programme.	Minimum water efficiency rating of 2.5 stars for machines with a load capacity of less than 5kg. Minimum water efficiency rating of 3 Stars for machines with a load capacity of 5kg or greater	Water consumption values divided into ranges with star rating applied to each range, 1 Star least efficient to 6 Stars most efficient. Over 70% of clothes washing machines registered have a 4 Star or higher rating.		AS/NZS 6400 AS/NZS 2040.1 AS/NZS 2040.2
	Additional water consumption	Dryer loaded to the rated capacity for drying a damp	Additional water consumption is determined from the volume recorded in	Not Applicable	No rating is applied, the water consumption measured for the dryer function is added to the water efficiency rating label.		AS/NZS 6400 AS/NZS 2442.1 AS/NZS 2442.2

	in dryer mode - litres	load of standard mixed cotton clothes. Initial damp load mass 190% of the bone-dry mass of the load. The dryer shall reduce the moisture content of the test load to no more than 6% of the bone-dry mass.	litres, of mains water consumed from the completed drying cycle to meet the performance parameters.				
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Table C.2 — China

Water using appliance	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Dishwashers	Total water consumption for complete wash cycle - litres	Programme recommended for dishwasher loaded to the rated capacity for cleaning a normally soiled load.	Average of total water consumption from one dishwasher units tested 5 times using recommended programme.	Not Applicable	Water consumption values divided into 5 classes, class 1 most efficient to class 5 least efficient.	Label requirement is under discuss and is expected to be mandatory from the beginning of next year.	GB38383-2019
Clothes washing machines	Measure water consumption of full load and half load for complete wash cycle - litres The n calculate water efficiency.	Programme recommended for clothes washing machine loaded to the rated capacity for washing a normally soiled cotton load.	Average of total water consumption from three clothes washing machine units tested using recommended programme.	Not Applicable	Water consumption values divided into 5 classes, class 1 most efficient to class 5 least efficient. Near 100% of front load washer on the market declare to be class 1 and over 70% of top load washer declare to be class 2 or higher rating.	Rating on the energy label combines water and energy consumption together. Only energy label shows on the washing machine.	GB12021.4-2013

Table C.3 — Singapore

Water using appliance	Water efficiency measurement	Performance parameters	Water consumption determination	Additional characteristics that affect water efficiency rating	Method of water efficiency rating and labelling	Additional information	Reference documents
Dishwasher for household use	Water consumption in litres per place setting	<p>Recommended wash programme by manufacturer for a normally soiled tableware.</p> <p>(a) Clause 8.2.4 of BS EN 50242: 2016 / BS EN 60436: 2016; or (b) Clause 8.2.4 of IEC 60436: 2015</p> <p>The water consumption is measured using the wash programme or other associated settings recommended in the manufacturer's product literature for a normally soiled load at rated load capacity and the followings are NOT required as test condition:</p> <p>(a) the use of a</p>	Water consumption is measured five times and an average water consumption calculated.	NIL	<p>Not more than 1.5 litres of water per place setting for normally soiled tableware.</p> <p>1-tick: >1.2 to 1.5 litres/place setting 2-tick: >0.9 to 1.2 litres/place setting 3-tick: >0.6 to 0.9 litres/place setting 4-tick: 0.6 litres/place setting or less</p>	NIL	<p>Public Utilities (Water Supply) Regulations</p> <p>WELS Guidebook</p> <p>BS EN 50242: 2016 / BS EN 60436: 2016; or IEC 60436: 2015 relating to water consumption</p>

		reference dishwasher for normalisation of base load items; (b) the parallel operation of a reference dishwasher with the tested dishwasher; (c) the use of a specific inlet water temperature, water hardness, water pressure, ambient temperature or humidity; (d) the use of soiling agents; (e) the use of detergent, rinse agent or salt; (f) the use of an electric supply at a specific voltage; (g) the use of regeneration operations; (h) the preparation and application of soiling agents.					
Clothes washing machine for household use	Water consumption in litres per kilogram	Recommended wash programme by manufacturer for a normally soiled load. (a) Clause 8.6 of IEC 60456	Water consumption is measured five times and an average water consumption calculated.	NIL	Not more than 12 litres of water per kilogram of wash load for a normally soiled load. 2-tick: > 9 to 12 litres/kg 3-tick: > 6 to 9 litres/kg 4-tick: 6 litres/kg or less	NIL	Public Utilities (Water Supply) Regulations WELS Guidebook IEC 60456

		<p>Edition 5.0 (2010-02); or (b) Clause 11 of BS EN 60456 (2005) relating to measurement of water consumption</p> <p>The following parameters are NOT required as test condition: The water consumption for a dishwasher is to be measured using the wash programme or other associated settings recommended in the manufacturer's product literature for normally soiled tableware at rated dishwasher capacity, and the followings are NOT required as test condition:</p> <p>(a) the use of a reference clothes washing machine for normalisation of base load items; (b) the parallel</p>					<p>Edition 5.0 (2010-02); or BS EN 60456 (2005) relating to water consumption</p>
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		<p>operation of a reference clothes washing machine with the tested clothes washing machine;</p> <p>(c) the use of a specific inlet water temperature, water hardness, water pressure, ambient temperature or humidity;</p> <p>(d) the use of stain test strips;</p> <p>(e) the use of detergent.</p>					
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Annex D (Informative)

Guidance on conformity assessment

D.1 Scope

This annex provides general information on the various approaches that countries or regions have taken regarding conformity assessment for their own labelling programmes. Programmes from Australia, China, Japan, European, Singapore and the USA are included.

D.2 How to use this annex

Countries who have implemented or plan to implement a water efficiency labelling programme should include the following requirements in their conformity assessment:

- Declaration of conformity
- Test report from accredited testing lab
- Product and factory audit
- Market inspection

For more information, see D.3 – D.7.

D.3 Australia

D.3.1 Registration

Seven types of water-using and water-saving products are regulated under the Water Efficiency Labelling and Standards (WELS) scheme and must be registered (see: www.waterrating.gov.au). The WELS scheme has an online product registration database that must be used. The following requirements must be met to register the product:

- Current WaterMark certification (for showers, toilets, taps (faucets), urinals and flow controllers)
- Test report/s to show that the product met product testing requirements for WaterMark (if applicable) and WELS
- Photo of the product/s to upload with application
- Written permission to register the product/s from the manufacturer, if you are not the manufacturer of the product

NOTE: WaterMark is a certification mark provided by independent certifying authorities. WaterMark is managed and administered by the Australian Building Codes Board.

D.3.2 Testing requirements

All products have to be tested for performance and water efficiency before being registered. This applies to all products regulated under the WELS scheme.

Testing needs to be conducted:

- At an accredited laboratory,
- In line with requirements for the Australian standard relevant to the product.

Plumbing products must have a valid WaterMark certification before being registered under the WELS scheme.

D.3.3 Assessment and certification

All regulated products must be tested, rated and labelled to meet requirements detailed in Australian Standard 6400:2016 Water efficient products — rating and labelling. This standard also identifies product-specific standards that need to be met.

The details of testing, performance requirements and technical specifications available in the standard should be reviewed and complied with for each product type

These water efficiency and performance standards are managed by Standards Australia.

WaterMark is managed and administered by the Australian Building Codes Board.

Product registrations must be renewed each year between 15 September and 5 December. The original registrant is responsible for renewing registrations. All suppliers, even if they are not the original registrant, are responsible for tracking the registration status of products they are selling or supplying. All registrations have a common expiry date of 22 January each year. Products not renewed by 22 January will have their status changed to 'ceasing' in product registration database.

D.3.4 Audit

WELS inspectors conduct inspections of businesses that supply regulated products in stores, online and as part of new homes or property developments in Australia.

WELS inspectors will help potential applicants regarding the obligations set out in the WELS Act, including requirements detailed in Australian Standard 6400:2016 Water efficient products — Rating and labelling.

D.3.5 Cancellation or suspension of registrations

Registration of the products may be cancelled or suspended under Section 15 of the WELS Determination:

- Copies of all documents included in the application for registration for are not retained for 2 years after the registration has ended, and are not made available on the Regulator's request
- The Regulator that the product has been altered in a way that affects the performance of the product, including water consumption and or compliance with the Australian Standard 6400:2016

Registration of products may also be cancelled or suspended under Section 15 of the WELS Determination if information provided in an application for registration of a product:

- Was not accurate at the time of the application
- Is no longer accurate as a result of changes to the product

A decision to cancel or suspend the registration of a regulated product is a reviewable decision under Sections 69-72 of the WELS Act.

NOTE: The WELS Determination is authorized under The Water Efficiency Labelling and Standards Act 2005 (the WELS Act) and permits the establishment of a national regulatory scheme administered by the Australian Government on behalf of participating States and Territories. Subsection 18(1) of the WELS Act provides that the Commonwealth Minister (the Minister) may determine, in writing, that water-use products or water-saving products of a specified kind are “WELS products”. A determination made under subsection 18(1) must set out, or incorporate by reference, the WELS standard for those products (see subsection 18(2) of the WELS Act). To do this the Minister must have agreement to the terms of the determination from a majority of the participating States and Territories (see subsection 18(4) of the WELS Act).

D.4 China

D.4.1 Implementation process

The implementation process of Water Efficiency Labelling Programme in China is shown in Figure D.1.

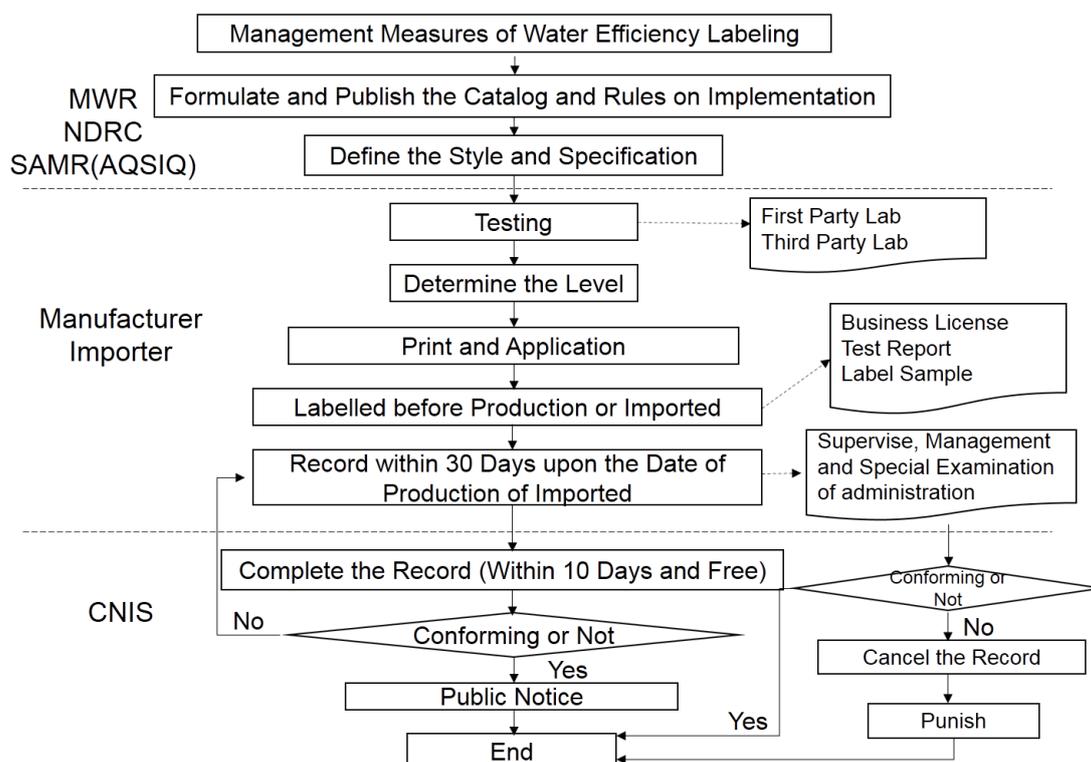


Figure D.1 — Implementation process of Water Efficiency Labelling Programme in China

D.4.2 Self-declaration by manufacturers

Water efficiency testing of products can be arranged by manufacturers independently (e.g. by a non-accredited third-party laboratory or by the manufacturer’s own laboratory). According to the test report of the product’s water efficiency, the manufacturers may make a declaration regarding the water efficiency rating and relevant parameters of the product and print and publish the water efficiency label.

D.4.3 Information to be submitted

Manufacturers shall submit the following information to the China National Institute of Standardization (CNIS):

- The completed application form
- The test report of product water efficiency
- The layout of water efficiency label
- Pictures of the product

The completeness and normalization of the submitted information will be verified by the authorized institution. The submitted information will be made public through the CNIS website for water efficiency labelling and identified by the two-dimensional code on the label.

D.4.4 Market surveillance

Market surveillance of labelled products is conducted through various modes, in order to ensure conformance and compliance. The surveillance modes include:

- Inspection by National departments and surveillance of product quality
- Special inspection and surveillance of CNIS Water Efficiency Labelling staff
- Surveillance by local departments
- Surveillance by social groups or consumers

Inspection and surveillance activities include:

- Verifying the accuracy of the records of water efficiency information supplied
- Verifying the conformity of the layout and information provided on the water efficiency label
- Verifying the accuracy of the water efficiency indicators and rating

D.5 European

D.5.1 General

The Unified Water Label Scheme is a voluntary scheme developed to raise awareness of water labelled products and to promote best practice for water saving within the bathroom environment (www.europeanwaterlabel.eu). The scheme is administered by Unified Water Label Company.

D.5.2 Registration

Companies wishing to register their products are asked to submit a Declaration of Conformity, signed and dated by authorized personnel of the applicant company, testifying that the product complies with the relevant criteria. Copies of certificates of compliance/test reports from bona fide 3rd Parties or copies of certificates/test reports confirming witness testing by bona fide 3rd Parties can be provided in support

of Declarations of Conformity. Unified Water Label may from time to time request original certificates/test reports – which will be returned.

D.5.3 Term of validity

Product listings will remain on the Scheme database for one year from date of approval. If the characteristics have changed for any reason then the company in question must submit a new application and listing and undergo a new procedure.

NOTE 1: if the product undergoes slight modifications, then the listing can be modified, it is not necessary to have a new application, complete a modification form.

NOTE 2: registration is a rolling one, with an annual payment, supported by a termination clause.

D.5.4 Audit

The Unified Water Label will arrange for 5% of the approved products and accompanying literature, point of sale material and advertisements in relationship to the listed products on the database will undergo an audit for compliance with the Scheme's requirements on an annual basis. The 5% will be selected, across the qualifying product ranges. The audit testing will be conducted by a bona fide 3rd Party. Audit test fees are payable by the registered company to the bona fide 3rd Party. If approved product already has 3rd party approval from ILAC registered ISO 17025 accredited test house, they will be exempt from audit testing but undergo a certificate check of 3rd party approval.

D.5.5 Cancellation

The Unified Water Label retains the right to cancel or suspend any listing of a product, which carries the water label. If a company does not adhere to the rules and regulations of the Scheme, or if The Water Label Company has proven that the information given at the application stage is inaccurate, The Unified Water Label retains the right to cancel or suspend the product listing. The Unified Water Label also retains the right to cancel or suspend a product listing where the characteristics of the product have been amended but the company has failed to notify The Unified Water Label or applied for a new application. if the product undergoes slight modifications by completing a modification form, then the listing can be modified, it is not necessary to have a new application.

D.6 Japan

D.6.1 General

Certification of sanitary ceramic products in Japan shall be performed in accordance with JIS Q1001 and JIS A5207.

Certification of water hydrant products in Japan shall be performed in accordance with JIS Q1001 and JIS B2061.

The registered certification body shall abide by JIS Q17025 (ISO/IEC 17025 IDT). Factory audit and business operation shall be performed in accordance with JIS Q9001 (ISO/IEC 9001 IDT) or in line with the requirements of the TQC system.

D.6.2 Certification process

D.6.2.1 Application for certification

The process of the application for certification in Japan is shown in Figure D.2.

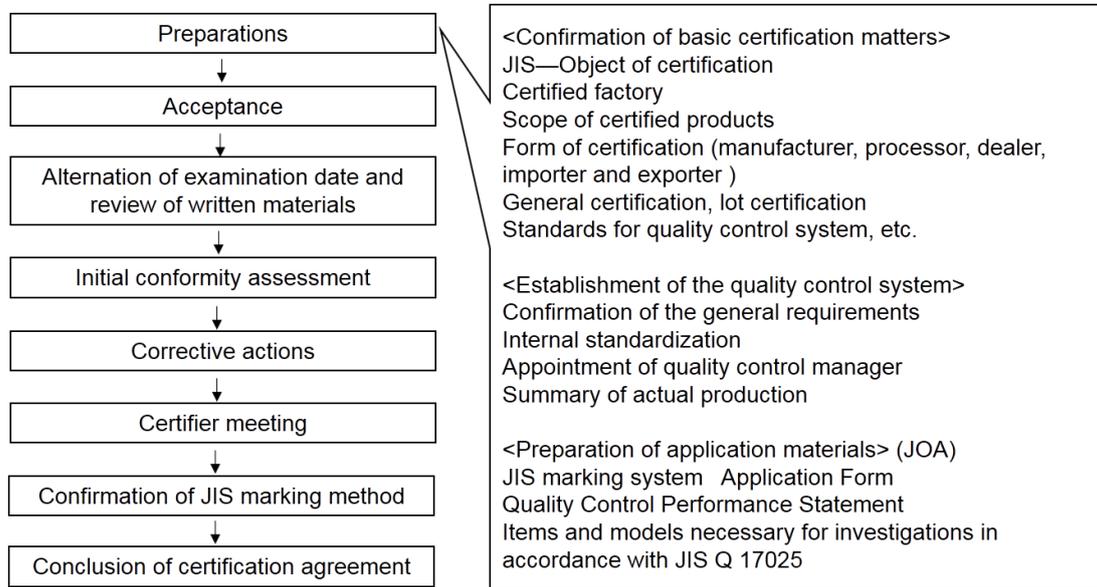


Figure D.2 — Process of the application for certification in Japan

D.6.2.2 Conformity assessment procedures

The procedures for the conformity assessment in Japan are shown as Figure D.3. And the certification qualification shall be subject to a periodic examination with the conformity assessment flow every three years.

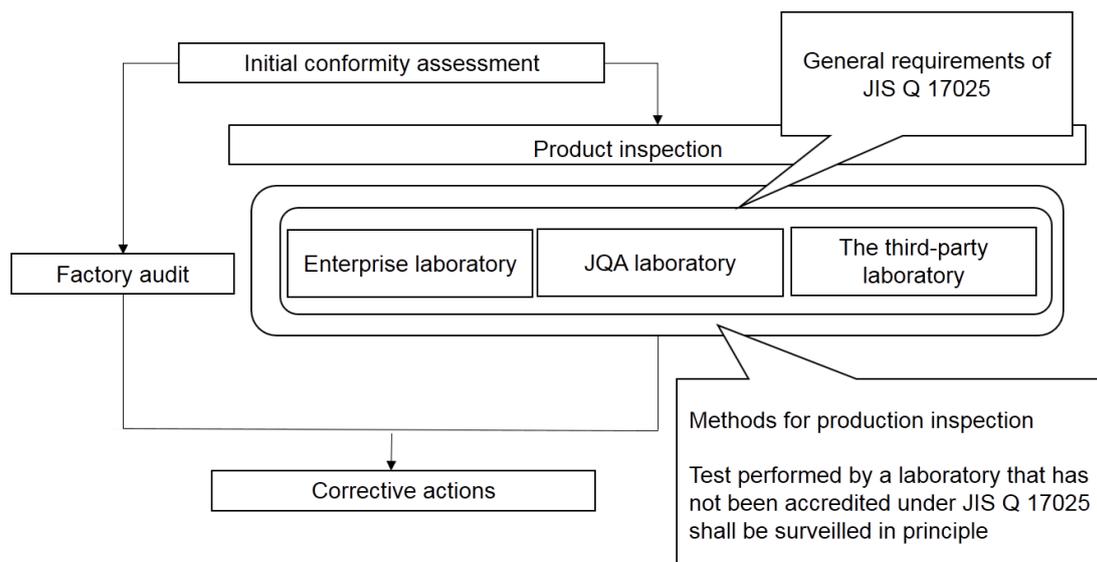


Figure D.3 — Procedures for the conformity assessment in Japan

D.6.3 Certification maintenance surveillance

The registered certification body shall check and certify whether the quality control system of the factory (place of business) conform to the following items:

- JIS Q1001,
- Annex B: Criteria of Audit of Quality Control System,
- B.1 Total quality control (TQC) system,
- B.2 Conformity to the quality control requirements of ISO9001.

Requirements specified by the registered certification body:

- Certification guidance (criteria of audit),
- Certification agreement.

D.6.4 Product Testing

Testing items: The registered certification body shall confirm that all items subject to testing are tested with the methods specified in JIS.

Sampling: The registered certification body shall take sampling from acceptable products.

Factors that should be considered in the production process include: type of product, type of material and whether or not the product comes with or without adjustable drain pipe.

Test place: The registered certification body shall check whether the test place meets the applicable requirements (JIS Q 17025 investigation).

D.6.5 Requirements on the third-party certification body

The registered certification body shall check whether the third-party certification body meets the applicable requirements of ISO/IEC 17025.

D.7 Singapore

D.7.1 General

PUB, national water agency in Singapore, is the regulatory body for the Mandatory Water Efficiency Labelling Scheme (WELS) which was introduced in 2009. Water fittings and appliances regulated under the scheme shall be registered before they are allowed for supply in Singapore. The legislative requirements on WELS are specified in the Public Utilities (Water Supply) Regulations. The types of water fittings and appliances covered under the scheme can be found in PUB's WELS website at <https://www.pub.gov.sg/wels>.

D.7.2 Registration

Application requirements, procedures and water efficiency requirements can be found in WELS Guidebook and PUB's WELS website at <https://www.pub.gov.sg/wels>. All applications should be submitted via online at PUB's WELS website.

To register a product, the product shall meet the following requirements:

- Tested for compliance to the relevant requirements in the Public Utilities (Water Supply) Regulations and PUB S&R*; and
- Certified by a Certification Body (CB) for WELS, which is accredited by the Singapore Accreditation Council (SAC) based on the relevant requirements specified by PUB.

**PUB's Stipulation of Standards & Requirements for Water Fittings for Use in Potable Water Service Installations.*

The PUB S&R and WELS Guidebook can be found at <https://www.pub.gov.sg> and <https://www.pub.gov.sg/wels> respectively.

D.7.3 Testing and product certification

All water fittings under the Mandatory WELS shall be tested and certified for performance, public health, safety and water efficiency before they can be registered.

A product is deemed to be complying with the stipulated standards if it is tested as complying with such standard by a test laboratory accredited by SAC or its Mutual Recognition Arrangement (MRA) partners. For more information on accredited test laboratories and MRA partners, please refer to SAC's website at <https://www.sac-accreditation.gov.sg>.

The certification scheme used is ISO/IEC 17065 – Type 1A.

As part of the registration procedure, PUB issues the water efficiency label of the certified product to CB and a product is deemed to be registered under WELS if it is published in PUB's WELS website.

NOTE: Since 1 April 2018, to improve administrative efficiency, the checking of product compliance is transferred to CBs. This new process is trade facilitative in nature and suppliers can get their products labelled faster as they have multiple CBs to choose from, as opposed to the previous regime where WELS processing is done strictly by PUB.

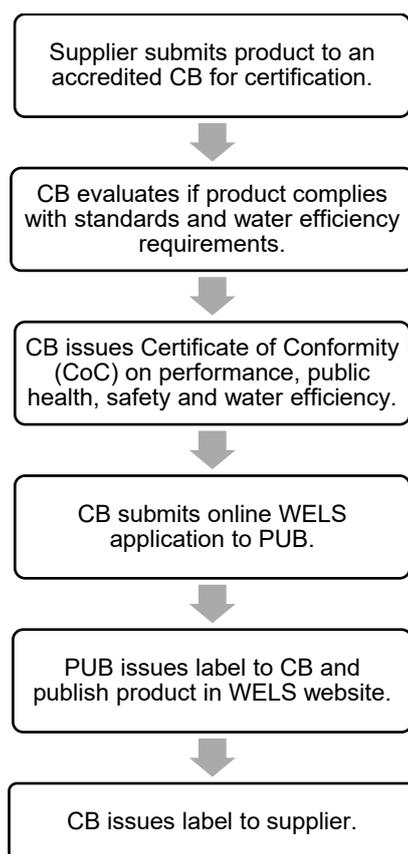


Figure D.4 — Registration procedures of Singapore Water Efficiency Labelling Programme

D.7.4 Surveillance

PUB conducts post-market surveillance on products covered under Mandatory WELS. Enforcement action can be taken against the responsible parties for non-compliance with PUB's requirements.

PUB extends its surveillance on CBs to ensure that the products certified by them are in accordance with the scheme requirements. Should there be any suspected non-conformities by CBs, PUB will inform SAC.

D.7.5 Modification, withdrawal, revocation, testing/analysis and recall of registered products

Requirements on modification, withdrawal, revocations, testing/analysis and recall of registered products are spelt out in the Public Utilities (Water Supply) Regulations.

D.8 USA

D.8.1 General

The United States Environmental Protection Agency (US EPA) established the WaterSense product certification system in 2009. The programme (see: <https://www.epa.gov/watersense>) was revised in 2016 and guides the certification and identification of all water dispensing or using products, including, the qualification and requirements of certification and product certification, production inspection and test requirements, authorized water-saving labelling requirements, requirements for continuous supervision of products after authorization, and procedures for illegal use of labels.

D.8.2 Registration

According to the evaluation factors of WaterSense, products can be registered if the following conditions are met, they :

- Offer equivalent or superior performance
- Are 20 percent or more water-efficient than conventional models
- Realize water savings on a national level
- Provide measurable results
- Achieve water efficiency through several technology options
- Are effectively differentiated by the WaterSense label

D.8.3 Product certification

The US EPA authorized 7 certification institutions to carry out certification of water dispensing or using products. Suppliers meeting the qualification of certification shall submit product certification application, product design / manufacturing / testing product conformity product information, etc. The certification body shall carry out product certification and verify the manufacturer's capabilities in accordance with the WaterSense certification system, evaluate the manufacturer's production process, test the conformity of products, authorize the qualified manufacturers to use water efficiency labels, provide the US EPA with product certification list, and conduct annual supervision and product continuity assessment supervision.

D.8.4 Certification process

The WaterSense certification process are as shown in Figure D.5.

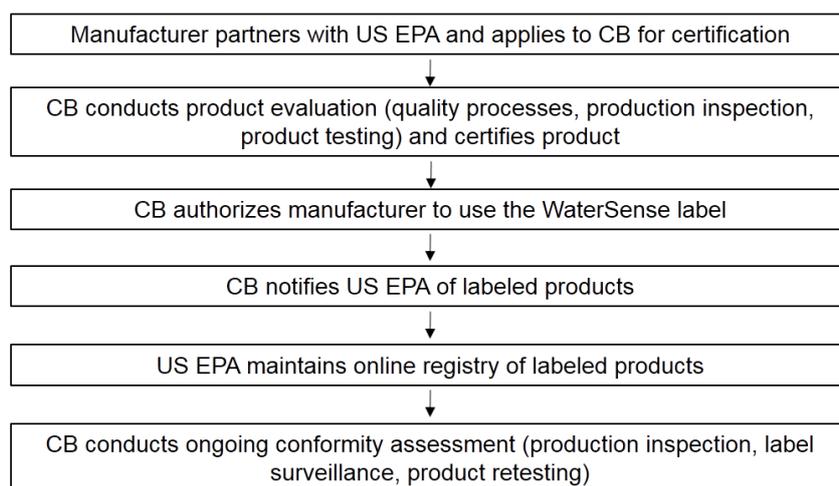


Figure D.5 — The WaterSense Certification process in USA

D.8.5 Conformity assessment

Conformity assessment must be certified by an EPA authorized agency in accordance with the WaterSense product certification system.

Bibliography

- [1] IEC 60436, *Electric dishwashers for household use - Methods for measuring the performance*
- [2] IEC 60456, *Clothes washing machines for household use - Methods for measuring the performance*
- [3] IEC 61121, *Tumble dryers for household use - Methods for measuring the performance*
- [4] IEC 62512, *Electric clothes washer-dryers for household use - Methods for measuring the performance*