AS 3718:2021

Australian STANDARD®

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Water supply — Tap ware

AS 3718:2021

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National Association of Testing Authorities Australia
Plastics Industry Pipe Association of Australia
Plumbing Products Industry Group
Queensland Brassware Association
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Plastics New Zealand
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Water supply — Tap ware

Originated in part as part of AS B1—1928T and MP 52—2001.
AS 1718—1992, AS 3496—1999, AS/NZS 3718:1997 and part of MP 52—2001 jointly revised, amalgamated and redesignated as AS/NZS 3718:2003.
Previous edition AS/NZS 3718:2005.
Third edition AS 3718:2021.

Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee WS-001, Water Fittings, to supersede AS/NZS 3718:2005.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this Standard is to provide requirements for tap ware in nominal sizes ranging from DN 6 to DN 50 that is designed to be used generally for continuous operating temperatures not exceeding 80 °C and maximum dynamic operating pressure 500 kPa. Requirements are also provided for outlets of a tap or mixing tap and for tapset breaching piece assemblies.

The major changes in this edition are as follows:

(a) Additional finish and coating information including PVD coating.

(b) Additional water shut-off device classifications and changes to endurance test cycles.

(c) Additional information on electrical and electromagnetic requirements.

(d) Addition of an endurance test for rotating or swivelling outlets.

The term “normative” is used in Standards to define the application of the appendix to which it applies. A “normative” appendix is an integral part of a Standard.

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Australian Standard®

Water supply — Tap ware

Section 1 Scope and general

1.1 Scope

This Standard specifies requirements for metallic taps, plastic taps, mixing taps, sensor taps, lever taps, timed flow taps, mixing taps mechanical (non-thermostatic), and tapsets in nominal sizes ranging from DN 6 to DN 50 that are designed to be used generally for continuous operating temperatures not exceeding 80 °C and maximum dynamic operating pressure 500 kPa.

This Standard does not prevent the use of products designed for other temperature ranges provided they meet the performance requirements specified herein.

The Standard also specifies requirements for outlets of a tap or mixing tap and for tapset breaching piece assemblies.

Means for demonstrating conformance to this Standard are given in Appendix A.

NOTE Where the static hot and cold water supply systems pressures are below 35 kPa, then water-efficient tap ware may not need to be fitted.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

AS 681, *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications (series)*

AS 1167.1, *Welding and brazing — Filler metals, Part 1: Filler metal for brazing and braze welding*

AS 1199.1, *Sampling procedures for inspection by attributes, Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

AS 1349, *Bourdon tube pressure and vacuum gauges*

AS 1432, *Copper tubes for plumbing, gasfitting and drainage applications*

AS 1565, *Copper and copper alloys — Ingots and castings*

AS 1572, *Copper and copper alloys — Seamless tubes for engineering purposes*

AS 1646, *Elastomeric seals for waterworks purposes*

AS 1722.2, *Pipe threads of Whitworth form, Part 2: Fastening pipe threads*

AS 1881, *Zinc alloys — Casting ingots and castings — Quality requirements*

AS 2331.3.1, *Methods of test for metallic and related coatings, Method 3.1: Corrosion and related property tests — Neutral salt spray test (NSS test)*

AS 2331.3.2, *Methods of test for metallic and related coatings, Method 3.2: Corrosion and related property tests — Acetic acid salt spray test (ASS test)*

AS 2331.3.3, *Methods of test for metallic and related coatings, Method 3.3: Corrosion and related property tests — Copper accelerated acetic acid salt spray test (CASS test)*

AS 2331.3.7, *Methods of test for metallic and related coatings, Method 3.7: Corrosion and related property tests — Corrodkote (Corr) test (ISO 4541:1978, MOD)*

AS 2331.4.1, *Methods of test for metallic and related coatings, Method 4.1: Physical tests — Qualitative adhesion tests*

AS 2331.4.5, *Methods of test for metallic and related coatings, Method 4.5: Physical tests — Electroplated plastics — Thermal cycling tests*

AS 2345, *Dezincification resistance of copper alloys*

AS 2738, *Copper and copper alloys — Compositions and designations of refinery products, wrought products, ingots and castings*

AS 3501, *Parallel screw threads of Whitworth form (BSW and BSF) and associated gauges and gauging practice*

AS 3558.5, *Methods of testing plastics and composite materials sanitary plumbing fixtures, Method 5: Determination of degradation by ultraviolet light*

AS 3635, *Unified (ISO inch) screw threads, associated gauges, and gauging practice*

AS 3688, *Water supply and gas systems — Metallic fittings and end connectors*

AS 5200.037.2, *Plumbing and drainage products, Part 037.2: Flow controllers for use with heated or cold water systems*

AS ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads, Part 1: Dimensions, tolerances and designation*

AS/NZS 1567, *Copper and copper alloys — Wrought rods, bars and sections*

AS/NZS 1568, *Copper and copper alloys — Forging stock and forgings*

AS/NZS 1572, *Copper and copper alloys — Seamless tubes for engineering purposes*

AS/NZS 2845.1, *Water supply — Backflow prevention devices, Part 1: Materials, design and performance requirements*

AS/NZS 3499, *Water supply — Flexible hose assemblies*

AS/NZS 3500.0, *Plumbing and drainage, Part 0: Glossary of terms*

AS/NZS 3500.1, *Plumbing and drainage, Part 1: Water services*

AS/NZS 3662, *Performance of showers for bathing*

AS/NZS 4020, *Testing of products for use in contact with drinking water*

AS/NZS 6400, *Water efficient products — Rating and labelling*

ISO 274, *Copper tubes of circular section — Dimensions*

ISO 6957, *Copper alloys — Ammonia test for stress corrosion resistance*

CEN/TS 13388, *Copper and copper alloys — Compendium of compositions and products*

EN 200, *Sanitary tapware — Single taps and combination taps for water supply systems of type 1 and type 2 — General technical specification*

EN 816, *Sanitary tapware — Automatic shut-off valves PN 10*

EN 817, *Sanitary tapware — Mechanical mixing valves (PN 10) — General technical specifications*

EN 1982, *Copper and copper alloys – Ingots and castings*

EN 15091, *Sanitary tapware — Electronic opening and closing sanitary tapware*

ASTM A269, *Standard Specification for Seamless and Welded Austentic Stainless Steel Tubing for General Service*

ASTM A276, *Standard Specification for Stainless Steel Bars and Shapes*

ASTM A313, *Standard Specification for Stainless Steel Spring Wire*

ASTM B127, *Standard Specification for Nickel-Copper Alloy Plate, Sheet, and Strip*

ASTM B163, *Standard Specification for Seamless Nickel and Nickel Alloy Condenser and Heat-Exchanger Tubes*

ASTM B164, *Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire*

ASTM B165, *Standard Specification for Nickel-Copper Alloy Seamless Pipe and Tube*

ASTM B584, *Standard Specification for Copper Alloy Sand Castings for General Applications*

NZS 3501, *Specification for copper tubes for water, gas, and sanitation*

WMTS-014, *Jointing materials*

1.3 Terms and definitions

For the purposes of this document, the definitions given in AS/NZS 3500.0 and those below apply.

1.3.1
automatic shut-off tap and/or valve
mechanical tap and/or valve that is opened by pressure on, or by twisting the top of, the operating spindle

Note 1 to entry: The tap and/or valve, when the pressure is released, closes under the action of a spring or of water pressure.

1.3.2
back nut
nut that retains surface-mounted tap ware

1.3.3
bathroom basin tap
tap that is designed to turn on and turn off the flow of water into a basin or bowl that is used primarily for washing the hands and face

1.3.4
combination tap
tap into which separate supplies of hot and cold water controlled by individual handles are mixed together to give a desired temperature and flow through a common outlet

1.3.5
connector nut
nut that connects two or more components together to provide a seal

1.3.6
distortion
flaw that is obvious to the eye without resorting to dimensional checking

1.3.7
electronic opening and closing tap and/or valve
tap and/or valve that is digitally controlled

1.3.8
fabricated assembly
joining of two or more components in the manufacturing process, which is intended as a permanent joint

1.3.9
flow controller
device designed to regulate the flow rate so as to maintain a constant flow rate over a given range of pressures

1.3.10
high pressure
where both the hot water and cold water supply pressures are at 150 kPa or above

1.3.11
isolating tap
in-line tap for insertion into the pipeline to deliver water to a tap, valve, fixture, or combination thereof, and which is shut only for maintenance or failure of the downstream installation

1.3.12
kitchen sink tap
device that is designed to turn on and turn off the flow of water into a sink in a kitchen, food preparation or dishwashing environment

1.3.13
laundry tub tap
device that is designed to turn on and turn off the flow of water into a sink or tub in a laundry or washroom

1.3.14
lever tap
tap that is operated by the movement of a lever

1.3.15
low pressure
where both the hot water and cold water supply pressures are below 150 kPa

1.3.16
may
indicates the existence of an option

1.3.17
mechanical mixing tap and/or valve
tap and/or valve into which hot and cold water enters through more than one port and is mixed in a chamber then delivered through a single common outlet

Note 1 to entry: The temperature of the mixed water is controlled by the operation of a control handle or handles.

1.3.18
nominal flow rate
water consumption of a fully open water tap, which is measured in litres per minute, using a dynamic water pressure of —

(a) 35 kPa in accordance with Appendix O;

(b) 250 kPa; or

(c) the average of 150, 250 and 350 kPa in accordance with Appendix F.

1.3.19
nominal size
size determined from the inlet connection

1.3.20
non-rising spindle tap
tap in which the spindle does not rise when the tap is opened

1.3.21
original equipment manufacturer market
OEM market
market segment requiring tap ware components and/or subassemblies for incorporation into a complete product assembly

1.3.22
outlet
portion of the tap assembly after the shut-off device where water flows for its intended use

1.3.23
retrofit (retail) market
market segment requiring tap ware subassemblies, components and/or replacement parts to be installed in the field with other manufacturers' compatible products

1.3.24
rising spindle tap
screw-down tap in which the spindle rises when the tap is opened

1.3.25
scaling factor
ratio of the end-use surface area-to-volume ratio to the test surface area-to-volume ratio

1.3.26
service condition
indicates level of serviceability in terms of appearance, corrosion resistance, wear resistance and performance generally

1.3.26.1
service condition 1
serviceability in warm dry conditions

Note 1 to entry: Examples include office furniture and cabinet hardware.

1.3.26.2
service condition 2
serviceability in indoor conditions where condensation may occur

Note 1 to entry: Examples include bathroom and electric light fittings.

1.3.27
shall
indicates that a statement is mandatory

1.3.28
should
indicates a recommendation

1.3.29
significant surface
part of the surface of an item that is required to be covered by the coating and is essential to its appearance and serviceability

1.3.30
stop tap
tap with inlet and outlet connections

Note 1 to entry: It usually incorporates a loose jumper valve and permits flow in one direction only.

1.3.31
swivel outlet
rotating outlet
outlet that has any means of rotary movement around an intermediate joint of a tap body or outlet and is part of the water way

1.3.32
tap assembly
assembly of tap components that includes; body, head/shut off device, outlet and operating mechanism for the purpose of water supply

1.3.33
tap body
part of a tap or of a tap assembly that includes the inlet and outlet connections and/or the upstream part of the tap body retaining the isolation mechanism and subject to hydrostatic pressure

1.3.34
tap head
part of a tap assembly that is removable and retains the shut-off device

1.3.35
tapset breaching piece assembly
two or more stop tap bodies in an assembly

1.3.36
timed flow tap
tap that is automatically turned off after a predetermined delivery time and/or volume

1.3.37
unequal pressure
where the hot water supply pressure is below 150 kPa and the cold supply pressure is at or above 150 kPa

1.3.38
unit construction
components of a tap that cannot be readily removed by unscrewing, or a component that forms a critical part of the body of the tap itself

1.3.39
Water Efficiency Labelling and Standards Scheme
WELS Scheme
Australia's urban water saving scheme. WELS reduces demand for high quality drinkable water by informing consumers about water efficiency at the point of sale

[SOURCE: AUSTRALIAN GOVERNMENT. *Water Rating*. www.waterrating.gov.au]

1.4 Size designation

The size by which a tap is designated shall be determined by its inlet connection. The designated size shall be between DN 6 and DN 50.

1.5 Marking requirements

1.5.1 Taps

All taps shall be marked legibly and visibly as follows except for (h):

(a) The number of this Standard i.e. AS 3718 and manufacturer's licence number on the body and head. Where sold as an integral tap, the marking shall be on the body. The marking shall be durable.

(b) On stop taps, isolating taps and regulating taps, the words “INLET” or “IN”, “OUTLET” or “OUT”, or a directional arrow.

(c) On taps intended for the supply of hot water only, the letter “H” or the word “HOT” or a red indicator. On taps intended for the supply of tempered water only, the letter “W” or the word “WARM” or a yellow indicator. On taps intended for the supply of cold water only, the letter “C” or the word “COLD” or a blue indicator. These markings shall be positioned to be clearly visible to the user.

NOTE 1 For marking taps intended for the supply tempered water only, refer to the relevant regulatory body.

(d) On combined taps and tapset breaching pieces and mixing taps mechanical, where the hot and cold inlets cannot be interchanged, a mark identifying the hot or cold inlet.

NOTE 2 This mark need only be visible prior to installation.

(e) On mixing taps, mechanical (non-thermostatic) markings, necessary to clearly indicate the direction of operation to select hot, cold and mixed temperature of the flow of water from the outlet, positioned to be clearly visible to the user.

(f) For taps and pressure-sensitive components that are individually packaged, the “maximum operating pressure” clearly visible on packaging, labelling or instruction sheet.

(g) For taps intended for particular applications, their intended use (e.g. basin, kitchen sink, ablution trough or laundry tub).

(h) For electronic taps, the following shall be included with the product:

(i) Electrical supply information, including the operating voltage and the rating in amperes or loading in W or VA. Any limitations to the operation shall also be marked (e.g. A.C., DC or frequency).

(ii) Except for battery-operated only taps, a warning that the valve requires connection to electrical power and that it will not operate without power.

NOTE 3 Refer to the relevant regulatory body for other applicable requirements.

Operating temperature and pressure limitations shall be included on the product or packaging or in the installation instructions.

NOTE 4 Manufacturers making a statement conformity with this Australian Standard on a product, packaging, or promotional material related to that product are advised to ensure that such conformance is capable being verified.

NOTE 5 Additional marking requirements may be applicable for products under the WaterMark Certification Scheme.

1.5.2 Components

1.5.2.1 Components for the retrofit market

Tap components, excluding handles and covers intended for sale to the retrofit market, shall be legibly marked on the product or packaging with the manufacturer’s licence number.

NOTE Additional marking requirements may be applicable for products under the WaterMark Certification Scheme.

1.5.2.2 Components for the OEM market

Tap components intended for sale to the OEM market shall display the manufacturer’s licence number on packaging only, since these components may be assembled into taps with other componentry.

1.6 Packaging and installation instructions

1.6.1 Intended application

Taps and outlets that conform to AS/NZS 6400 shall be labelled on the packaging with their nominated supply pressure (e.g. high pressure, low and/or unequal pressure) and intended application (e.g. basin, kitchen sink, ablution trough or laundry tub).

1.6.2 Installation instructions

Tap ware requiring assembly and fitting, as part of the installation process, shall be accompanied by installation instructions in the English language.

Installation instructions shall include the following:

(a) Description of installation requirements in accordance with the AS/NZS 3500 series of Standards.

(b) Operating temperatures.

(c) Pressure applications.

(d) Any limitations on use.

(e) Manufacturer's warranty.

NOTE Refer to the Plumbing Code Australia or the New Zealand Building Code for information on warranties or other requirements.

Installation instructions for tap ware that conforms to AS/NZS 6400 shall also include the following information:

(i) Commissioning procedures for the product.

(ii) Any flow controller incorporated in the outlet to be tightened to prevent removal by hand.

Section 2 Materials

2.1 Scope of Section

This section specifies requirements for the materials for tap bodies and component parts of taps.

2.2 Metallic materials

2.2.1 Use of metallic material

Except where otherwise stated, metallic materials used for the following components shall be corrosion resistant as specified in Clause 2.2.2:

(a) Tap bodies and tapset breaching piece assembly.

(b) Other components that are made from metals and that are in contact with water.

2.2.2 Corrosion-resistant metallic materials

For the purpose of this Standard, the following materials shall be deemed to be corrosion-resistant:

(a) Copper specified in Clause 2.2.3.

(b) Copper alloy specified in Clauses 2.2.4 and 2.2.5.

(c) Stainless steel specified in Clause 2.2.6.

(d) Material for springs specified in Clause 2.4(c).

(e) Other materials as specified in Clause 2.4.

2.2.3 Copper

Copper shall conform to the following:

(a) *Wrought products* — AS 2738.

(b) *Tubular components* — Copper pipe conforming to AS 1432, NZS 3501 or ISO 274.

2.2.4 Copper alloy

Copper alloy shall conform to CEN/TS 13388 or the following:

(a) *Castings* — AS 1565, EN 1982 or ASTM B584 and a lead content of less than 4.5 %.

(b) *Hot pressings* — AS/NZS 1568.

(c) *Rod for machined parts* — AS/NZS 1567.

(d) *Tubular components* — Copper alloy pipe conforming to AS 1572 alloy designation C 26130. Where bent or stamped in the fabrication process, the pipe shall be stress-relieved so that it is capable of passing the stress corrosion test specified in ISO 6957:1988 Clause 8, using a test solution of pH 9.5 without prior pickling, after all fabrication processes are completed.

NOTE ISO 6957 requires that the entire component is tested before any coating or plating operation.

Pressed end fittings manufactured from copper-zinc alloys containing more that 10 % zinc shall be capable passing the stress corrosion test specified in ISO 6957:1988 Clause 8, using a test solution pH 9.5 without prior pickling, after all pressing processes area completed.

2.2.5 Dezincification-resistant (DR) copper alloy

Copper alloys in contact with water and subject to hydrostatic pressure shall conform to AS 2345.

2.2.6 Stainless steel

Stainless steel, in contact with water, shall conform to ASTM A276 for wrought components or ASTM A269 for tubular components, Grades 304, 304L, 304LN, 316, 316L, 316Ti, UNS S31803 (2205) or equivalent.

NOTE Stainless steel used in above ground applications should have a PREN rating not less than 16.

Stainless steel used in below ground applications and marine environments should have a PREN rating not less than 22.

The pitting resistance equivalent number (PREN) may be calculated as follows:

PREN = %Cr + (3.3 x %Mo) + 16 × (%N)

A PREN 18 is approximately equivalent to Grade 304, and a PREN 23 is approximately equivalent to Grade 316.

2.3 Plastic and elastomeric materials

2.3.1 General

Plastic and elastomeric materials used in tap components shall be of a type specified in the polymer manufacturer's instructions as suitable and appropriate for use in the manufacture of the tap component or otherwise capable of demonstrating suitability for use. Characteristics to be taken into account shall include compatibility and resistance to variations in water quality and elevated temperatures.

Under hydrostatic pressure, plastic and elastomeric materials shall be able to demonstrate suitability at the maximum operating pressure and temperature for the intended life of the product.

2.3.2 Acetal

Acetal plastics used for structural components that are in contact with the water supply shall be copolymer.

NOTE Copolymers are inherently more stable and resistant to thermal degradation during service life than homopolymer.

2.3.3 UV resistance

The materials of plastic and elastomeric components that are designed to be exposed to direct sunlight, when installed, shall not crack, craze or exhibit signs of any defect when tested in accordance with AS 3558.5.

2.3.4 Resistance to chemical degradation

When tested in accordance with Clause 4.2, plastic-bodied taps shall conform to the following:

(a) Upon completion of the exposure period, samples shall show no cracking, crazing or surface degradation visible to the naked eye.

(b) Upon completion of the exposure period and subsequent short-term endurance test, samples shall conform to the requirements in Clauses 4.3 and 4.5 (watertightness under pressure).

2.4 Other materials

The following requirements apply to other materials used for tap bodies and component parts of taps:

(a) *Filler metals* — Filler metal shall be one of the following:

(i) Silver brazing alloy containing not more than 0.05 % cadmium conforming to AS 1167.1.

(ii) Copper-phosphorous brazing alloys conforming to AS 1167.1 with a minimum of 1.8 % silver.

(b) *Material for springs* — Materials for springs shall conform to one of the following:

(i) Stainless steel — ASTM A313.

(ii) Phosphor bronze — AS 2738, C51000 or C51800.

NOTE 1 Other grades may be used provided they meet the performance criteria this Standard.

(c) *Nickel-copper-iron* — Nickel-copper-iron shall conform to one of the following:

(i) AS 2738, Alloy C71500.

(ii) ASTM B127, ASTM B163, ASTM B164 and ASTM B165.

(d) *Zinc alloy die-castings* — Zinc alloy die-castings shall only be used for non-pressure applications. The die-castings shall conform to AS 1881.

(e) *Washers and sealing rings* — Washers and sealing rings shall be in accordance with Clause 4.7 and the following:

(i) *Gland packing* — Material for gland packing shall be asbestos free and suitable for hot or cold water.

(ii) *O-ring* — Material for O-rings shall conform to AS 1646 and AS 681.1

(f) *Lubricants* — Lubricants shall be in accordance with Clause 4.7.

NOTE 2 Ceramic materials may also be used.

NOTE 3 Handles and covers, other than T-head handles, may be manufactured from other materials not specified in this section provided they meet the performance criteria this Standard.

Section 3 Design and manufacture

3.1 Scope of section

This section specifies requirements for the design and manufacture of taps including their integral components.

NOTE The figures in this Standard are diagrammatic examples only.

3.2 End connectors

NOTE Australia and New Zealand have different dimensional requirements for end connectors.

3.2.1 Copper and copper alloy end connectors

Copper and copper alloy end connectors for use in Australia shall conform to AS 3688.

3.2.2 Other end connectors

Other end connectors shall conform to the relevant Australian or New Zealand Standards or WaterMark Technical Specifications.

3.3 Screw threads

3.3.1 General

Threads on components of taps may be right-hand or left-hand. They shall be in accordance with this clause.

3.3.2 Thread engagement

Threaded joints that will be disassembled for any purpose shall have the minimum number of full threads engaged as specified in Table 3.1. For threaded joints that are assembled in a permanent manner, the minimum number of threads engaged as specified in Table 3.1 may be reduced by 40 % provided no less than two full threads are used. The number of full threads shall be counted when the threaded joint is assembled with washers or seals.

Table 3.1 — Thread engagement

Thread nominal size[a]	Other threads (major diameter) mm	Minimum number of full threads engaged
≤ 1″/25 mm	≤ 35	3
> 1″/25 mm ≤ 2″/50 mm	> 35 ≤ 60	4
> 2″/50 mm ≤ 3″/80 mm	> 60 ≤ 90	5
[a] Pipe threads shall conform to AS ISO 7.1 and AS 1722.2.		

3.4 Water shut-off devices

3.4.1 General

Water shut-off devices may be of the manufacturer's own design.

3.4.2 Single and combination taps jumper valve

3.4.2.1 Spindles

Spindles shall be of sufficient length to ensure that —

(a) where the tap is fitted with a loose jumper valve with the washer removed, the handle is clear of any external obstruction when the tap is in the closed position; and

(b) where the tap is fitted with an O-ring type head assembly and a fixed handle, the O-ring is accessible for replacement.

3.4.2.2 Jumper valve

3.4.2.2.1 Design

Where the shut-off device is a jumper valve and compatibility and connectability are required, loose jumper valves shall be in accordance with Figure M.10. Alternatively, the jumper valve may be of the manufacturer's own design.

3.4.2.2.2 Construction

Jumper valve stems and washer plates shall be of single-unit construction.

3.4.3 Other water shut-off valves

Other water shut-off valves in common use are the following:

(a) Automatic mechanical shut-off valves.

(b) Mechanical mixing valves.

(c) Electronic opening and closing valves.

3.5 Thickness of metal parts

3.5.1 General

The thickness of material in any part of a tap shall be as specified in this Standard. Unless otherwise specified, the measured thickness shall exclude the depth of any screw thread and the thickness of any coating or plating material.

The minimum thicknesses do not apply to parts that are not critical to the performance of the tap.

NOTE Parts that are not critical to the performance include decorative covers and parts that, if removed, would not affect the operation of the tap.

3.5.2 Copper, copper alloy and stainless steel tubes

The minimum mean thickness of tubes manufactured from —

(a) copper;

(b) copper alloy; and

(c) stainless steel,

shall be not less than the minimum thickness as specified in AS 1432 for Type B copper tubes or NZS 3501. Where the mean outside diameter is not equivalent to those tubes specified in AS 1432 or

NZS 3501, the minimum wall thickness of the tubes shall be that specified in AS 1432 or NZS 3501 for the next larger size.

3.5.3 Other sections

Where the thickness of a part is not specified elsewhere in this Standard, it shall be in accordance with Table 3.2.

The measured thickness shall exclude the depth of any screw thread and the thickness of any coating or plating material.

Table 3.2 — Minimum wall thickness of unspecified metal parts

Nominal size DN	Plain sections subject to permanent hydrostatic pressure mm	Plain sections not subject to permanent hydrostatic pressure mm
6	1.8	1.1
8	1.8	1.1
10	1.8	1.1
15	1.8	1.1
20	1.8	1.1
25	2.2	1.4
32	2.2	1.4
40	2.8	1.7
50	2.8	1.7
NOTE Hydrostatic pressure refers to pressure under no flow conditions.		

3.6 Fabricated assemblies

Fabricated assemblies shall pass the torque test as specified in Clause 4.8. Assemblies comprising copper alloy components joined by brazing or welding shall conform to Clause 2.2.5 after fabrication.

3.7 Outlets

3.7.1 Unit construction outlets

Outlets that are of unit construction with the tap body shall conform to the requirements of this Standard, as applicable.

3.7.2 Other outlets

All other outlets, including flexible free water outlets, shall conform only to Clause 3.2, Clause 3.10 and Clause 4.7, except as specified in Clauses 3.7.3 to 3.7.5.

3.7.3 Flexible hoses

3.7.3.1 Backflow prevention

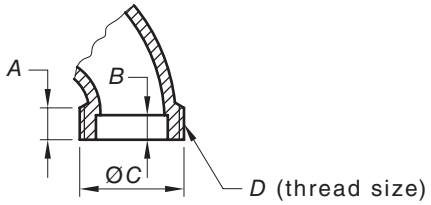
Where flexible hoses are supplied with the tap, they shall incorporate backflow prevention in accordance with AS/NZS 3500.1.

3.7.3.2 Flexible hoses with shut-off devices

Flexible hoses with shut-off devices shall conform to the performance requirements of both this Standard and AS/NZS 3499.

3.7.4 Hose tap outlets

Hose tap outlets shall conform to the dimensional criteria specified in Figure 3.1.



A mm	*B* mm	*C* mm		*D* (thread size designation in inches)
Min.	Min.	Min.	Max.	—
9	5	16.8	17.0	G 3/4 B
9	7	22.3	22.8	G 1 B
13	8	30.3	30.8	G 1 1/4 B
13	9	35.0	35.3	G 1 1/2 B
13	9	41.4	41.9	G 2 B
16	11	52.5	52.9	G 2 1/2 B

Figure 3.1 — Hose tap outlets

3.7.5 Showerheads for personal bathing

Showerheads shall conform to AS/NZS 3662.

3.8 Operating mechanisms

The handle, lever or button may be fitted to the spindle by any means provided that —

(a) the assembly is capable of passing the torque test in accordance with Clause 4.10;

(b) the handle is removable, where necessary, for the replacement or adjustment of sealing devices;

(c) the handles of wall-mounted bath or shower taps conform to Clause 4.14;

(d) foot-operated taps are designed so as to be capable of passing the load test specified in Clause 4.13;

(e) button-operated taps are designed so as to be capable of passing the load test specified in Clause 4.13;

(f) isolating taps are designed to operate without a handle provided that the spindle is supplied with a screwdriver slot or wrenching flats;

(g) taps have special operating provisions in lieu of handles to prevent unauthorized use or vandalism; and

(h) the outer end of the spindle of a ferrule stop tap is suitable for adaptors.

3.9 Finish and workmanship

Taps and tap components shall conform to the following requirements:

(a) Components shall be sound and free from folds, laps, blisters, laminations, blowholes, and other defects that affect the performance or function of the taps in service.

(b) Sealing faces shall not be pitted.

NOTE 1 Pitting is permitted elsewhere provided that the minimum wall thickness requirements this Standard are maintained.

(c) Castings shall be plugged, stopped, or patched but only by a vacuum impregnation process with a material specified in Clause 4.7, and hydrostatically tested in accordance with Clause 4.5.

(d) Taps shall be supplied free of sand, grit and swarf.

(e) All moving parts of the tap shall be lubricated with a non-toxic water insoluble lubricant conforming to Clause 4.7 or WMTS-014. The lubricant may be contained within the material structure of a tap component.

(f) Finished taps shall be free of burrs, fins, irregularities and sharp edges that would affect the performance or function of the tap in service or the safe handling of the tap during installation or use.

Where decorative finishes are applied, they shall conform to the criteria of the relevant standard and industry norms.

NOTE 2 See Appendix T for an informative reference applicable test criteria for finishes and coatings.

3.10 Accessories or components supplied with tap products

3.10.1 General

Accessories or components supplied integral with the tap shall conform to the requirements of the relevant Standard.

3.10.2 Flexible hose connectors

Flexible hose connectors shall conform to AS/NZS 3499.

3.10.3 Integral backflow devices

Taps incorporating integral backflow-prevention devices shall conform to the relevant requirements of AS/NZS 2845.1.

3.10.4 Flow control devices

Flow control devices shall conform to AS 5200.037.2.

3.11 Taps and tap components to suit industry-specific dimensional characteristics

3.11.1 General

Clauses 3.11.2 to 3.11.7 set out the specific dimensional characteristics to accommodate the interchange ability of components of the same size and type produced by different manufacturers. This includes installation practices common in Australia, whereby different parts of a tap may be installed at different times during building construction.

The manufacturer's instructions shall include sufficient relevant information with the product to enable the product to be correctly installed with applicable compatible assemblies.

3.11.2 Valve seating, valve chamber and tap head connection

The valve seat, chamber and tap head connection shall conform to the dimensions shown in Figure M.2 and Figure M.3.

3.11.3 Tap head

The tap head fixing detail shall conform to the dimensions shown in Figure M.6 or Figure M.7.

3.11.4 Spindle end

The spindle end to suit a loose jumper valve shall conform to the dimensions shown in Figure M.8 or Figure M.9.

3.11.5 Loose jumper valves

Loose jumper valve stems and washer plates shall be of unit construction and conform to the dimensions shown in Figure M.10.

3.11.6 Tapset breaching piece assemblies

Tapset breaching piece assemblies shall conform to the requirements of this Standard.

3.11.7 Replacement tap seats

Replacement tap seat inserts shall conform to the requirements of this Standard. The minimum wall thickness, excluding the depth of thread, shall be as follows:

(a) Copper alloy — 1.1 mm.

(b) Stainless steel — 0.6 mm.

3.12 Electronic taps and/or valves

3.12.1 General

Electronic taps and/or valves shall be checked for safe use and electromagnetic compatibility.

NOTE Refer to the relevant regulator for electrical and electromagnetic compatibility requirements.

3.12.2 Power failure

If power failure occurs while the tap is delivering water, the water shall be shut off as specified in Clause 4.15.

3.12.3 Electrical safety

NOTE Refer to the NCC for requirements related to electrical safety components.

3.12.4 Electromagnetic compatibility

NOTE Refer to the NCC for requirements related to electromagnetic compatibility products.

Section 4 Performance requirements

4.1 General

All products and components shall be tested to the relevant performance requirements.

4.2 Plastic materials used for plastic-bodied taps

When tested in accordance with Appendix B, a tap assembly shall exhibit characteristics for compatibility and resistance to variations in water chemistry and elevated temperatures.

4.3 Hydraulic strength test

When tested in accordance with Appendix C, a tap assembly shall show no signs of permanent distortion, splitting, cracking or breakage or other failure.

4.4 Surface-mounting strength test for taps

When tested in accordance with Appendix D, the surface-mounting components of the tap shall show no signs of cracking, deformation, stripping of threads or unsecured mounting. Following the completion of this test, the components shall conform to the requirements of Clause 4.5

NOTE This clause does not apply to recessed, wall-mounted tap bodies.

4.5 Watertightness under pressure

When tested in accordance with Appendix E, a tap or hand spray with shut-off device shall show no signs of cracks, leakage, or other failure.

4.6 Nominal flow rate

4.6.1 General

4.6.1.1 High pressure

The flow rate of a tap or tap outlet shall be determined in accordance with Appendix F.

4.6.1.2 Low and unequal pressure

The flow rate of a tap or tap outlet shall be determined in accordance with Appendix O.

4.6.2 Outlets where conformance to AS/NZS 6400 is mandatory

4.6.2.1 High pressure

Where labelling in accordance with AS/NZS 6400 is mandatory, the nominal flow rate shall be determined in accordance with Appendix F, and conform to the following:

(a) The maximum difference between the highest and lowest average flow rate shall not exceed 2.0 L/min.

(b) The highest average flow rate shall not exceed the upper limit of the flow range for the determined nominal flow rate in AS/NZS 6400 by more than 1.0 L/min.

(c) The lowest average flow rate shall be not less than the lower limit of the flow range for the determined nominal flow rate in AS/NZS 6400 by more than 1.0 L/min.

4.6.2.2 Low and unequal pressure

Where labelling in accordance with AS/NZS 6400 is mandatory, the nominal flow rate shall be determined in accordance with Appendix O.

4.6.3 Other taps and outlets

For taps and outlets that are not covered by AS/NZS 6400, their nominal flow rate may be determined at 250 kPa dynamic flow pressure.

NOTE Example taps not covered by AS/NZS 6400 are bath taps, washing machine taps, cistern taps and garden hose taps.

4.7 Contamination of water

Materials in contact with drinking water shall conform to AS/NZS 4020.

Components made from a single material may be pre-qualified by use of simulated samples in accordance with Appendix N.

The process of pre-qualification may be applicable to the following types of materials:

(a) Metals and metallic alloys.

(b) Plastic materials.

4.8 Torque of fabricated joints

When a fabricated tap assembly is tested in accordance with Appendix G, the fabricated joint shall show no signs of splitting, cracking, distortion, or thread damage. This test is a test of a fabricated joint and twisting of copper pipe tails is not a failure of the test.

4.9 Torque of head to body

When tested in accordance with Appendix H, the head to body connection shall show no distortion, stripping of mating thread or parts, damage to wrenching flats or internal components.

NOTE This test is not required for mixing taps mechanical (non-thermostatic).

4.10 Torque of operating mechanism

When tested in accordance with Appendix I, a tap-operating mechanism shall show no signs of cracking, bending or damage.

4.11 Endurance test for taps and tap components

4.11.1 Endurance test for tap operating mechanisms

4.11.1.1 General

Taps and tap components shall be capable of passing the endurance tests set out in Appendix J, Q, R and S.

Alternatively, for taps with a maximum inlet temperature not exceeding 65 °C, the endurance tests set out in EN 200, EN 816, EN 817 or EN 15091 may be used to demonstrate conformance to this performance requirement.

4.11.1.2 Pre-endurance testing

The watertightness test shall be carried out before the endurance test, see Clause 4.5.

4.11.1.3 Cycles

Table 4.1 sets out the number of cycles required for endurance testing.

Table 4.1 — Endurance testing cycle range

Tap classification	Number of cycles	Appendix
Single taps	50,000 ± 500	J
Combination taps	50,000 ± 500	J
Mechanical mixing taps	70,000 ± 700	Q
Automatic shut-off taps — single	200,000 ± 2000	R
Automatic shut-off taps — mixing	100,000 ± 1000	R
Electronic opening and closing taps	200,000 ± 2000	S
Isolation or drain taps	10,000 ± 100	J
Jumper valves	25,000 ± 250	J

4.11.1.4 Subsequent tests

Following the endurance test, taps shall be capable of passing the following:

(a) Watertightness under pressure test where applicable, see Clause 4.5.

(b) Torque of operating mechanism test where applicable, see Clause 4.10.

(c) Resistance of handle to removal test where applicable, see Clause 4.14.

4.12 Strength of connector nut and assembly

When tested in accordance with Appendix K, the nut and assembly shall show no signs of splitting, cracking, distortion or thread damage. Combinations of connector nuts and assemblies that are manufactured of copper or copper alloys to conform to AS 3688 need not be tested.

4.13 Strength of button-operated and foot-operated taps

When installed according to the manufacturers' instructions and tested in accordance with Appendix L, button-operated and foot-operated taps shall show no signs of cracks, breakages, bending or damage.

NOTE This test does not apply to digitally (electronically) controlled taps and mixers.

4.14 Resistance of handle to removal

The handles of wall-mounted bath or shower taps shall not fracture or pull off under an axial static load of 68 +0, –0.5 kg.

4.15 Power failure for electronically controlled taps

In the event of an electrical power failure, water shall shut off within 1 min.

4.16 Rotating or swivel outlet

When tested in accordance with Appendix P, a rotating outlet shall show no signs of leakage from the tap body connection to the outlet connection. The torque to rotate the outlet during testing shall not exceed a torque of 3 Nm.

Alternatively, for taps with a maximum inlet temperature not exceeding 65 °C, the endurance test for a rotating or swivel outlet may be undertaken in accordance with EN 200 or EN 817 to demonstrate conformance to this performance requirement.

Appendix A
(normative)

Product conformity

A.1 Scope

This appendix sets out the minimum requirements for evaluating product conformity to this Standard through —

(a) initial type testing; and

(b) a minimum sampling and testing frequency plan.

A.2 Relevance

The long-term performance of sanitary plumbing fixtures is critical to the durability of building infrastructure, protection of public health and safety, and protection of the environment.

A.3 Terms and definitions

A.3.1
batch release test
test performed by the manufacturer on a batch of components, which has to be satisfactorily completed before the batch can be released

A.3.2
production batch
clearly identifiable collection of units, manufactured consecutively or continuously under the same conditions, using material or compound to the same specification

A.3.3
sample
one or more units of product drawn from a batch, selected at random without regard to quality

Note 1 to entry: The number of units of product in the sample is the sample size.

A.3.4
sampling plan
specific plan that indicates the number of units of components or assemblies to be inspected

A.3.5
type test batch
schedule of units of the same type, identical dimensional characteristics, all the same nominal diameter and wall thickness, from the same compound

Note 1 to entry: The batch is defined by the manufacturer.

A.3.6
type testing
TT
testing performed to demonstrate that the material, component, joint or assembly is capable of conforming to the requirements given in the Standard

A.4 Testing

A.4.1 Type testing

Table A.1 sets out the requirements for type testing and frequency of re-verification.

A.4.2 Batch release testing

Table A.2 sets out the minimum sampling and testing frequency plan for a manufacturer to demonstrate conformance of product(s) to this Standard on an ongoing basis.

A.4.3 Retesting

In the event of a test failure, the products within the batch shall be retested so as to ensure that only those batches found to conform may be claimed and/or marked as conforming to this Standard.

Table A.1 — Type testing

Characteristic	Clause No.		Requirement	Test method	Frequency	Tap	Components			
							Tap head/ Head assembly	Outlets	Tap body	Water shut-off device
Materials[a]	2.2	Metallic materials	Materials	Review materials against Standards referenced in this Standard	At any change in materials specification	✓	✓		✓	✓
	2.2.2	Corrosion-resistance metallic materials				✓	✓		✓	✓
	2.2.3	Copper				✓	✓		✓	✓
	2.2.4	Copper alloy				✓	✓		✓	✓
	2.2.5	Dezincification-resistance (DR) copper alloy				✓	✓		✓	✓
	2.2.6	Stainless steel				✓	✓		✓	✓
	2.3	Plastic and elastomeric materials				✓	✓		✓	✓
	2.4	Other materials				✓	✓		✓	✓
Design and manufacture	3.2	End connectors	Design	Relevant Standard	At any design or process change	✓		✓	✓	
	3.3	Screw threads	Design	Relevant Standard		✓			✓	
	3.5	Thickness of metal parts	Design	Dimensional		✓	✓		✓	
	3.7	Outlets	Design	Dimensional		✓		✓		
	3.7.3	Flexible hoses	Design	Relevant Standard		✓				

Table A.1 *(continued)*

Characteristic	Clause No.	Requirement	Test method	Frequency	Tap	Components			
						Tap head/ Head assembly	Outlets	Tap body	Water shut-off device
Performance	4.2 Plastic material used for plastic-bodied tap	Performance	Appendix B	As specified	✓			✓	
	4.3 Hydraulic strength test	Performance	Appendix C		✓			✓	
	4.4 Surface-mounted strength test for taps	Performance	Appendix D		✓				
	4.6 Nominal flow rate	Performance	Appendix F and Q		✓		✓		
	4.7 Contamination of water	Performance	AS/NZS 4020 Appendix N		✓	✓	✓	✓	✓
	4.8 Torque of fabricated joints	Performance	Appendix G		✓			✓	
	4.9 Torque of head to body	Performance	Appendix H		✓	✓			
	4.10 Torque of operating mechanism	Performance	Appendix I		✓	✓			
	4.11 Endurance test for taps and tap components	Performance	Appendix J, Q, R and S		✓				✓
	4.12 Strength of connector nut and assembly	Performance	Appendix K		✓			✓	
	4.13 Strength of button-operated and foot-operated tap	Performance	Appendix L		✓				
	4.14 Resistance of handle to removal	Performance	Review against Standard		✓	✓			
	4.15 Power failure for electronically controlled taps	Performance	Review against Standard		✓				
	4.16 Rotating or swivel outlet	Performance	Appendix P		✓		✓		
Marking requirements	1.5	Marking requirements	Visual observation	At any label or marking change	✓				
Packaging and installation instructions	1.6	Packaging and installation instructions	Document review	At any change in installation requirements	✓				

[a] Material requirements may be verified by the submission of recent test certificates that confirm compliance. Any test certificates submitted need to provide traceability to material/formulation and manufacturer/site of manufacture. The Conformity Assessment Body reserves the right to independently verify compliance.

Table A.2 — Batch testing

Characteristic	Clause No.		Requirement	Test method	Frequency
Materials[a b]	2.2 to 2.4	Materials	Materials	Relevant Standard	Each batch or lot
Design and manufacture	3.2	End connectors	Design	Relevant Standard	AS 1199.1 Insp. Level II
	3.5	Thickness of metal parts	Design	Dimensional	
Performance	4.5	Watertightness under pressure	Performance	Appendix E[d]	100 % for cast bodies and concealed assemblies and for others AS 1199.1 Insp. Level II
	4.6	Nominal flow rate[c]	Performance	Appendix F	Each batch or lot

[a] Critical materials used e.g. brass body, brass and plastics polymers.

[b] Tests, such as those for AS/NZS 4020, and tests for plastics may not be required for every batch; compliance materials may be based on suppliers' certificates.

[c] Compliance may be based on supplier certificates for a WaterMark approved component or product that defines the nominal flow rate.

[d] All components up to and including the shut off device only.

Appendix B
(normative)

Resistance of plastic-bodied taps to chemical degradation

B.1 Scope

This appendix sets out the requirements for resistance to chemical degradation for plastic-bodied taps.

B.2 Principle

Tap body samples are exposed to various chemical environments then inspected and subjected to a short-term endurance test. Individual samples are required for each exposure condition. Taps or components designed for applications where the design maximum temperature is other than up to 80 °C are tested to an appropriate maximum temperature (°C) for the temperature rating of the tap or component. Where tested at an alternative temperature range, the temperature rating shall be clearly identified in accordance with Clause 1.6.

B.3 Apparatus

The following apparatus is required:

(a) A water bath capable of maintaining 95 +2, −0 °C.

(b) A sealable container of sufficient capacity to hold the tap assembly.

(c) 0.4 % to 0.5 % weight for weight sodium hypochlorite solution.

(d) A temperature-controlled environment capable of maintaining 20 +2, −0 °C.

B.4 Procedure

Tap assemblies shall be tested in the fully open position. Tap components shall be assembled with other components conforming to the requirements of this Standard, as appropriate, and tested with the assembly in the fully open position.

Components that do not form part of the tap body, or waterway, and which may be damaged or destroyed through water immersion shall be removed prior to the exposures. Following the exposure periods, the removed components shall be re-fitted prior to any post exposure performance tests. E.g. the electronic solenoid fitted to a solenoid valve.

The procedure shall be as follows:

(a) Expose individual samples to the following conditions and solutions:

  (i) *Sample 1* — Fully immerse the sample in deionized water at 95 +2, −0 °C for 1 000 +20, −0 h.

(ii) *Sample 2* — Fully immerse the sample in 0.4 % to 0.5 % weight for weight sodium hypochlorite solution at 20 +2, −0°C. Exclude all air from the container and seal for 1 000 +20, −0 h.

(b) On completion of exposure, subject each tap assembly to a short-term endurance test in accordance with Appendix J, Q, R or S as applicable, except that only 3 000 +50, −0 cycles shall be completed.

(c) Then subject the sample to the hydraulic strength of plastic-bodied tap assembly test in accordance with Clause 4.3 and the watertightness under pressure test in accordance with Clause 4.5.

B.5 Test report

The following shall be reported:

(a) Model, manufacturer, type and size of tap or component(s).

(b) Any cracking, crazing or surface degradation visible to the naked eye.

(c) Results of the hydraulic strength of plastic-bodied tap assembly test.

(d) Results of the watertightness under pressure test.

(e) Statement of conformance or non-conformance to the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix B.

Appendix C
(normative)

Hydraulic strength test for tap assemblies

C.1 Scope

This appendix sets out the method for the hydrostatic strength testing of taps.

C.2 Principle

The tap is supported in a test rig without any external force being applied. Hydraulic pressure is applied over a predetermined time period, entrapped air being bled off initially prior to testing. The tap is then tested in accordance with Appendix E and inspected for any leakage, and then dismantled and inspected for distortion, splitting or breakage.

C.3 Application

Draw-off taps shall be tested with the tap in the closed position only. In-line taps and hose taps shall be tested with the tap in the closed and open positions.

The test shall also be conducted to establish the strength of the fabricated joints.

C.4 Apparatus

C.4.1 Pressurizing system

A hydraulic system capable of producing a test pressure of 3 +0.5, −0 MPa, without shock or pulsations. The pressurizing system shall be capable of maintaining the pressure where flow conditions occur during the test.

C.4.2 Test rig

A rig to support the tap including its connection ends, so that no external force is applied to them.

C.4.3 Test sample

Samples consisting of outlets of in-line tap samples capable of being sealed by a control valve, and outlets of draw-off tap samples, open to allow free discharge. The internal sealing device of the tap may be strengthened to minimize internal leakage. The body and head of taps shall not be strengthened.

C.4.4 Pressure gauge

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy. The pressure gauge shall be placed within 100 mm of the tap inlet and on the upstream side.

C.4.5 Thermometer

A thermometer capable of indicating the required test temperature to within ± 2 % of the true value, or digital or analogue temperature gauges of equal accuracy.

C.4.6 Timing device

A timing device capable of reading to 0.1 s, to measure the time interval from which the flow rate is calculated.

C.5 Testing environment

C.5.1 Safety

Provision shall be made to protect the operator in the event of the tap failing the test.

C.5.2 Conditioning of tap assemblies

Tap assemblies shall be tested with water at a temperature of 80 ± 2 °C. Where the manufacturer specifies a maximum operating temperature greater than 40 °C, the test temperature shall be the maximum operating temperature.

Prior to testing, tap assemblies shall be conditioned for a period of 30 +10, −0 min either by placing the assembly in hot air at the specified temperature or by running hot water through it at the specified temperature.

Alternative conditioning environments may be used provided that equal accuracy can be demonstrated.

C.6 Procedure

The procedure shall be as follows:

(a) Mount the tap in the test rig, connect inlet or inlets to the pressurizing system and bleed off any entrapped air. Condition the tap if applicable.

(b) Open the tap and run hot water at 80 ± 2 °C through it for a period of 30 min at a flow rate of not less than 2 L/min, except that taps marked cold water only shall be tested at 40 ± 2 °C. Where the manufacturer specifies a maximum operating temperature greater than 40 °C, the test temperature shall be the maximum operating temperature.

(c) Measure the water temperature at a point 100 mm upstream from the tap connection to check on flow-through temperature.

(d) Close the tap and apply a pressure of 3 +0.1, −0 MPa and hold this pressure for 60 +5, −0 min. Where the manufacturer specifies a maximum operating pressure, the test pressure shall be twice the maximum operating pressure.

NOTE During this period, the tap should be allowed to cool down.

Seepage through the tap shut-off mechanism is permitted provided the pressure is maintained.

(e) For plastic-bodied taps, carry out Steps (b) to (d) 10 times.

(f) Remove the tap from the test rig, and retest in accordance with Appendix E. Check for any leakage.

(g) Dismantle the tap and visually inspect the body and head for splitting, distortion, cracking and breakage.

C.7 Test report

The following shall be reported:

(a) Model, manufacturer, type and size of the tap.

(b) Test pressure and the test temperature.

(c) All leakage observed at each step in the test.

(d) Result of retesting for watertightness in accordance with Appendix E.

(e) Any splitting, distortion, cracking, breakage or other failure.

(f) Statement of conformance or non-conformance to the test criteria.

(g) Reference to this test method, i.e. AS 3718 Appendix C.

Appendix D
(normative)

Surface-mounting strength test for taps

D.1 Scope

This appendix sets out the method to assess the strength of a tap body and mounting components to resist damage when subjected to given bending moments. The test is intended to simulate conditions that may occur in service.

D.2 Principle

The tap is securely fixed in accordance with the manufacturer's designated fitment instruction such that when fitted with an adaptor, rotating beam and test load, the rotation axis is vertical.

D.3 Apparatus

The following apparatus is required:

(a) A rigid mounting plate that does not deflect under the applied load designed to accept the normal fixing method for the tap under test, see Figures D.1, D.2 and D.3.

(b) A screwed plug or adaptor to fit into or onto the tap body for the attachment of the test beam and weight.

(c) A hot water supply capable of producing a constant supply of hot water according to Clause D.4(b) for the duration of the test.

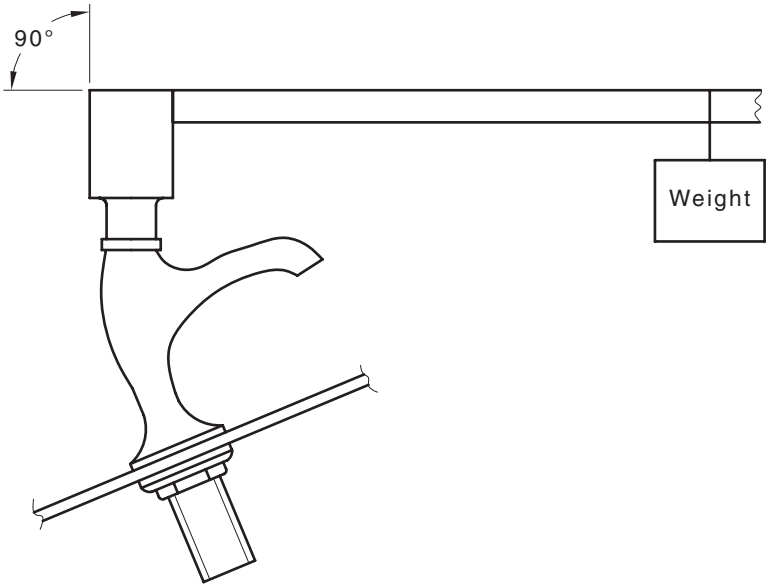


Figure D.1 — Bending test apparatus — Type 1

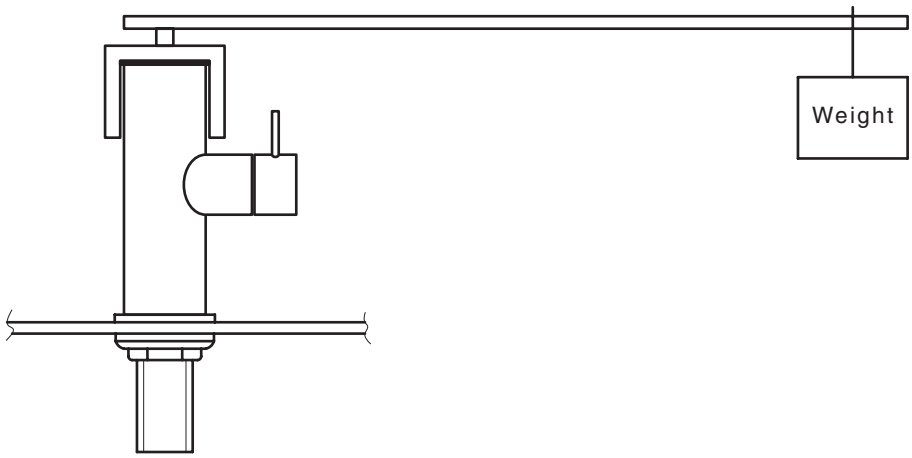


Figure D.2 — Bending test apparatus — Type 2

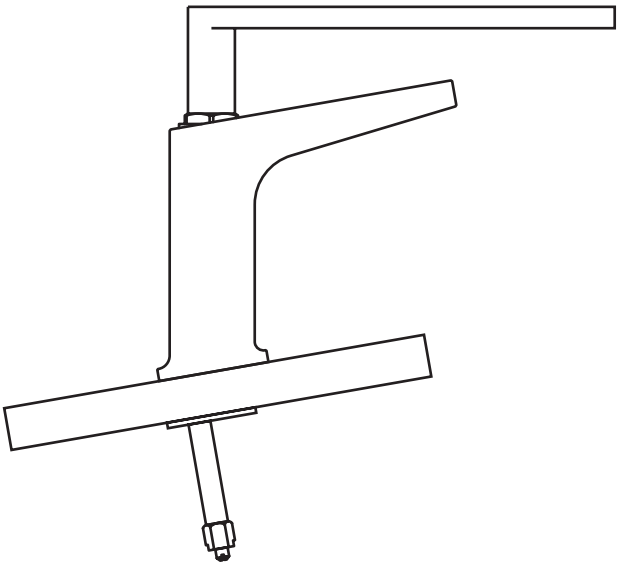


Figure D.3 — Bending test apparatus — Type 3

D.4 Procedure

The procedure shall be as follows:

(a) Securely fix the body of the tap under test into or onto the mounting plate in accordance with the manufacturer's designated fitment instructions. Outlet or components not critical for mounting integrity on mixer taps may be removed for test purposes. For pillar taps, mount the plate so that the head assembly for the tap is mounted in a vertical plane (top face of body is generally horizontal, see Figure D.1). If the manufacturer does not provide instructions for tightening of backnuts, these shall be hand-tightened.

(b) Condition taps with plastic body or mounting components by running water at 80 ± 2 °C recorded at the tap outlet and maintained for a minimum period of 60 s before stopping water flow.

(c) Remove the head assembly (if applicable) or fit the adaptor into or onto the top of the tap body in the same manner as the head assembly.

(d) Attach the test beam to the adaptor and apply the test load to the beam to produce a moment of 50 Nm in a vertical plane.

(e) Slowly rotate the beam through 360° in a horizontal plane to uniformly apply the bending moment to the tap. For taps with plastic body or mounting components, Steps (d) and (e) shall be accomplished within 45 s to 60 s.

(f) Remove the load and inspect the tap and mounting components.

(g) Remove the body from fixture, reassemble and determine the watertightness in accordance with Appendix F.

D.5 Test report

The following shall be reported:

(a) Model, manufacturer, type and size of tap.

(b) Bending moment applied.

(c) Location if bending moment application on tap body

(d) Results of the determination of watertightness in accordance with Appendix E.

(e) Statement of conformance or non-conformance to the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix D.

Appendix E
(normative)

Determination of watertightness

E.1 Scope

This appendix sets out two methods for testing assembled taps for leakage through the tap assembly. The methods are as follows:

(a) Hydrostatic pressure test at not less than the following:

  (i) Not less than 2 MPa to areas subjected to permanent hydrostatic pressure in normal use, except where the manufacturer specifies a maximum operating pressure, the test pressure to be not less than 1.5 times the maximum operating pressure.

  (ii) Not less than 500 kPa to areas not normally subjected to permanent hydrostatic pressure in normal use or 1.5 times the manufacturer specified maximum operating pressure, whichever is the lesser.

(b) Pneumatic pressure test at not less than the following:

  (i) Not less than 700 kPa to areas subjected to permanent hydrostatic pressure in normal use, except where the manufacturer specifies a maximum operating pressure, the test pressure to be not less than 1.5 times the maximum operating pressure.

  (ii) Not less than 500 kPa to areas not normally subjected to permanent hydrostatic pressure in normal use or 1.5 times the manufacturer specified maximum operating pressure, whichever is the lesser.

E.2 Principle

The tap is held in a test rig and hydraulic pressure is applied over a predetermined time period, entrapped air being bled off prior to testing. Alternative procedures applying pneumatic pressure to the tap and rig assembly may be used. The tap is then inspected for cracks, leakage or other failure.

E.3 Apparatus

E.3.1 Pressurizing system

Pressurizing system capable of producing the specified test pressure without shock or pulsations. A hydraulic or pneumatic accumulator or pump may be used for this purpose.

The hydrostatic pressure test shall be conducted with water. The system shall be capable of providing the required pressure under no-flow conditions.

The pneumatic pressure test shall be conducted with compressed air. The system shall be capable of providing the required pressure under no flow conditions.

The hydraulic pressure test shall have a suitable means of demonstrating leakage that may include —

(a) visual, e.g. leakage through the body or outlet; or

(b) measurement, e.g. a minimum viable volume including the test tap is pressurized to the test pressure, isolated from the main supply and any pressure decay measured.

The pneumatic pressure test shall have a suitable means of demonstrating leakage that may include —

(i) visual, e.g. bubble release from the tap when submerged under water;

(ii) measurement, e.g. a minimum viable volume including the test tap is pressurized to the test pressure, isolated from the main supply and any pressure decay measured; or

(iii) bubble tube to highlight air flow when no flow should occur.

NOTE An alternative test method may be permitted by the Conformity Assessment Body subject to such testing demonstrating equal effectiveness.

E.3.2 End connections

The tap is connected to the pressurizing system, supported and held in a jig.

Connection to the tap inlet and plugging of the tap outlet shall be made by threaded or compression ends, or by means of an elastomeric sealing medium set in a supporting mechanism, plate or plugs located against or around the connection end or into a socket. For a capillary connection end conforming to AS 3688, the sealing medium on a plug inserted within the capillary socket shall be at a depth not greater than 25 % of the total socket length. The pressurizing unit shall be connected to the inlet of the tap. Each tap of a combined tap shall be tested in a way that establishes the integrity of each tap.

External clamping forces may be applied to the fitting to hold the tap against the connection sealing mechanism. Adequate guarding shall be provided to protect the tester.

For the hydrostatic and pneumatic tests of areas subjected to permanent hydrostatic pressure, the free discharge shall be open to atmosphere.

For the hydrostatic and pneumatic tests of areas not subjected to permanent hydrostatic pressure, the free discharge shall be plugged and sealed.

E.3.3 Pressure gauge

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

NOTE Digital or analogue pressure gauges with equivalent or better accuracies may be used.

A typical test arrangement is shown in Figure E.1.

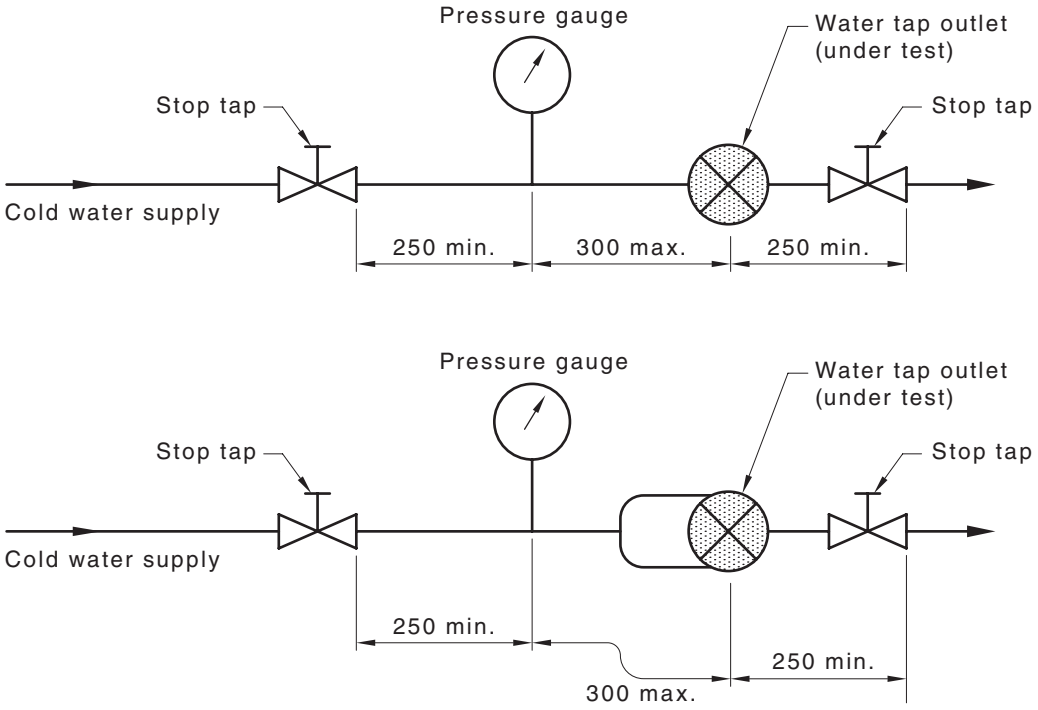


Figure E.1 — Typical test arrangement

E.4 Procedure

E.4.1 Hydrostatic test

The procedure shall be as follows:

(a) Mount the tap in a test jig and connect inlets and outlets to the pressurizing system.

(b) Open tap and outlet stop tap, allow water to run and discharge freely to atmosphere and remove air. Ensure that the outside of the fitting is free of drops or globules of water.

(c) Proceed as follows:

(i) *For draw-off taps*, close the tap (outlet free to discharge) and pressurize the tap at its inlet to the test pressure in Clause E.1(a)(i).

Test for 10 s to 25 s.

Open the tap and discharge freely to atmosphere to reduce the test pressure and remove air from all areas. With the tap open, plug and seal the free outlet. Pressurize the tap at its inlet to the test pressure in Clause E.1(a)(ii).

Test for 10 s to 25 s.

(ii) *For in-line taps and hose taps,* open the tap and close the outlet stop tap and pressurize the entire tap assembly to the test pressure.

Test for 10 s to 25 s.

With the pressure still maintained to the tap inlet, shut the tap and open the outlet stop tap.

Test for 10 s to 25 s.

NOTE The sequence application the pressure may be changed provided that an equivalent test occurs.

(d) While the pressures are being maintained, observe for leakage through the tap or record any record pressure less measured.

E.4.2 Pneumatic test

The procedure shall be as follows:

(a) Mount the tap in a test rig and connect inlets or outlets to the pressurizing system. The tap shall not contain any water.

(b) Proceed as follows:

(i) *For draw-off taps*, close the tap (outlet free to discharge) and pressurize the tap at its inlet to the test pressure in Clause E.1(b)(i).

Test for 5 s to 15 s.

Open the tap and discharge freely to atmosphere to reduce the test pressure. With the tap open, plug and seal the free outlet. Pressurize the tap at its inlet to the test pressure in Clause E.1(b)(ii).

Test for 5 s to 15 s.

(ii) *For in-line taps and hose taps,* open the tap and close the stop tap on the outlet and pressurize the tap to the test pressue in Clause E.1(b)(i).

Test for 5 s to 15 s.

With the pressure still maintained to the tap inlet, close the tap and open the flow-control valve.

Test for 5 s to 15 s.

(c) While the pressures are being maintained, observe for leakage through the tap or record any pressure loss measured.

E.5 Test report

The following shall be reported:

(a) Manufacturer, model, type and size of the tap.

(b) Test pressures applied to tap and the test method used.

(c) Any visible splits, cracks, permanent deformation, leakage or other failure of the tap.

(d) Statement of conformance or non-conformance to the test criteria.

(e) Reference to this test method, i.e. AS 3718 Appendix E.

Appendix F
(normative)

Determination of the nominal flow rate of taps and tap outlets for use with high pressure

F.1 General

This appendix sets out the method for determining the flow rates through taps and tap outlets for use with high pressure.

This test method shall be used as a basis for rating the water efficiency of taps and tap outlets in AS/NZS 6400.

Where a tap (tap and/or tap outlet, or mixer tap) is supplied with an aerator or outlet device, the nominal flow rate shall be measured with the tap and tap outlet in the fully open position providing maximum flow.

NOTE: AS/NZS 6400 forms a basis for the rating and labelling of a range of products under the mandatory Water Efficiency Labelling and Standards (WELS) scheme, as required by the Australian Water Efficiency Labelling and Standards Act 2005 (Cth) (the WELS Act).

F.2 Principle

The test sample to be tested is supported in a test rig and water is passed through the test sample at dynamic flow pressures of 150 kPa, 250 kPa, 350 kPa and 500 kPa. When the flow rate has stabilized it is recorded at each of these pressures.

F.3 Apparatus

The following apparatus is required:

(a) A water supply capable of delivering the required volumes at a temperature of 20 ± 5 °C and at a dynamic flow pressure of at least 500 kPa.

(b) Test apparatus made from Type B copper tube of diameter equal to the inlet size of the tap. The branch for flow pressure measurements shall be located at least 250 mm downstream of any valve or fitting. The tap outlet, mixer tap, or flow controller connection(s) shall be not more than 300 mm downstream of the flow pressure measurements.

(c) A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

(d) Flow meter having an accuracy of ± 2 % of the true value.

NOTE See Figure F.1 for a typical test arrangement.

Dimensions in millimetres

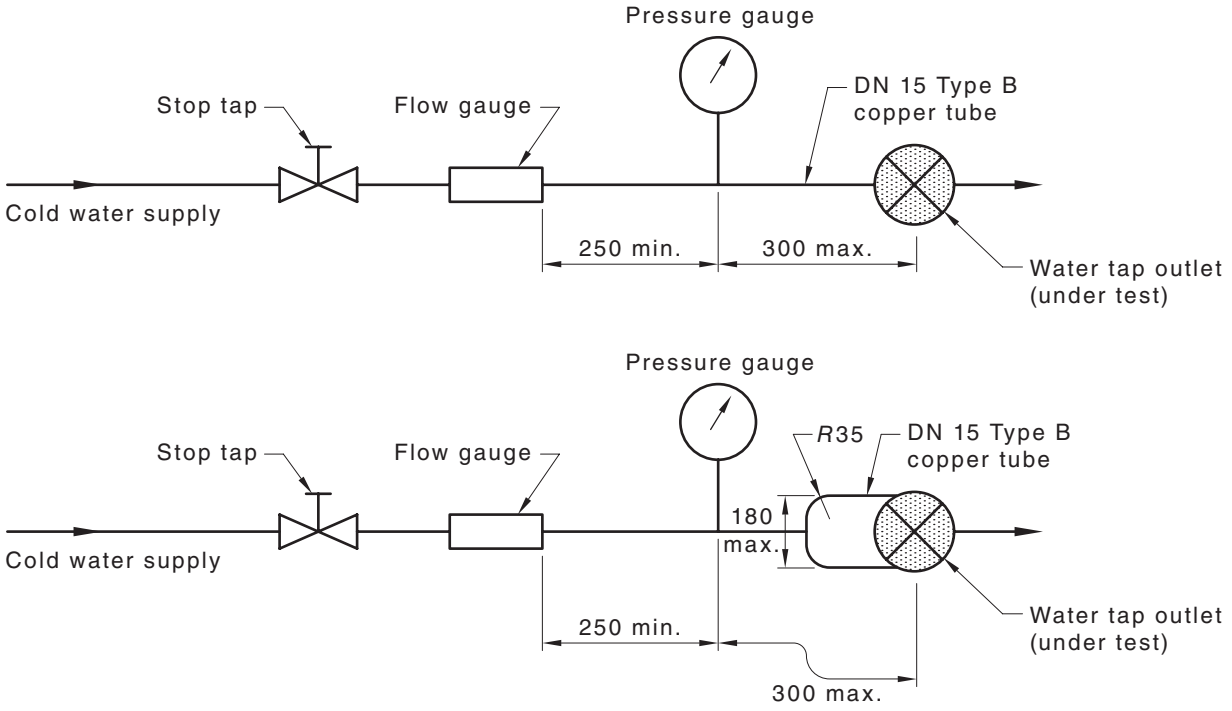


Figure F.1 — Typical test arrangement

F.4 Procedure

The procedure shall be as follows:

(a) Mount the test sample (tap and/or tap outlet, or mixer tap) in the test rig with the inlet(s) connected to the water supply in accordance with the product manufacturer's intended method of installation.

(b) The test sample operating mechanism or mechanisms or actuating valve(s) shall be adjusted to achieve the maximum flow at the outlet.

(c) Condition the test sample by allowing the water to flow through and then adjust the control valve gradually until the dynamic flow pressure of 500 kPa is achieved for at least 1 min.

(d) Gradually adjust the control valve to turn off the flow of water.

(e) Gradually adjust the control valve until the dynamic flow pressure of 150 +5, −0 kPa is achieved, allowing the flow and pressure to stabilize.

(f) Observe the flow meter and record the flow rate at that dynamic flow pressure.

(g) Repeat Steps (e) and (f) with the dynamic flow pressure increased to 250 +5, −0 kPa, 350 +5, −0 kPa and then to 500+5, −0 kPa.

(h) Gradually adjust the control valve to turn off the flow of water.

(i) Repeat Steps (e) to (g) to obtain a second reading of the flow rates at the range of pressures.

(j) Calculate and record the average flow rates at each of the following dynamic pressures:

  (i) 150 kPa.

  (ii) 250 kPa.

(iii) 350 kPa.

(iv) 500 kPa.

(k) Calculate the mean of the average flow rates obtained in Step (j)(i) to (j)(iii), and record this value as the nominal flow rate.

(l) From the averages obtained in Step (j)(i) to (j)(iii), record the highest and lowest average flow rates.

(m) Calculate and record the maximum differences between the highest and lowest average flow rates at Step (l).

NOTE AS/NZS 6400 specifies that the maximum difference between the highest and lowest average flow rates is not to exceed 2.0 L/min.

F.5 Test report

The following shall be reported:

(a) Manufacturer, brand name, model name and model number (if these are applicable) of the test sample (tap and/or tap outlet, or mixer tap).

(b) Flow rates (in litres per minute) through the test sample, at the dynamic flow pressures as determined at Clause F.4(j) of —

(i) 150 kPa;

(ii) 250 kPa;

(iii) 350 kPa; and

(iv) 500 kPa.

(c) Nominal flow rate as determined at Clause F.4(k).

(d) Difference between the highest and lowest average flow rates as determined at Clause F.4(m).

NOTE Although the tap is conditioned to 500 kPa, the recording the average flow rate at that pressure is for data collecting purposes only.

(e) Statement of conformance to Clause 4.6.2.1(b) for maximum average flow rate.

(f) Statement of conformance to Clause 4.6.2.1(c) for minimum average flow rate.

(g) Product nominated for use with high pressure as defined in this Standard.

(h) Recorded test water temperature.

(i) Reference to this test method, i.e. AS 3718 Appendix F.

Appendix G
(normative)

Torque test for fabricated joints

G.1 Scope

This appendix sets out the method for torque testing the joints of fabricated assemblies. It measures the strength of fabricated joints that require a torsional force to ensure a seal during installation.

G.2 Principle

The fabricated tap assembly is held by one side in a test rig and a predetermined torque is applied to the opposite joint. The tap assembly is then inspected for cracks and distortion in the fabricated joint.

G.3 Apparatus

The following apparatus is required:

(a) A fixing jig to hold the assembly firmly.

(b) A torque wrench of ± 5 % accuracy. Alternatively, a lever arm may be used with a known force applied at its end at 90 ± 5° to the radius between the point of application of the force to the lever and the centre of rotation. The lever arm method used shall be of at least the same accuracy as the torque wrench.

NOTE Torque (in newton metres) = force (in newtons) × radius (in metres).

G.4 Procedure

The procedure shall be as follows:

(a) Mount the assembly into a fixing jig that is designed to hold one side of the fabricated joint firmly.

(b) Apply the torque specified in Table G.1 to the other side of the fabricated joint.

(c) Maintain the torque for 10 s to 20 s.

(d) Remove the torque and repeat Steps (a), (b), and (c) on all other fabricated joints (if any).

(e) Then test for leakage in accordance with Appendix E.

(f) Remove the assembly from the jig and inspect nut components for cracking, breakage and thread damage.

Table G.1 — Torque loadings for fabricated tap bodies and assemblies

Inlet size of tap DN	Torque Nm	
6	40	+ 2, – 0
8	40	
10	40	
15	60	
20	85	
25		
32		
40	185	
50	215	

G.5 Test report

The following shall be reported:

(a) Manufacturer, model, type and size of the tap.

(b) Torque applied, then test for leakage in accordance with Appendix E.

(c) Any splitting, cracking, thread damage, leaks or other failure.

(d) Statement of conformance or non-conformance to the test criteria.

(e) Reference to this test method, i.e. AS 3718 Appendix G.

Appendix H
(normative)

Torque test for head-to-body connection

H.1 Scope

This appendix sets out the method for torque testing the head-to-body connection of a tap assembly. It measures the strength of the head-to-body connection. The connection may be a threaded connection or a connection by screws.

H.2 Principle

The tap body is held in a test rig. A predetermined torque is applied to the head assembly. The tap is then inspected for distortion or stripping of thread.

H.3 Apparatus

The following apparatus is required:

(a) A fixing jig to hold the tap body firmly.

(b) A mechanism to apply the torque to the head joint. This can be either —

(i) a torque wrench that is capable of applying the required torque and has an accuracy of ± 5 %; or

(ii) a lever arm to which a known force can be applied at a minimum radius of 300 mm.

The lever arm method used shall be of at least the same accuracy as the torque wrench.

NOTE Torque (in newton metres) = force (in newtons) × radius (in metres).

H.4 Procedure

The procedure shall be as follows:

(a) Mount the assembled tap into the fixing jig.

(b) Apply the torque to the head component in accordance with Table H.1.

(c) Maintain the torque for 10 s to 20 s.

(d) Remove the torque and repeat Steps (b) and (c) on all other threaded components (if any) forming part of the head-to-body connection.

(e) Dismantle the tap and inspect components for cracking, breakage, and thread damage.

Table H.1 — Head to body torque loading

Inlet size of tap DN	Torque Nm	
6	25	+ 1, – 0
8	25	
10	25	
15	25	
20	30	
25	40	
32	50	
40	70	
50	80	

H.5 Test report

The following shall be reported:

(a) Manufacturer, model, type and size of the tap.

(b) Torque applied.

(c) Any damage to internal components, stripping of mating threads or damage to wrenching flats or other failure.

(d) Statement of conformance or non-conformance to the test criteria.

(e) Reference to this test method, i.e. AS 3718 Appendix H.

Appendix I
(normative)

Torque test for operating mechanism of tap

I.1 Scope

This appendix sets out the method for torque testing the entire operating mechanism of a tap (temperature and/or flow). It measures the ability of the tap to withstand the operating torques and loads that can be expected to be encountered in service.

The test is not required for button-operated, sensor-operated and foot-operated taps.

I.2 Principle

The tap with its valve fully closed is held in a test rig. A predetermined torque is applied to the handle through all directions of operation. The tap is then inspected for cracking or damage.

I.3 Application

The test applies to taps that are operated with a rotary motion or have a mechanical mixing obturator, actuated through either a handle or lever. The rotary motion may be for part of a rotation or many rotations.

The test torques are dependent on the design of the tap and shall be as specified in Table I.1. The tests shall be carried out with the operating handle or lever attached.

If different styles of handles are available, the test shall also be conducted with each handle style.

I.4 Apparatus

The following apparatus is required:

(a) A fixing jig to hold the tap firmly.

(b) A mechanism to apply the torque to the operating mechanism in all directions of operation. This may be either —

  (i) a torque wrench that is capable of applying the required torque with an accuracy of ± 5 %; or

  (ii) a lever arm to which a known force can be applied about the axis of rotation of the tap operating mechanism. The force shall be applied pependicular to the lever arm at a minimum radius of 300mm on a plane perpendicular to operating mechanism axis of roatation. The lever arm method used shall be of at least the same accuracy as the torque wrench.

(c) A mechanism to apply force “F” within 10mm of the outer extremities of the handle. The force shall be applied by a weight or device within ± 5 % of the true value tangentially about the axis of rotation of the tap operating mechanism, and on a plane perpendicular to the operating mechanism axis of roatation. Connection to the handle may be by means of a suitable clamp or claws that straddle the handle

or lever. Material may be removed or added to the outer extremity of the handle to allow the application of force.

NOTE 1 This clause is only applicable to DN6–15 non-screwdown pattern taps with handles extremities < 63mm radius. Larger handles will result in torques exceeding Table I.1.

NOTE 2 Torque (in newton metres) = force (in newtons) × radius (in metres).

I.5 Procedure

The procedure shall be as follows:

(a) Mount the assembled tap into the fixing jig with the tap in the fully closed position.

(b) Apply torque "T" or force "F" (see Clause I.4) as specified in Table I.1 in the direction required to close the tap. Maintain for 30 +20, −0 s.

(c) Repeat Step (b) with the tap in the fully open position and the torque applied in the direction required to open the tap.

(d) For mixing taps mechanical (non-thermostatic), this test shall be repeated by applying a torque to the handle at the end of movement in the hot and cold and off and on stop positions.

(e) Remove from the jig, dismantle the tap and inspect all components for cracking, bending, breaking, thread stripping and damage.

(f) Remove the handle and inspect all components for cracking, breaking and damage.

Table I.1 — Rotational loadings for the operating mechanism of taps

DN	T Nm			F N
	Screw-down pattern taps including alternate head assemblies	Other taps (e.g. mixer taps)		Other taps (e.g. mixer taps)
6	12	8	+ 1, − 0	± 7
8	12	8		± 7
10	12	8		± 7
15	12	8		± 7
20	15	10		N/A
25	20	14		
32	25	17		
40	35	23		
50	40	26		

I.6 Test report

The following shall be reported:

(a) Manufacturer, model, type and size of the tap.

(b) Handle type and style.

(c) Torque applied.

(d) Any cracking, bending, or other failure.

(e) Statement of conformance or non-conformance to the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix I.

Appendix J
(normative)

Endurance test for single and combined taps and components

J.1 Scope

This appendix sets out the method by which single and combined taps and components are tested for mechanical endurance. The test measures the ability of taps and valves to operate satisfactorily with normal opening and closing operations on hot and cold applications during the expected life of the tap.

Where an outlet is not of unit construction with the tap, it need not be tested under this Appendix.

J.2 Principle

The tap is held in a test rig and connected to a temperature-controlled hot and cold water supply at a given pressure. A cyclic mechanism to fully open and close the tap at a predetermined torque within a given time period is connected to the tap operating mechanism. A device to monitor the system for inconsistencies and breakdown is integrated into the test rig. The tap or jumper valves are inspected for adjustment, wear or replacement during the test.

J.3 Application

To simulate temperature changes that occur in actual operation, the tap is also subjected to alternate supplies of hot and cold water every 55 ± 5 cycles.

Combined taps shall have the supplies so arranged that during testing both hot and cold water inlets of the combined tap under test have hot water and cold water supplied to them alternately for 55 ± 5 cycles.

J.4 Apparatus

J.4.1 Test rig

A test rig shall be used that is fitted with a counter to count complete cycles, and capable of the following performance:

(a) Operating the tap through its complete operating sequence and limits of open, temperature selection and closing movements.

(b) Fully opening and closing the tap over the full extent of the tap's operating limits.

(c) Where an operating torque is required to operate the tap, apply a 2.5 ± 0.5 Nm torque to the operating mechanism in the closing direction. The torque loading shall be applied and set with the activating mechanism of the rig in a stationary position at the fully closed position. The force to be applied shall be within 50 mm from outer end of the handle.

(d) Rotating the spindle or handle at a speed that allows both of the following closing and opening times:

  (i) Screw-down pattern taps — 0.5 +5, −0 s.

  (ii) Other taps — 0.5 +1, −0 s.

The applied torque and the speed of operation shall be physically checked. The method used shall have an accuracy of ± 10 % for both the torque and the speed of operation.

For single and combined taps incorporating operating mechanisms of other types, the test rig shall simulate the normal operation.

J.4.2 Water supply system

The heated water test temperature shall be —

(a) 80 ± 3 °C for taps for the hot water supply system;

(b) 40 ± 3 °C for taps designed for use in cold water services only; or

(c) the maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40 °C.

The cold water test temperature shall be 20 ± 5°.

The water temperature shall be measured within the range 0 mm to 100 mm upstream of the tap's inlet connection. For the purpose of this measurement, the hot water temperature shall be the temperature of the water when the flow finishes during the third cycle.

The system shall be capable of supplying water to the tap at a static pressure of 500 ± 20 kPa and at a pressure during flow conditions sufficient to give a flow rate not less than the nominal flow rating of the tap or 30 L/min, whichever is the lesser.

J.4.3 Measurement of pressure

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

J.4.4 Timing and control equipment

Timing and control equipment shall be used to achieve the following complete cycle:

(a) Tap opens.

(b) Tap remains open for a period of 1 +5, −0 s.

(c) Tap fully closes.

(d) Tap remains fully closed for 2 +5, −0 s.

During each cycle, the tap shall be supplied with water from either the hot supply or the cold supply. After every 55 ± 5 cycles, the supply shall be switched from being cold to hot and vice versa.

J.4.5 Temperature of measurement

All measurements shall be taken at ambient temperature.

J.5 Procedure

The procedure shall be as follows:

(a) Connect the tap assembly to the test rig.

(b) Adjust the supply pressures with each water supply and check that the flow rates in the open position are not less than the specified nominal flow rates for the tap under test. Check that the supply water temperatures are as specified.

(c) Commence the opening and closing operations of the taps, and set so that the tap mechanism opens to at least 90 % of fully open and that the torque and opening and closing times are in accordance with Clause J.4.1.

(d) Reset the cycle counter to zero.

(e) Commence the cycles with water supplied from either the cold source or the hot source, but not both simultaneously.

(f) Continue cycles and change the water supply after every 55 ± 5 cycles. Check that the prescribed limits are being met throughout the test and also that the tap shuts off water when closed. Record the results and the number of cycles at which these checks occur. The washer shall be replaced on screw-down pattern taps immediately when the tap is found not to shut off water. A tap washer may only be replaced once during an endurance test. A second failure will invalidate the test. For other taps, stop the test as the tap fails.

NOTE 1 The rig may be turned off to perform this test.

NOTE 2 Table K.1 specified allowable maintenance for screw-down pattern taps only.

(g) Except for isolating and drain taps, after each 25 000 +10 000, −5 000 cycles, stop the cycling test and perform the hot water shut-off test as follows:

(i) Set the rig to supply hot water only.

(ii) Open the tap for 5 +1, −0 min.

(iii) Close the tap with a 2.5 ± 0.5Nm torque. Disengage or neutralize the spindle operating mechanism within the next 1 min.

(iv) Check that the supply pressure is 500 +20, −0 kPa.

(v) Leave the tap to cool in the specified ambient conditions for 30 +5, −0 min.

(vi) On the completion of the cooling down period, observe the tap, tap washer or sealing device closely for leakage for a further 5 +2, −0 min.

(h) On the completion of the hot water shut-off test, recommence the cycling test from Step (f).

(i) At the completion of the prescribed number of cycles (see Table 4.1), check the equipment meets the parameters and limits of this test.

(j) Remove the tap assembly and carry out the watertightness test of Appendix E.

No repairs or part replacements shall be carried out before the final watertightness test and hot water shut-off test other than as listed in Table J.1.

Table J.1 — Allowable maintenance — Single and combination taps incorporating jumper valves only

Allowable maintenance for screw-down pattern taps only	
Replace the washer of a screw-down pattern tap immediately if tap is found not to shut off water A rising spindle thread and o-ring may also be lubricated at this time[b]	Once[a]
Replace the washer of a screw-down pattern tap[c]	Prior to final watertightness and hot water shut test
Adjust gland packings if necessary[d]	Prior to final watertightness and hot water shut test

[a] A second washer failure shall invalidate the test.

[b] Replacement parts and lubrication shall be according to the manufacturer's specifications.

Table J.1 *(continued)*

Allowable maintenance for screw-down pattern taps only	
c	The washer may be replaced provided that no washers have been replaced during the cycling test.
d	The gland may be adjusted provided that no adjustments have occurred during the cycling test.

J.6 Test report

The following shall be reported:

(a) Manufacturer, model, size, and type of the tap.

(b) Number of cycles completed.

(c) Result of the hot water shut-off test and result of retesting for watertightness in accordance with Appendix E.

(d) The nature of tap adjustment and replacements, and when they occurred during the test.

(e) Equipment adjustments and problems experienced during the test.

(f) Statement of conformance or non-conformance to the test criteria.

(g) Reference to this test method, i.e. AS 3718 Appendix J.

Appendix K
(normative)

Strength test for connector nuts and assembly

K.1 Scope

This appendix sets out the method for torque testing connector nuts on assemblies. It measures the strength of the nut and assembly.

K.2 Principle

The assembly is held on one side in a test rig and a predetermined torque is applied to the nut and assembly. The nut and assembly is then inspected for cracks or other failure.

K.3 Apparatus

The following apparatus is required:

(a) A hot water supply capable of producing a constant supply of hot water, at the test temperature, for the duration of the test.

(b) A fixing jig to hold one side of the assembly firmly at the opposing connection end.

(c) A torque wrench with accuracy within ± 5 %. Alternatively, a lever arm may be used with a known force applied at its end at 90 ± 5° to the radius between the centre of rotation and the centre point of application of the force. The lever arm method used shall be of at least the same accuracy as that for the torque wrench.

K.4 Procedure

During testing, the threaded section of the component under test shall not be supported in any way as to influence the results of the test. The torque loading shall be applied to the nut in the same manner as normally applied in field conditions.

The heated water test temperature shall be as follows:

(a) 80 ± 2°C for taps for the hot water supply system.

(b) 40 ± 2°C for taps designed for use in cold water services only.

(c) The maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40 C°.

The procedure shall be as follows:

(i) Mount the assembly into a fixing jig that is designed to hold one side of the assembly firmly.

(ii) With the water supply connected to the nut assembly under test and with the nut to be tested hand tightened, turn on the hot water supply. When the temperature has been stabilized to the test temperature and maintained for a minimum period of 60 s, apply within 5 s, the torque specified in Table K.1 and maintain the applied force for a period of 10 s to 20 s.

(iii) Remove the torque and repeat Steps (a), (b) and (c) on the other nuts (if any).

(iv) Remove the assembly from the jig and inspect all components for cracking, breakage or thread damage.

Table K.1 — Torque loadings for nuts and assemblies

Inlet size	Torque	
DN	Nm	
6	12	+ 1, – 0
8	12	
10	16	
15	30	
18	40	
20	40	
25	60	+ 2, – 0
n	80	
40	100	
50		

K.5 Test report

The following shall be reported:

(a) Model, manufacturer, type, and size of the assembly.

(b) Torque applied.

(c) Any splitting, cracking, distortion or thread damage or other failures.

(d) Statement of conformance or non-conformance to the test criteria.

(e) Reference to this test method, i.e. AS 3718 Appendix K.

Appendix L
(normative)

Load test for button-operated and foot-operated taps

L.1 Scope

This appendix sets out the method of load testing the operating mechanism of button-operated and foot-operated taps. The method is applicable to the following range:

(a) Button-operated taps — 250 N.

(b) Foot-operated taps — 1 200 N.

NOTE This test does not apply to digitally (electronically) controlled taps and mixers.

L.2 Principle

The footpad, kneepad or button-operated tap is held in a rig with a mechanism to apply a predetermined force over a given time. The tap is then inspected for breakage, bending or other damage.

L.3 Apparatus

A mechanism is required to apply the force to the button-operated or foot-operated mechanism. The force shall be achieved by a weight or device within ± 2 % of the true value.

For button-operated taps and knee pads, a force of 250 ± 5 N shall be applied to the button. The force shall be spread evenly over the button and applied in line with the direction of travel. The force may be applied with a contour arrangement.

For foot-operated taps, a force of 1200 ± 20 N shall be applied to the foot-operating mechanism. The force shall be applied in the direction of the lever. The force may be applied with a contour arrangement.

L.4 Procedure

The procedure shall be as follows:

(a) Set up the loading arrangement to allow the force to be applied in accordance with the tap type.

(b) Apply the force and maintain for 30 +20, −0 s.

(c) Remove the force.

(d) Dismantle the tap assembly and inspect all components for cracking, breakage, bending, and damage.

L.5 Test report

The following shall be reported:

(a) Manufacturer, model, type and size of the tap.

(b) Force applied.

(c) Any cracks, breakages, bending, or other failure.

(d) Statement of conformance or non-conformance to the test criteria.

(e) Reference to this test method, i.e. AS 3718 Appendix L.

Appendix M
(normative)

Dimensions of taps

M.1 Scope

This appendix specifies a range of requirements for the dimensions of taps where compatibility and connectability is required. It provides prescriptive information that may be used for the design of tap ware.

NOTE Typical cross-sections bib tap assemblies are shown in Figure M.1.

Where conformance to the performance requirements of this Standard have been established, design alteration is permitted without further testing provided the design remains within the dimensions of this appendix.

Where the design conforms to all applicable dimensions in this appendix, then the performance testing set out in Appendix J is not required to establish conformance.

M.2 Dimensions

Tap bodies and component parts of taps shall conform to the appropriate dimensions shown in Figure 3.1 and Figures M.3 to M.11. For the purpose of this appendix, nominal size of taps refers to the nominal bore of the tap.

M.3 Valve seating

M.3.1 General

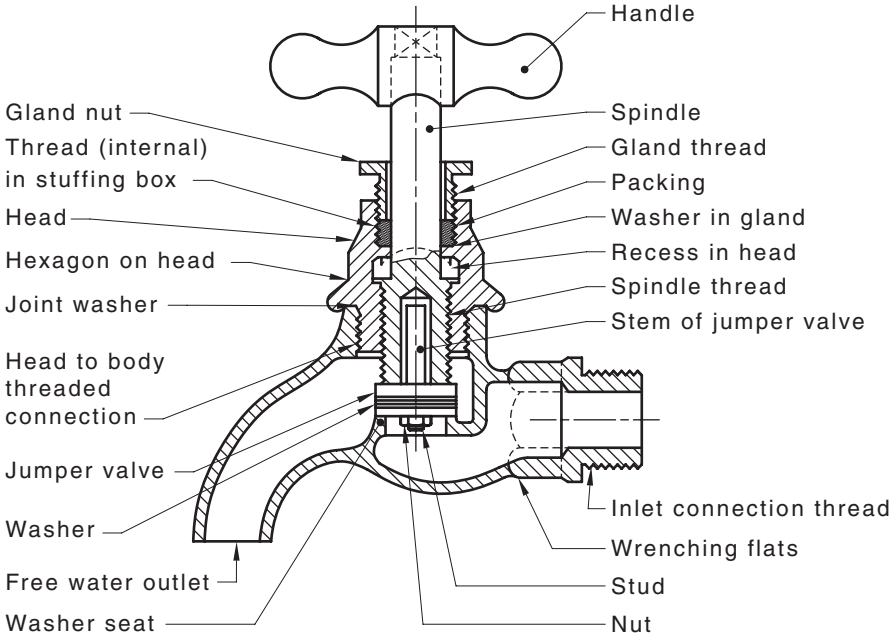
The valve seat shall either be integral with the tap body or a removable seat, see Figures M.2 and M.3. Inlet and outlet connections shall conform to Clause 3.2.

M.3.2 Dimensions

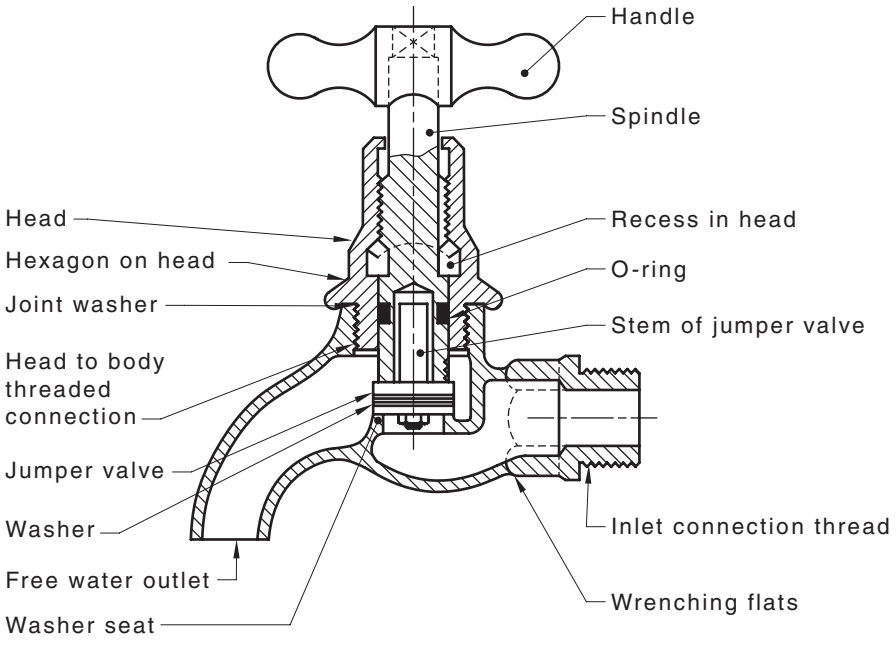
The valve seat shall conform to the dimensions shown in Figure M.4.

M.4 Handles

Handles for T-head taps shall have minimum dimensions as shown in Figure M.8.

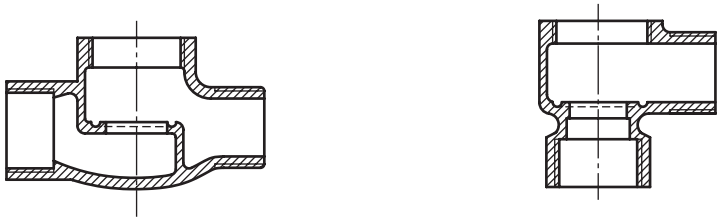


(a) Packed gland type head assembly



(b) O-ring type head assembly

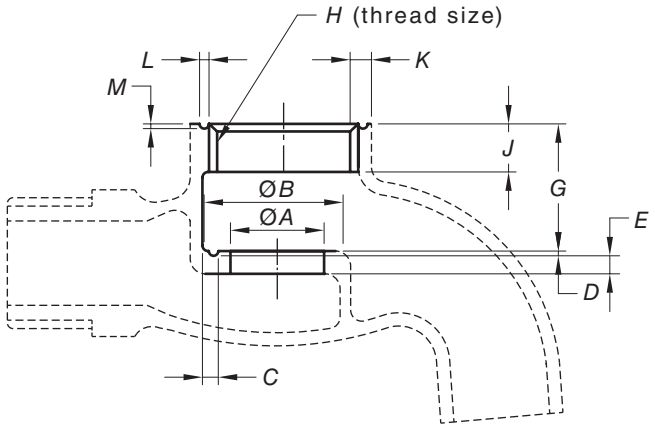
Figure M.1 — Typical cross-sections of bib tap assemblies



(a) In-line stop tap (b) Right-angle stop tap

NOTE For details for valve seating and head attachment, see Figure M.3.

Figure M.2 — Bodies of stop taps



Nominal size of tap	*A* mm		*B*[a] mm		*C* mm	*D* mm	*E* mm	*G*[b] mm		*H*[c] (thread size designation) inches	*J* mm	*K*[d] mm	*L*[e] mm	*M* mm
	Min.	Max.	Min.	Max.	Min.	Min.	Min.	Min.	Max.	—	Min.	Min.	Min.	Min.
DN 10	9.02	9.53	14.20	15.0	1.8	0.7	1.9	19.96	20.20	3/4 20 UNEF 2B[f]	6.3	3.7	0.8	0.4
DN 12	12.19	12.70	19.0	19.80	1.8	0.7	1.9	23.01	23.40	5/8	7.9	4.0	0.8	0.4
DN 15	15.37	15.88	22.20	23.0	2.0	0.7	1.9	23.01	23.40	3/4	7.9	4.0	0.8	0.4
DN 20	18.54	19.05	25.40	26.20	2.2	0.7	1.9	26.19	26.60	7/8	9.5	4.0	0.8	0.4
DN 25	24.89	25.40	31.70	32.50	4.5	1.5	2.3	32.54	32.90	11/4	12.7	4.1	0.8	0.4
DN 32	31.24	31.75	38.10	38.90	4.5	1.5	2.3	41.28	41.70	11/2	12.7	1.4	0.8	0.4
DN 40	37.59	38.10	44.40	45.20	4.5	1.5	2.9	46.81	47.20	13/4	12.7	4.7	0.8	0.4
DN 50	5.29	50.80	57.10	57.90	4.5	1.5	2.9	58.75	59.10	21/4	14.2	4.7	0.8	0.4

[a] The seat of the tap shall be a full annular ring with an outer recess groove that may break through to a clear waterway on the delivery side of the tap body.

[b] The maximum dimension shall apply only to stop taps and ferrule taps.

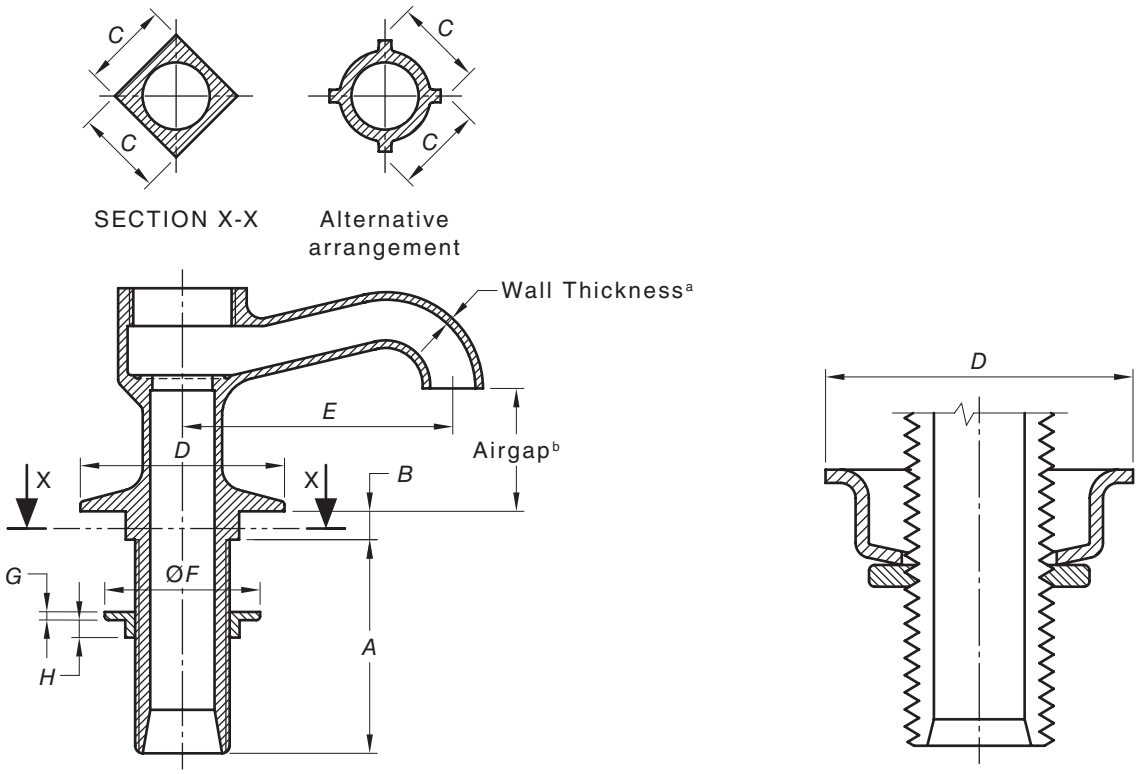
[c] Fastening pipe thread shall conform to AS 1722.2 Series G.

[d] For 10 mm to 20 mm taps, these values include provision for an external thread not coarser than 1.33 mm pitch (i.e. 19 t.p.i.) for attachment of an “easy-clean” cover. Where no external thread is required, this dimension may be reduced by 1.0 mm.

[e] The gasket groove has an opening at the sealing face conforming to dimension *L* and a depth conforming to dimension *M*. The groove shall be triangular, square, or rounded at the bottom.

[f] For 10 mm taps, the thread shall conform to AS 3635.

Figure M.3 — Valve seat and head attachment



(a) Union inlet

(b) Cup washer and nut

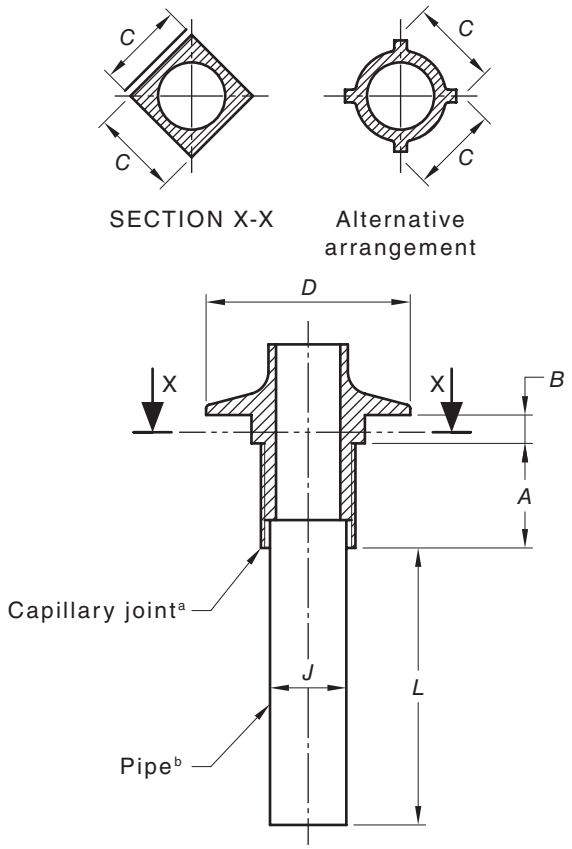
Nominal size of tap	*A* mm	*B* mm	*C* (across flats) mm		*D* mm	*E* mm	*F* mm	*G* mm	*H* mm
	Min.	Min.	Min.	Max.	Min.	Min.	Min.	Min.	Min.
DN 10	63	4	27.0	28.6	45	66	42	2.3	7.9
DN 12	63	4	27.0	28.6	45	66	42	2.3	7.9
DN 20	63	4	27.0	29.6	45	66	42	2.3	7.9

This figure shall be viewed in conjunction with Figure M.3.

[a] The minimum wall thickness shall be in accordance with Table 3.2.

[b] When installed, outlets shall have no drip back along outer surfaces at any flow rate. They shall conform to the air gap requirements specified in AS/NZS 3500.1.

Figure M.4(a) — Bodies of pillar taps



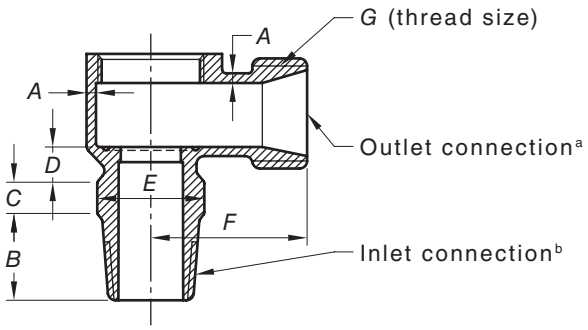
Nominal size of tap	*A* mm	*B* mm	*C* (across flats) mm		*D* mm	*J*[c] mm	*L* mm
	Min.	Min.	Min.	Max.	Min.		
DN 10	25	4	27.0	28.6	45	10	300
DN 12	25	4	27.0	28.6	45	15	300
DN 20	25	4	27.0	28.6	45	20	300

[a] Capillary joints shall be in accordance with AS 3688.

[b] Annealed copper pipes shall be in accordance with Clause 2.2.3.

[c] Nominal size of pipe.

Figure M.4(b) — Bodies of pillar taps



Nominal size of tap	Nominal size of union end	*A* mm	*B* mm	*C* mm	*D* mm	*E* (across flats hexagon or square) mm	*F* mm	*G*[c] (thread size designation) inches
		Min.	Min.	Min.	Min.	Min.	Min.	—
DN 12	DN 20	1.9	23	5	8	22	39	3/4
DN 20	DN 25	1.9	24	6	14	27	44	1
DN 25	DN 32	2.3	24	6	22	34	50	11/4
DN 32	DN 40	2.3	27	8	22	43	55	13/4
DN 40	DN 50	2.9	30	9	25	49	60	2
DN 50	DN 65	2.9	35	9	25	60	59	21/2

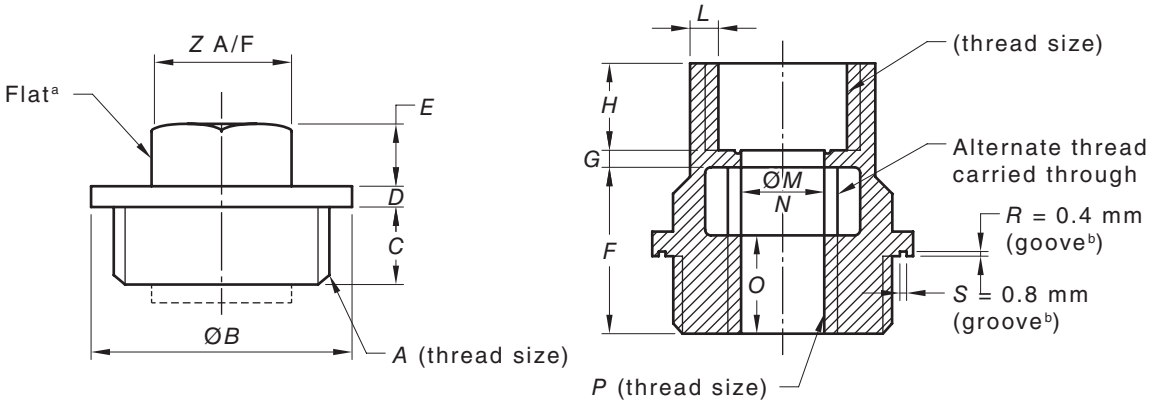
This figure shall be viewed in conjunction with Figure M.3.

[a] The outlet connection end shall conform to AS 3688.

[b] The inlet connection thread shall be the same size as the nominal size the tap and AS ISO 7.1 Series R.

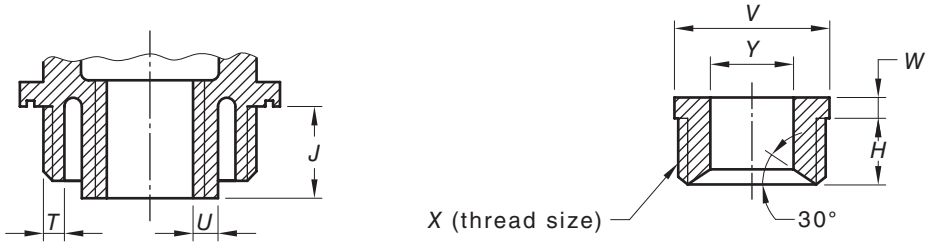
[c] Fastening pipe thread shall conform to AS 1722.2 Series GB.

Figure M.5 — Bodies of ferrule taps



(a) Front view

(d) Section through head



(b) Alternative section through bottom of head

(c) Section through gland

Figure M.6 — (in part) Tap heads — Packed gland type

Nominal size of tap	*A*[c] (thread size) inches	*B*[d] mm	*C*[e] mm		*D* mm	*E* mm	*F* mm	*G* mm	*H* mm	*J*[e] mm		*K*[f] (thread size) inches	*L* mm	*M* mm		*N* mm	*O* mm	*P*[g] (thread size) BSW inches	*T* mm	*U* mm	*V*[h] (across flats) mm	*W* mm	*X*[i] (thread sizes) inches	*Y* mm		*Z*[h] (across flats) mm
	—	Min.	Min.	Max.	Min.	Min.	Min.	Min.	Min.	Min.	Max.	—	Min.	Min.	Max.	Min.	Min.	—	Min.	Min.	Min.	Min.	—	Min.	Max.	—
DN 10	3/420 UNEF 2A[j]	27.4	7.9	8.7	1.9	6	16.6	2.3	9.5	—	—	RP 3/8[k]	3.0	9.14	9.27	13.4	11.3	1/2	—	—	15.8	3.1	RP 3/8[k]	9.4	9.7	17.9
DN 12	5/8	29.2	9.5	10.3	1.9	6	19.5	2.3	12.7	—	—	3/8	3.0	9.65	9.78	15.0	11.3	9/16	—	—	17.4	3.1	3/8	10.0	10.3	19.5
DN 15	3/4	32.2	9.5	10.3	1.9	6	19.5	2.3	12.7	—	—	3/8	3.0	9.65	9.78	15.0	11.3	9/16	—	—	17.4	3.1	3/8	10.0	10.3	19.5
DN 20	7/8	36.5	11.1	11.9	1.9	9	21.1	2.3	13.4	—	—	1/2	3.4	11.25	11.38	16.6	12.1	5/8	—	—	22.2	3.1	1/2	11.6	11.8	21.1
DN 25	$1^{1/4}$	47.8	14.2	15.1	2.3	9	27.5	3.1	15.8	—	—	5/8	3.4	12.83	12.95	19.8	15.3	3/4	—	—	25.4	3.9	5/8	13.2	13.5	24.3
DN 32	$1^{1/2}$	53.8	14.2	15.1	2.3	12	33.0	3.1	15.8	14.2	15.1	5/8	3.4	14.43	14.55	19.8	16.1	3/4	4.4	3.7	25.4	3.9	5/8	14.8	15.0	24.3
DN 40	$1^{3/4}$	60.9	14.2	15.1	2.9	12	35.4	3.1	17.4	17.4	18.2	5/8	3.4	14.43	14.55	19.8	16.9	3/4	4.4	3.7	25.4	4.7	5/8	14.8	15.0	25.5
DN 25	$2^{1/4}$	72.9	15.8	16.6	2.9	12	44.9	3.1	19.0	24.5	25.4	3/4	3.4	15.24	15.37	19.8	22.4	3/4	4.4	3.7	30.1	4.7	3/4	15.6	15.9	25.5

[a] A minimum of four wrenching flats shall be provided.

[b] The groove shall be triangular, square or rounded at the bottom.

[c] Fastening pipe thread shall conform to AS 1722.2 Series GA

[d] For 10 mm to 20 mm taps, this dimension includes provision for a thread not coarser than 1.33 mm pitch (i.e. 19 t.p.i.) for attachment of a cover. Where no external thread is required, this dimension may be reduced by 2 mm.

[e] The maximum dimension shall apply only to stop taps and ferrule taps.

[f] Fastening pipe thread shall conform to AS 1722.2 Series G

[g] Coarse thread shall conform to AS 3501 Medium Class

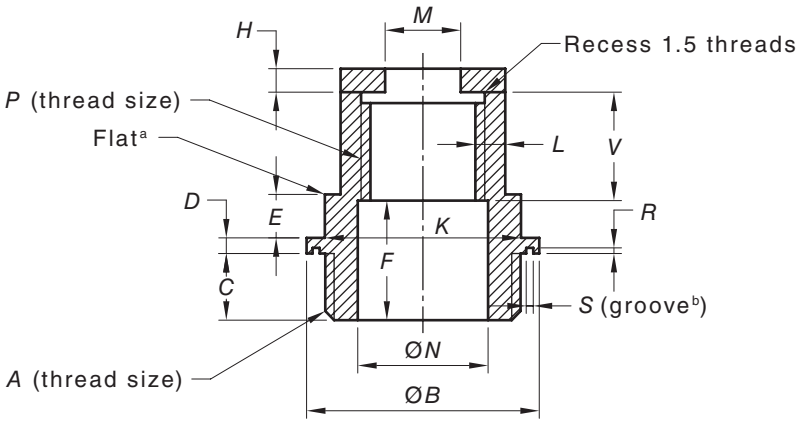
[h] For 12 mm, 15 mm and 20 mm taps, the flange on the gland may be a knurled circle of a diameter not less than the dimensions shown for V.

[i] Fastening pipe thread shall conform to AS 1722.2 Series GB

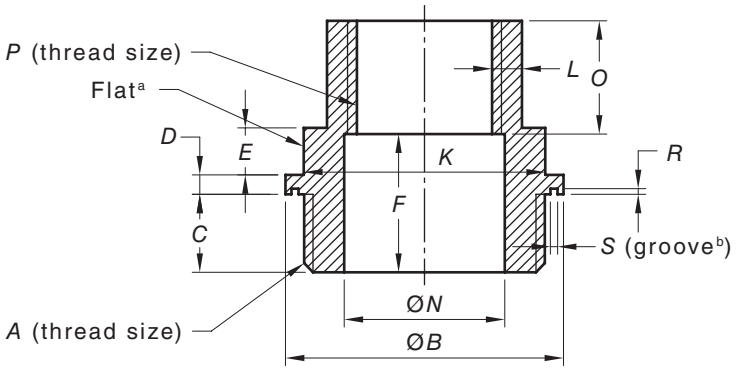
[j] For 10 mm taps, the thread shall conform to AS 3635.

[k] For 10 mm taps, the thread shall conform to AS ISO 7.1.

Figure M.6 — (in part) Tap heads — Packed gland

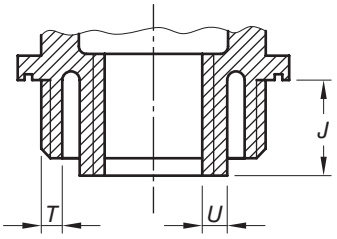


(a)(i) Without cover



(a)(ii) Without cover[c]

Section through head



(b) Alternative section through bottom of head

Figure M.7 — (in part) Tap heads — O-ring type

Nominal size of tap	*A*[d] (thread size) inches	*B*[e] mm	*C*[f] mm		*D* mm	*E* mm	*F* mm	*H* mm	*J*[f] mm		*K* (across flats) mm	*L*[b] mm	M[g] mm		*N* mm	*O* mm		*P*[h] (thread size) BSW inches	*R*[b] mm	*S*[b] mm	*T* mm	*U* mm	*V*[g] (across flats) mm
	—	Min.	Min.	Max.	Min.	Min.	Min.	Min.	Min	Max.	—	Min.	Min.	Max.	Min.	Max.	Min.	—	Min.	Min.	Min.	Min.	—
DN 10	3/4 20 UNEF 2A[i]	27.4	7.9	8.7	1.9	6	16.7	2.3	—	—	17.9	3.0	9.14	9.27	13.16	13.26	9.5	1/2	0.4	0.8	—	—	14.5
DN 12	5/8	29.2	9.5	10.3	1.9	6	17.8	2.3	—	—	19.5	3.4	9.65	9.78	14.73	14.83	9.5	9/16	0.4	0.8	—	—	14.5
DN 15	3/4	32.2	9.5	10.3	1.9	6	17.8	2.3		—	19.5	3.4	9.65	9.78	14.73	14.83	9.5	9/16	0.4	0.8	—	—	14.5
DN 20	7/8	36.5	11.1	11.9	1.9	9	18.6	2.3	—	—	21.1	3.6	11.25	11.38	16.31	16.41	12.1	5/8	0.4	0.8	—	—	15.5
DN 25	$1^{1/4}$	47.9	14.2	15.1	2.3	9	21.7	2.3	—	—	24.3	3.7	12.83	12.95	19.51	19.61	15.3	3/4	0.4	0.8	—	—	19.1
DN 32	$1^{1/2}$	53.8	14.2	15.1	2.3	12	29.7	2.3	14.2	15.1	24.3	3.7	14.43	14.55	19.51	19.61	16.1	3/4	0.4	0.8	4.4	1.9	19.9
DN 40	$1^{3/4}$	60.9	14.2	15.1	2.9	12	32.1	2.3	17.4	18.2	25.5	3.7	14.43	14.55	19.51	19.61	16.9	3/4	0.4	0.8	4.4	1.9	20.7
DN 25	$2^{1/4}$	72.9	15.8	16.6	2.9	12	35.3	2.3	24.5	25.4	25.5	3.7	15.24	15.37	19.51	19.61	22.4	3/4	0.4	0.8	4.4	1.9	26.2

[a] A minimum of four wrenching flats shall be provided.

[b] The gasket groove has an opening at the sealing face conforming to dimension S and a depth conforming to dimension R. The groove shall be triangular, square, or rounded at the bottom.

[c] Where a cover or cover type handle is fitted, the head shown in Figure N7(a)(ii) may be used provided that the spindle cannot be screwed up to an extent that the valve stem can become disengaged from the spindle.

[d] Fastening pipe thread shall conform to AS 1722.2 Series GA.

[e] For 10 mm to 20 mm taps, this dimension includes provision for a thread not coarser than 1.33 mm pitch (i.e. 19 t.p.i) for attachment of a cover. Where no external thread is required, this dimension may be reduced by 2 mm.

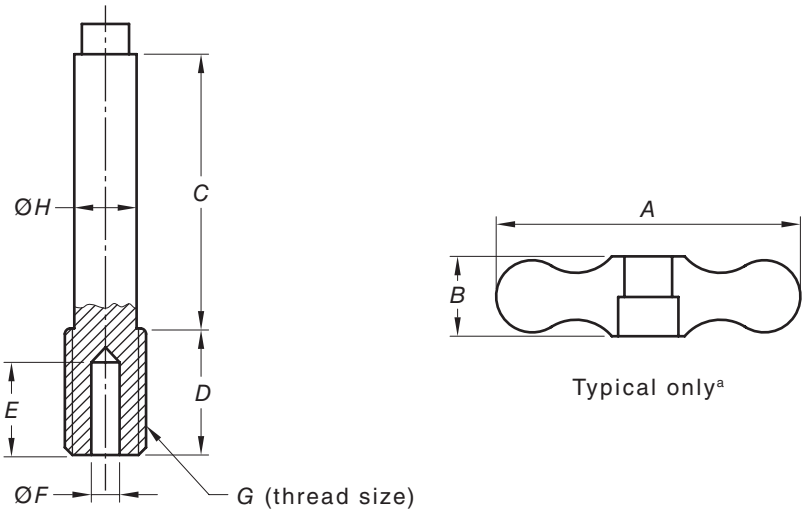
[f] The maximum dimension shall apply only to stop taps.

[g] Dimension M may be increased when the head is intended for use with a spindle of large diameter provided that the tolerances and clearances as specified in conjunct ith dimension E of Figure N.9 are maintained on both components.

[h] Coarse thread shall conform to AS 3501 Medium Class.

[i] For 10 mm taps, the thread shall conform to AS 3635.

Figure M.7 — (in part) Tap heads — O-ring type



Nominal size	*A* mm	*B* mm	*C*[b] mm	*D* mm	*E* mm	*F* mm		*G*[c] (thread size) BSW inches	*H* mm	
	Min.	Min.	Min.	Min.	Min.	Min.	Max.	—	Min.	Max.
DN 10	50.8	13.4	51.0	16.6	12.1	5.16	5.28	1/2	9.02	9.14
DN 12	50.8	14.2	52.0	19.0	15.8	5.16	5.28	9/16	9.40	9.53
DN 15	50.8	14.2	52.0	19.0	15.8	5.16	5.28	9/16	9.40	9.53
DN 20	55.5	14.2	55.0	21.4	18.2	6.35	6.48	5/8	11.00	11.13

Nominal size	*A* mm	*B* mm	*C*[b] mm	*D* mm	*E* mm	*F* mm		*G*[c] (thread size) BSW inches	*H* mm	
	Min.	Min.	Min.	Min.	Min.	Min.	Max.	—	Min.	Max.
DN 25	61.8	15.8	75.0	25.4	22.2	6.35	6.48	3/4	12.57	12.70
DN 32	69.8	19.1	75.0	35.3	29.3	7.92	8.05	3/4	14.17	14.30
DN 40	76.2	19.1	77.0	36.5	30.9	8.71	8.84	3/4	14.17	14.30
DN 50	92.0	22.2	82.0	46.0	40.4	8.71	8.84	3/4	14.99	15.11

[a] See Clause 3.10.

[b] Dimention *C* is applicable to spindles with fixed handles. If the handle is removable, the spindle may be shorter provided that all tap parts are interchangeable between units of the same size and type from any one manufacturer.

[c] Coarse thread shall conform to AS 3501 Medium Class.

Figure M.8 — Spindles and handles for taps with packed glands

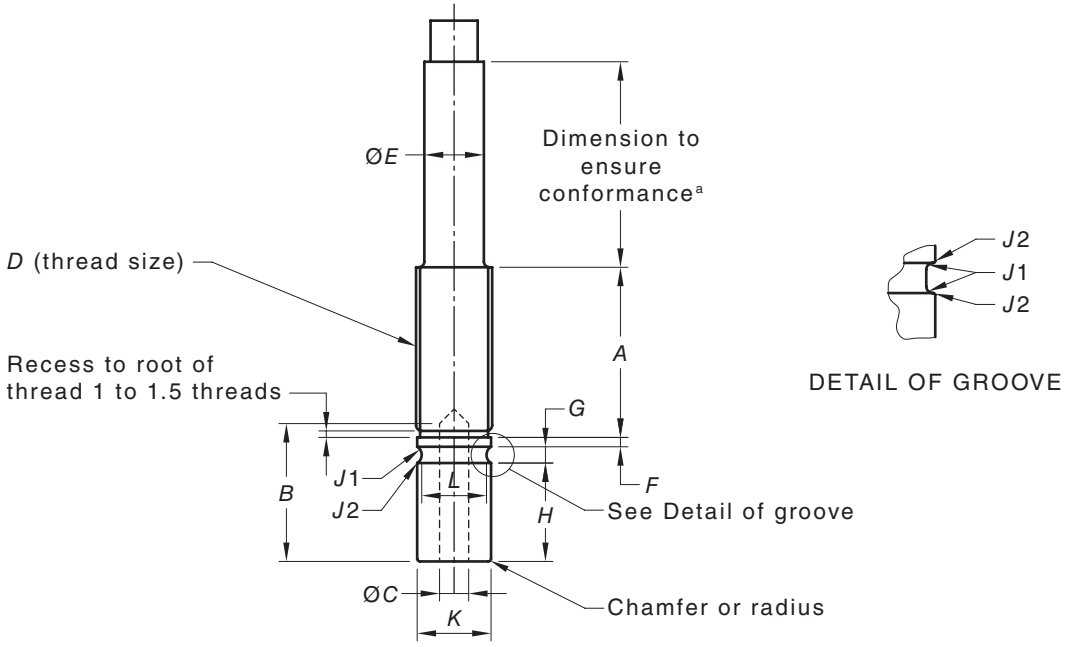


Figure M.9 — (in part) Spindles for taps with O-rings

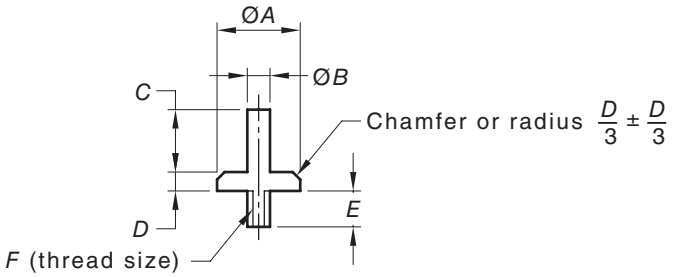
Nominal size of tap	*A* mm	*B* mm	*C* mm		*D*[b] (thread size) BSW inches	*E*[c] mm		*F* mm	*G* mm		*H* mm	*J*1 (radius at the bottom of groove) mm		*J*2 (radius at outside edge of groove) mm		*K* diameter mm		*L* diameter mm	
	Min.	Min.	Min.	Max.	—	Min.	Max.	Min.	Min.	Max.	Min.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
DN 10	16.6	12.1	5.16	5.28	1/2	9.02	9.14	2.3	2.92	3.30	11.0	0.25	0.60	0.12	0.25	13.01	13.08	9.20	9.30
DN 12	16.6	15.8	5.16	5.28	9/16	9.40	9.53	2.3	3.18	3.56	12.2	0.25	0.60	0.12	0.25	14.58	14.66	10.31	10.41
DN 15	16.6	15.8	5.16	5.28	9/16	9.40	9.53	2.3	3.18	3.56	12.2	0.25	0.60	0.12	0.25	14.58	14.66	10.31	10.41
DN 20	18.7	18.2	6.35	6.48	5/8	11.0	11.13	2.3	3.18	3.56	13.0	0.25	0.60	0.12	0.25	16.15	16.23	11.89	11.99
DN 25	21.9	22.2	6.35	6.48	3/4	12.57	12.70	2.3	3.18	3.56	16.2	0.25	0.60	0.12	0.25	19.35	19.43	15.09	15.19
DN 32	29.8	29.3	7.92	8.05	3/4	14.17	14.30	2.3	3.18	3.56	24.2	0.25	0.60	0.12	0.25	19.35	19.43	15.09	15.19
DN 40	32.2	30.9	8.71	8.84	3/4	14.17	14.30	2.3	3.18	3.56	26.5	0.25	0.60	0.12	0.25	19.35	19.43	15.09	15.19
DN 50	35.1	40.4	8.71	8.84	3/4	14.99	15.11	2.3	3.18	3.56	29.7	0.25	0.60	0.12	0.25	19.35	19.43	15.09	15.19

[a] Dimension shall be in accordance with Clauses 3.4.2.1.

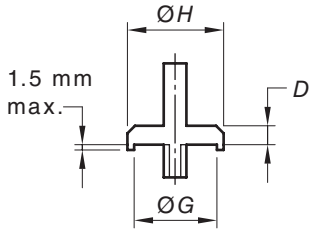
[b] Coarse thread shall conform to AS 3501, Medium Class.

[c] Dimension E may be increased where the spindle is intended for use with a head of larger diameter provided that the tolerances and clearances as specified in conjunction with dimension M given in Figure M.7 are maintained.

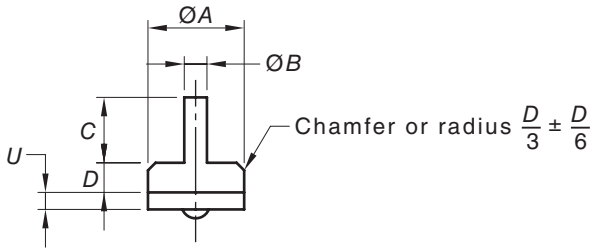
Figure M.9 — (in part) Spindles for taps with O-rings



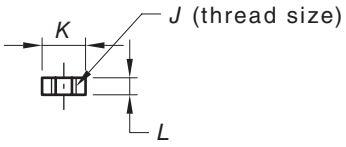
(a) Plain type valve



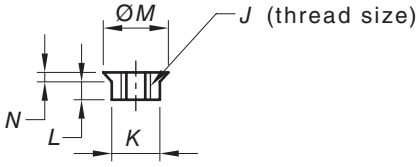
(b) Shrouded type valve



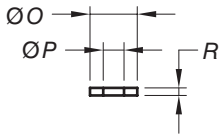
(c) Valve with metal or plastic body



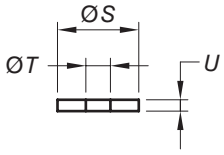
(d) Nut



(e) Alternative nut



(f) Metal washer between valve washer and nut



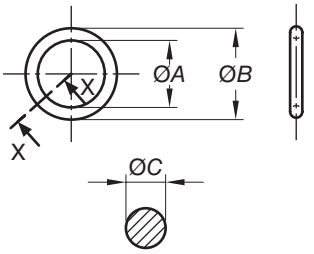
(g) Tap washer

Figure M.10 — (in part) Dimensions of jumper valves and tap washers

Nominal size of tap	*A* mm		*B* mm		*C* mm		*D* mm		*E* mm	*F*[a] (threa ize) BSW inches	*G* mm		*H* mm		*J*[a] (threa ize) BSW inches	*K* (across flats) mm	*L* mm	*M* mm	*N* mm	*O* mm	*P* mm		*R* mm	*S* mm		*T* mm	*U* mm	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	—	Min.	Max.	Min.	Max.	—	Min.	Min.	Min.	Min.	Min.	Min.	Max.	Min.	Min.	Max.	Min.	Min.	Max.
DN 10	14.0	14.2	4.80	4.93	10.5	11.3	3.5	3.8	7.9	3/16	14.38	14.50	16.0	16.5	3/16	7.9	2.5	—	—	8.4	4.8	5.1	0.5	14.0	14.5	4.7	3.1	3.4
DN 12	18.8	19.3	4.80	4.93	14.3	15.0	3.9	4.2	7.9	3/16	19.18	19.30	20.0	20.3	3/16	7.9	2.5	—	—	8.4	4.8	5.1	0.5	18.8	19.3	4.7	3.1	3.4
DN 15	21.9	22.4	4.80	4.93	14.3	15.0	3.9	4.2	7.9	3/16	22.61	22.73	23.5	23.7	3/16	7.9	2.5	—	—	8.4	4.8	5.1	0.5	22.2	22.7	4.7	3.1	3.4
DN 20	25.1	25.6	5.94	6.07	16.6	17.4	4.7	5.0	9.5	1/4	25.53	25.65	26.4	26.6	1/4	9.5	2.8	—	—	10.0	6.4	6.7	0.5	25.1	25.6	6.3	3.1	3.4
DN 25	33.0	33.5	5.94	6.07	20.7	21.4	4.7	5.0	9.5	1/4	33.45	33.58	34.6	34.9	1/4	11.1	2.8	15.8	1.5	15.8	6.4	6.7	1.2	33.0	33.5	6.3	3.1	3.4
DN 32	39.4	39.9	7.26	7.39	27.8	28.5	5.5	5.8	11.1	1/4	39.80	39.93	41.0	41.2	1/4	11.1	2.8	19.0	1.5	19.0	6.4	6.7	1.2	39.4	39.9	6.3	3.1	3.4
DN 40	47.3	47.8	8.05	8.18	29.3	30.1	5.5	5.8	12.7	5/16	47.75	47.88	48.9	49.2	5/16	12.7	4.0	25.4	2.3	25.4	8.0	8.3	1.4	47.3	47.8	7.9	3.1	3.4
DN 25	61.6	62.1	8.05	8.18	38.9	39.6	7.1	7.4	12.7	5/16	62.03	62.15	63.2	63.5	5/16	12.7	4.0	33.3	2.3	33.3	8.0	8.3	1.4	61.6	62.1	7.9	3.1	3.4

[a] Coarse thread shall conform to AS3501, Medium Class

Figure M.10 — (in part) Dimensions of jumper valves and tap washers



SECTION X-X

Nominal size of tap	*A* mm		*B* mm		*C* mm	
	Min.	Max.	Min.	Max.	Min.	Max.
DN 10	8.69	8.94	13.26	13.82	2.29	2.44
DN 12	9.80	10.05	14.88	15.44	2.54	2.69
DN 15	9.80	10.05	14.88	15.44	2.54	2.69
DN 20	10.65	10.90	15.72	16.28	2.54	2.69
DN 25	13.82	14.07	18.90	19.46	2.54	2.69
DN 32	13.82	14.07	18.90	19.46	2.54	2.69
DN 40	13.82	14.07	18.90	19.46	2.54	2.69
DN 50	13.82	14.07	18.90	19.46	2.54	2.69

Figure M.11 — Spindle O-rings

Appendix N
(normative)

Simulated samples

N.1 Scope

This appendix sets out means by which simulated samples may be used for components made from a single material.

N.2 General

Components made from a single material may be pre-qualified by a simulated sample that has been tested in accordance with this Standard and meets the requirements of AS/NZS 4020. The simulated sample shall be manufactured using the same manufacturing processes and having an envelope of characteristics (e.g. dimensions, surface finish, material composition) within which the components lie.

N.3 Typical examples of simulated samples

The process of pre-qualification may be applicable to the following types of materials:

(a) Metals and metallic alloys.

(b) Plastic materials (this excludes materials with elastomeric properties).

N.4 Special issues

For assessment purposes, the documentation surrounding the simulated sample shall be comprehensive so that a clear relationship exists between the simulated sample and the component under consideration.

A clear description of the simulated sample would include the following:

(a) General description including a specific sample number.

(b) Material designation, such as —

  (i) manufacturer, commercial grade of material and this Standard; and

  (ii) where the maximum level of a specific element(s) of the material is critical to the test requirements, a measurement and recording of these elements and their maximum level.

(c) Processing used to manufacture the simulated sample is the same as that used to manufacture the components. It could be defined as follows:

  (i) The manufacturing processes used to make the simulated sample.

  (ii) Details of the specific processes that are deemed to be critical to passing the test requirements and meeting this Standard.

(d) Dimensional criteria, i.e. a dimensioned drawing of the simulated sample including calculations under test conditions of —

  (i) total wetted surface area, in square millimetres;

(ii) total wetted volume, in millilitres; and

(iii) surface area-to-volume ratio.

(e) Testing of the sample as an in-line product or an end-of-line product.

(f) The scaling factor.

(g) A copy of the test report for the simulated sample to this Standard, showing that the sample passed all appropriate test requirements.

N.5 Component documentation

The following documentation shall be required:

(a) Identification/name of the component.

(b) Evidence that the component conforms to this Standard.

(c) Evidence that the material matches that of the simulated sample.

(d) The processes used to manufacture the component.

(e) Dimensional criteria, i.e. dimensioned drawing(s) of the component and finished product, including evidence of calculations for the component of the following criteria where the component is installed in the finished product:

(i) Total wetted surface area, in square millimetres.

(ii) Total wetted volume, in cubic centimetres or millilitres.

(iii) Surface area-to-volume ratio.

NOTE These dimensions are not calculated or checked by the testing laboratory.

(f) Reference to this test method, i.e. AS 3718 Appendix N.

Appendix O
(normative)

Determination of the nominal flow rate of taps and tap outlets for use with low and unequal pressures

O.1 General

This appendix sets out the method for determining the flow rates through taps and tap outlets for use in low and unequal pressures.

The test method herein shall be used as a basis for rating water efficiency of taps and tap outlets in accordance with AS/NZS 6400.

All tap ware (tap and/or tap outlet, or mixer tap) shall be tested as supplied to assess the nominal flow rate when adjusted to its maximum flow.

NOTE: AS/NZS 6400 forms a basis for the rating and labelling of a range of products under the mandatory Water Efficiency Labelling and Standards (WELS) scheme, as required by the Australian Water Efficiency Labelling and Standards Act 2005 (Cth) (the WELS Act).

O.2 Principle

The test sample to be tested is supported in a test rig and water is passed through the test sample at dynamic flow pressures of 35 kPa. When the flow rate has stabilized it is recorded.

O.3 Apparatus

The following apparatus is required:

(a) A water supply capable of delivering the required volumes at a temperature of 20 ± 5°C and at a dynamic flow pressure of at least 150 kPa.

(b) Test apparatus made from Type B copper tube of diameter equal to the inlet size of the tap. The branch for flow pressure measurements shall be located at least 250 mm downstream of any valve or fitting. The tap outlet, mixer tap, or flow controller connection(s) shall be not more than 300 mm downstream of the flow pressure measurements.

(c) A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

(d) Flow meter having an accuracy of ± 2 % of the true value.

NOTE See Figure F.1 for a typical test arrangement.

O.4 Procedure

The procedure shall be as follows:

(a) Install the test sample (tap and/or tap outlet, or mixer tap) as supplied by the manufacturer in the test rig with the inlet(s) connected to the water supply.

(b) The test sample operating mechanism or mechanisms or actuating valve(s) shall be adjusted to achieve the maximum flow at the outlet.

(c) Condition the test sample by allowing the water to flow through and then adjust the control valve gradually until the dynamic flow pressure of 150 kPa is achieved for at least 1 min.

(d) Gradually adjust the control valve to turn off the flow of water.

(e) Gradually adjust the control valve until the dynamic flow pressure of 35 +2, −0 kPa is achieved, allowing the flow and pressure to stabilize.

(f) Observe the flow meter and record the flow rate at that dynamic flow pressure.

(g) Gradually adjust the control valve to turn off the flow of water.

(h) Repeat Steps (e) to (g) to obtain a second reading of the flow rates.

(i) Calculate and record the average flow rate and record this value as the nominal flow rate.

O.5 Test report

The following shall be reported:

(a) Manufacturer, brand name, model name and model number (if these are applicable) of the test sample (tap and/or tap outlet, or mixer tap).

(b) That the product tested is for use in low or unequal pressure applications only as defined in this Standard, i.e. AS 3718.

(c) The nominal flow rate of the test sample (in litres per minute) determined at Clause O.4(i).

(d) Reference to this test method, i.e. AS 3718 Appendix O.

Appendix P
(normative)

Endurance test for rotating or swivelling outlets

P.1 Scope

This appendix sets out the method by which outlets that rotate or swivel are tested for endurance. The test measures the ability of intermediate joint/s of a rotating or swivelling outlet to operate satisfactorily during the expected life of the tap.

P.2 Principle

The tap and/or outletis held in a test rig and connected to a temperature-controlled hot and cold water supply at a given pressure. A cyclic mechanism that is able to apply rotation to swivelling joints of a outlet is connected the operating mechanism. A device to monitor the system for inconsistencies and breakdown is integrated into the mechanism.

P.3 Application

Tap ware consisting of a outlet that has any means of rotary movement around an intermediate joint of a tap body or outlet. The test excludes taps which have fixed and non-rotating or swivelling outlets.

P.4 Apparatus

P.4.1 Test rig

A test rig shall be used that is fitted with a counter to count complete cycles, and capable of the following performance:

(a) A fixing jig to firmly hold the tap body or inlet connection of the outlet.

(b) A cyclic mechanism that is able to apply a maximum rotation of 90° about the axis of a rotating or swivelling outlet.

(c) A cyclic mechanism that is able to monitor and apply a torque up to 3 Nm.

P.4.2 Water supply system

The heated water test temperature shall be —

(a) 80 ± 3°C for taps for hot water applications;

(b) 40 ± 3°C for taps designed for use in cold water services only; or

(c) the maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40°C.

The water temperature shall be measured within the range 0 mm to 100 mm upstream of the tap's inlet connection.

The system shall be capable of supplying water to the tap at a dynamic pressure of 500 ± 20 kPa.

P.4.3 Measurement of pressure

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

P.4.4 Measurement of temperature

A thermometer capable of indicating the required test temperature to within ± 2 % of the true value, or digital or analogue temperature gauges of equal accuracy.

P.4.5 Timing and control equipment

Timing and control equipment shall be used to achieve the following complete cycle:

(a) Rotate the outlet to a maximum of 90°.

(b) Maintain the position of the outlet for 1 +5, −0 s.

(c) Rotate the outlet back to the original position of 0°.

(d) Maintain the position of the outlet for 1 +5, −0 s

P.5 Procedure

The procedure shall be as follows:

(a) Connect the tap assembly to the test rig.

(b) Condition the outlet by applying 500 kPa dynamic or 1.5 times the manufacturer specified maximum operating pressure, whichever is the lesser for a period of 60 s and inspect for leakage or any other failures. Where no failures are observed, proceed to Step (c).

(c) Commence rotating the outlet about its axis of rotation to 90 +0, −5° or 90 % of the rotational limits of the outlet (see Figure P.1), whichever is lesser.

(d) Adjust the supply pressure to 250 kPa dynamic through the outlet with a minimum flow rate of 4 L/min.

(e) Ensure the correct supply temperature or the manufacturer's specified maximum operating temperature is achieved.

(f) Commence cyclically rotating the outlet as follows:

  (i) Starting at Position 1, rotate the outlet clockwise to Position 2, 90 +5, −0° or to 90 % of the limits of the outlet, whichever is lesser.

  (ii) Maintain the position of the outlet for 1 +0.5, −0 s.

  (iii) Rotate the outlet anti-clockwise back to Position 1.

  (iv) Maintain the position of the outlet for 1 +0.5, −0 s.

  (v) Repeat for 2 500 cycles and inspect for any leakage or other forms of failure.

  (vi) Isolate the water supply. Do not drain any residual water remaining in the outlet after isolating the water supply.

  (vii) Repeat Steps (i) to (iv) for an additional 2 500 cycles.

  (viii) Upon completion, apply 500 kPa dynamic or 1.5 times the manufacturer specified maximum operating pressure, whichever is the lesser for a period of 60 s and inspect for leakage or any other failures.

Rotational speed of the outlet shall not exceed 60 +5, −5° angular / second.

The torque required to move the outlet throughout the test shall not exceed 3 Nm.

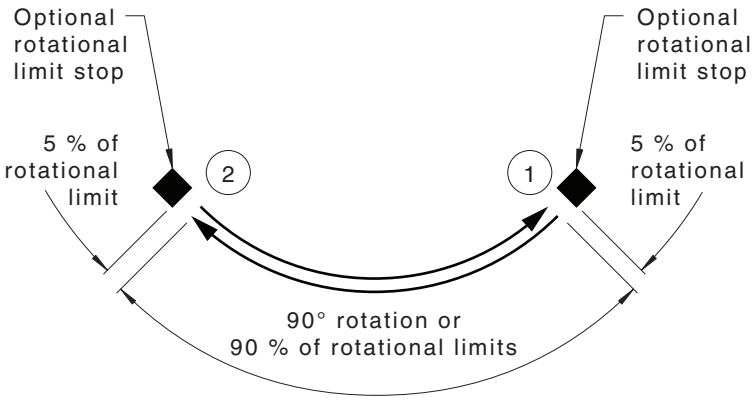


Figure P.1 — Outlet rotation limits

P.6 Test report

The following shall be reported:

(a) Manufacturer, model, size, and type of the tap.

(b) Test temperature.

(c) Result of initial conditioning.

(d) Number of cycles completed.

(e) Result and observations upon completion.

(f) Statement of conformance or non-conformance to the test criteria.

(g) Reference to this test method, i.e. AS 3718 Appendix P.

Appendix Q
(normative)

Endurance test for mixing taps mechanical (non-thermostatic)

Q.1 Scope

This appendix sets out the method by which mixing taps mechanical (non-thermostatic) are tested for mechanical endurance. The test measures the ability of mixing taps to operate satisfactorily with normal opening, closing and temperature adjustment applications during the expected life of the tap.

Where an outlet is not of unit construction with the tap, it need not be tested under this appendix.

This test is not required for separate mechanical mixing mechanisms within automatic shut-off taps.

Q.2 Principle

The tap is held in a test rig and connected to separate temperature-controlled hot and cold water supplies at a given pressure. A cyclic mechanism to operate the tap using a predetermined torque in a specific sequence within a given time period is connected to the tap operating mechanism. A device to monitor the system for inconsistencies and breakdown is integrated into the test rig.

Q.3 Application

To simulate temperature changes that occur in actual operation, the tap shall have the supplies so arranged that during testing both hot and cold water inlets of the tap under test have hot water and cold water supplied to them alternately for 55 ± 5 cycles.

Q.4 Apparatus

Q.4.1 Test rig

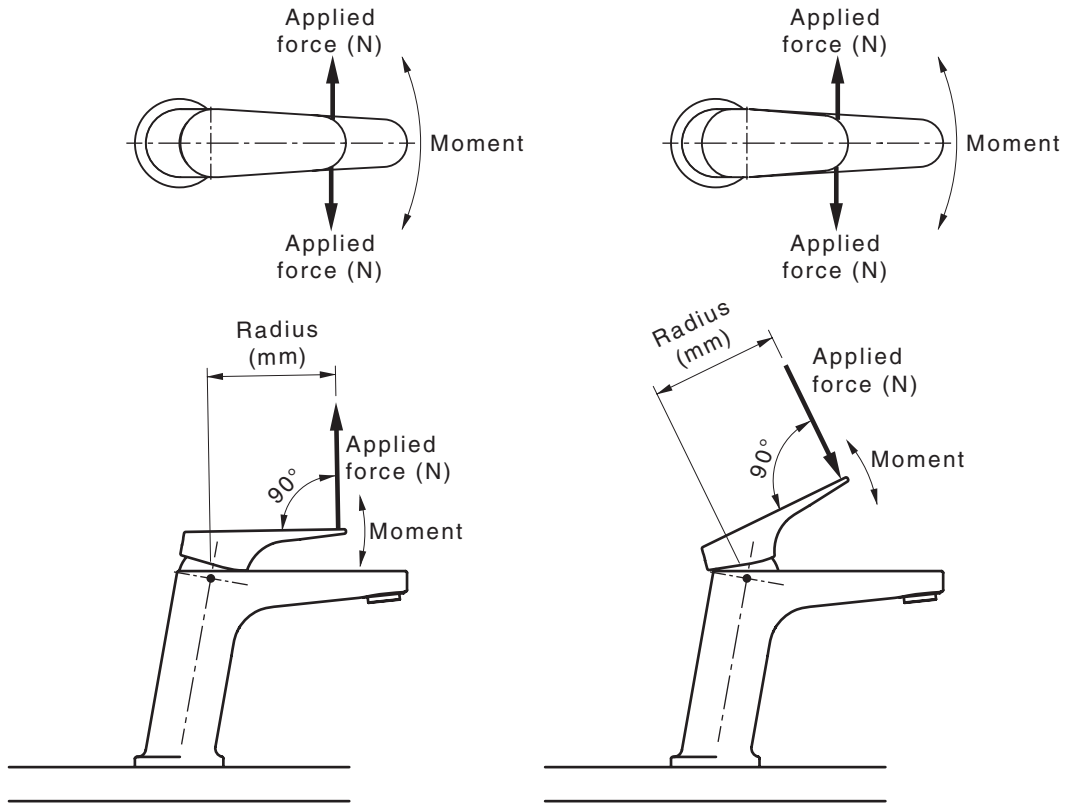
A test rig shall be used that is fitted with a counter to count complete cycles, and capable of the following performance:

(a) Operating the tap through its complete operating sequence and limits of open, temperature selection and closing movements.

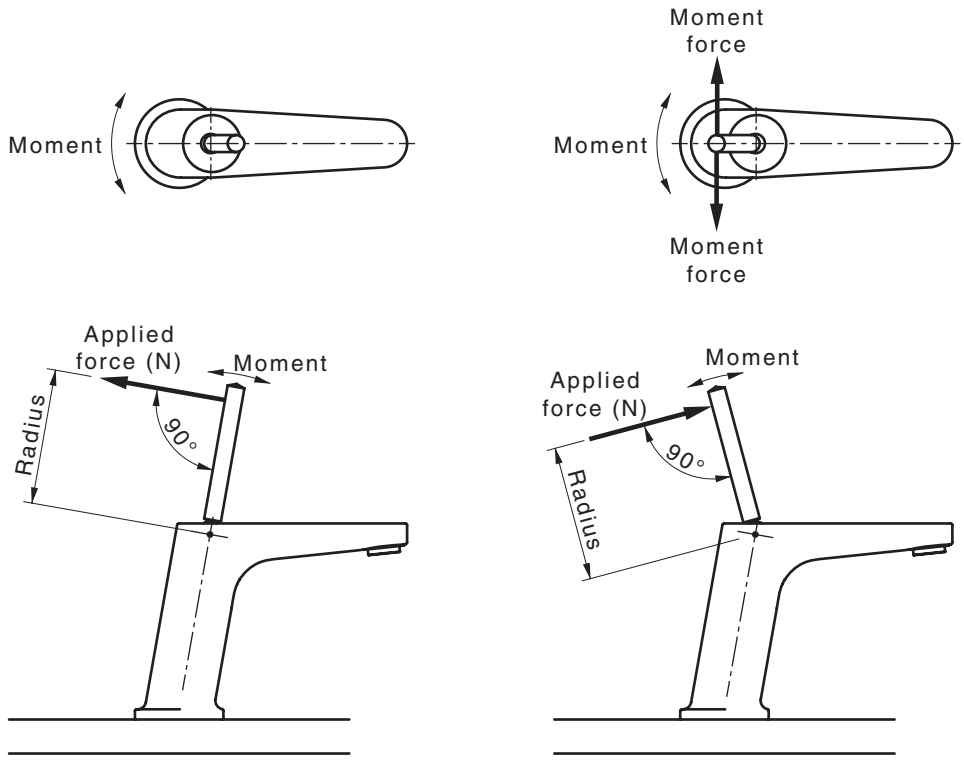
(b) The test rig shall stop if an operating torque of 3 Nm is exceeded. The force to be applied shall be within 50 mm from the outer end of the handle.

NOTE Torque (in newton metres) = force (in newtons) × radius (in metres).

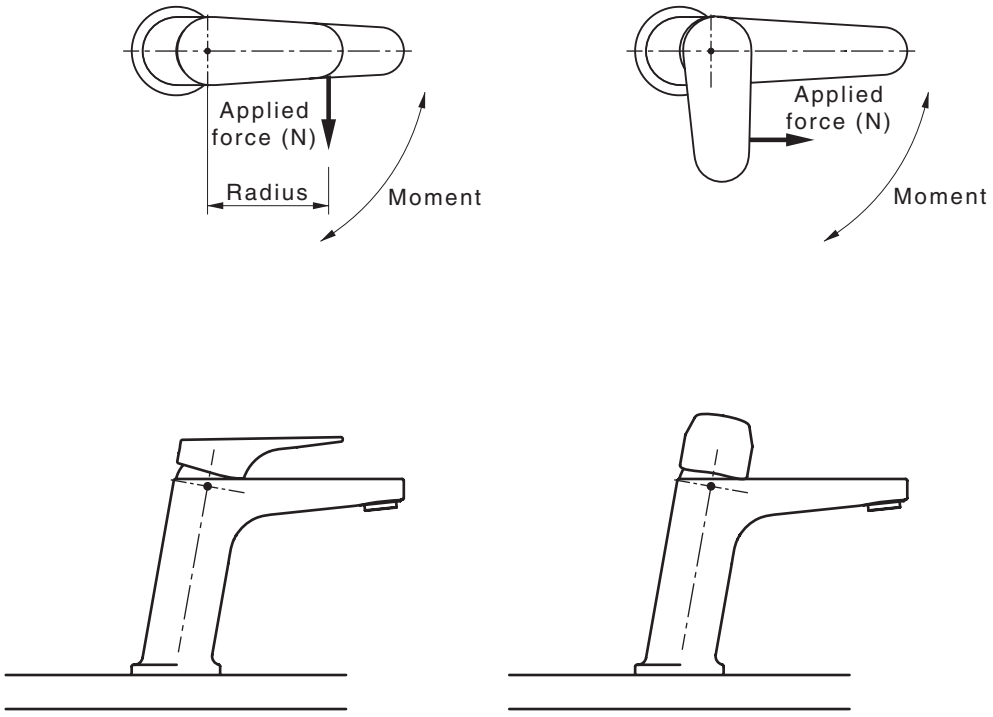
(c) Any force to exert the operating torque shall be applied perpendicular to the lever eliminating any eccentric forces, which may cause abnormal wear on the mixing tap, originating from horizontal or vertical movements of the test rig operating mechanism, see Figure Q.1.



(a) Conventional mixing valve



(b) Joystick mixing valve



(c) Sequential mixing valve

Figure Q.1 — Test bench adjustment torque

(d) Rotational movement of the test rig operating mechanism shall not exceed 60 ± 5° angular/s.

(e) Movement in any one direction shall be continuous.

(f) Movement to closure shall create leaktightness.

(g) Movement in all directions shall equal approximately 95 % of the total travel.

The applied torque and the speed of operation shall be physically checked. The method used shall have an accuracy of ± 10 % for both the torque and the speed of operation.

Q.4.2 Water supply system

The heated water test temperature shall be —

(a) 80 ± 3°C for taps for the hot water supply system;

(b) 40 ± 3°C for taps designed for use in cold water services only; or

(c) the maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40°C.

The cold water test temperature shall be 20 ± 5°C.

The water temperature shall be measured within the range 0 mm to 100 mm upstream of the tap's inlet connection.

The system shall be capable of supplying water to the tap at a static pressure of 500 ± 20 kPa and at a pressure during flow conditions sufficient to give a flow rate not less than the nominal flow rating of the tap or 30 L/min, whichever is the lesser.

Q.4.3 Measurement of pressure

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

Q.4.4 Timing and control equipment

Timing and control equipment shall be used to achieve the following complete cycle:

(a) For rectangular movement:

(i) Start at the middle of the temperature adjustment in the closed position (Position 1).

(ii) Open to the middle of the temperature adjustment (Position 2).

(iii) Return to the closed position in the middle of the temperature adjustment (Position 1).

(iv) Move to the cold water position (Position 3).

(v) Open in cold water position (Position 4).

(vi) Move to the full open hot water position (Position 5).

(vii) Move to full open cold water position (Position 4).

(viii) Close in the cold water position (Position 3).

(ix) Move to the closed hot water position (Position 6).

(x) Open in the hot water position (Position 5).

(xi) Close in the hot water position (Position 6).

(xii) Return to the middle of the temperature adjustment in the closed position (Position 1).

NOTE 1 Rectangular movements are shown in Figure Q.2.

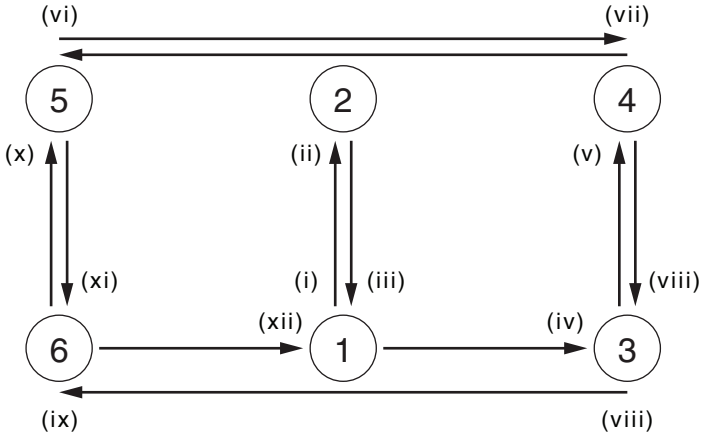


Figure Q.2 — Handle movement sequence — Rectangular

(b) For triangular movements:

(i) Start in the closed position (Position 1).

(ii) Open to the middle of temperature adjustment (Position 2).

(iii) Return to the closed position (Position 1).

(iv) Open in the full cold water position (Position 3).

(v) Move to the full hot water position (Position 4).

(vi) Move to the full cold water position (Position 3).

(vii) Return to the closed position (Position 1).

(viii) Open in the full hot water position (Position 4).

(ix) Return to the closed position (Position 1).

NOTE 2 Triangular movements are shown in Figure Q.3.

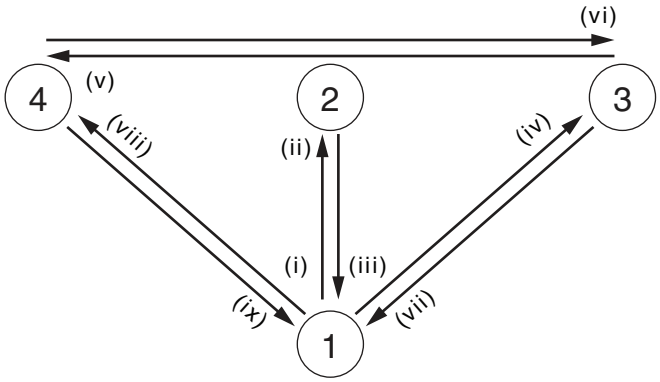


Figure Q.3 — Handle movement sequence — Triangular

(c) For progressive movements:

(i) Start in the closed position (Position 1).

(ii) Move to mid temperature/flow position (Position 2).

(iii) Move to full cold water position (Position 3).

(iv) Move to full hot water position (Position 4).

(v) Return to the closed position (Position 1).

NOTE 3 Progressive movements are shown in Figure Q.4. The figure is indicative and the direction operation could be clockwise or counter-clockwise.

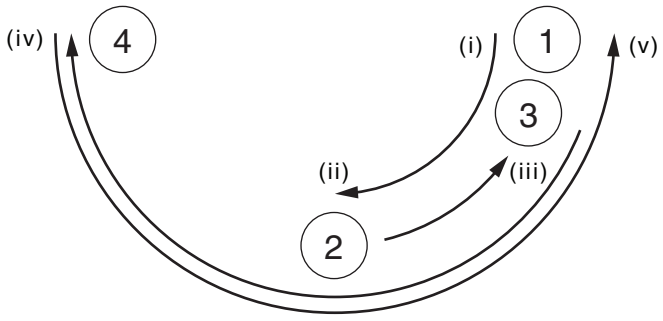


Figure Q.4 — Handle movement sequence — Progressive

Q.4.5 Temperature of measurement

All measurements shall be taken at ambient temperature.

Q.4.6 Procedure

The procedure shall be as follows:

(a) Connect the tap assembly to the test rig.

(b) Adjust the supply pressures with each water supply and check that the flow rates in the open position are not less than the specified nominal flow rates for the tap under test. Check that the supply water temperatures are as specified in Clause Q.4.2.

(c) Commence the movement operations of the tap, and set so that the tap mechanism opens to at least 95 % of the full range of movement in all directions and that the torque and opening and closing times are in accordance with Clause Q.4.1 and Q.4.4.

(d) Reset the cycle counter to zero.

(e) Commence the cycles.

(f) Check that the prescribed limits are being met throughout the test and also that the tap shuts off water when closed. Record the results and the number of cycles at which these checks occur. Stop the test as the tap fails.

NOTE The rig may be turned off to perform this test.

(g) At the completion of the prescribed number of cycles (see Table 4.1), check the equipment meets the parameters and limits of this test.

(h) Remove the tap assembly and carry out the watertightness test specified in Appendix E.

No repairs or part replacements shall be carried out before the final watertightness test.

Q.5 Test report

The following shall be reported:

(a) Manufacturer, model, size, and type of the tap.

(b) Number of cycles completed.

(c) Result of retesting for watertightness in accordance with Appendix E.

(d) Equipment adjustments and problems experienced during the test.

(e) Statement of conformance or non-conformance of the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix Q.

Appendix R
(normative)

Endurance test for automatic shut-off valves

R.1 Scope

This appendix sets out the method by which single and mixer button-operated and foot-operated taps with automatic shut-off are tested for mechanical endurance. The test measures the ability of taps to operate satisfactorily with normal opening, closing and temperature adjustment applications during the expected life of the tap.

NOTE 1 For the purposes this endurance test, a mixing button-operated or foot-operated tap is one where the user can manually adjust temperature while using the tap. A tap with a pre-mixed temperature is considered a single tap.

NOTE 2 Thermostatic temperature control is specified in AS 4032.4.

Where an outlet is not of unit construction with the tap, it need not be tested under this Appendix.

R.2 Principle

The tap is held in a test rig and connected to an appropriate temperature-controlled hot and cold water supply system at a given pressure. A cyclic mechanism to operate the tap in a predetermined sequence within a given time period is connected to the operating mechanism. A device to monitor the system for inconsistencies and breakdown is integrated into the mechanism.

R.3 Application

To simulate temperature changes that occur in actual operation, the single tap is subjected to alternate supplies of hot and cold water every 55 ± 5 cycles.

Mixing taps shall have the supplies so arranged that during testing both hot and cold water inlets of the mixing tap under test have hot water and cold water supplied to them alternately for 55 ± 5 cycles.

R.4 Apparatus

R.4.1 Test rig

A test rig shall be used that is fitted with a counter to count complete cycles, and capable of the following performance:

(a) Operating the tap through its complete operating sequence and limits of open and closing actuation and temperature selection movements.

(b) A minimum operating force of at least 20 N shall be applied to operate the tap (i.e. opening of flow). The force shall be spread evenly over the button and applied in line with the direction of travel. The force may be applied with a contour arrangement. The test rig shall stop if the tap fails to fully open under the operating force.

(c) An operating torque of 2.5 ± 0.5 Nm shall be applied to operate the mixer (i.e. temperature selection). The torque shall be applied perpendicular to the lever eliminating any eccentric forces, which may cause abnormal wear on the mixing tap, originating from horizontal or

vertical movements of the test rig operating mechanism. The test rig shall stop if an operating torque of 3 Nm is exceeded.

(d) Rotational movement of the test rig operating mechanism shall not exceed 60 ± 5° angular/s.

The force applied shall be physically checked. The method used shall have an accuracy of 2 %.

The applied torque and the speed of operation shall be physically checked. The method used shall have an accuracy of ± 10 % for both the torque and the speed of operation.

R.4.2 Water supply system

The heated water test temperature shall be —

(a) 80 ± 3 °C for taps for the hot water supply system;

(b) 40 ± 3 °C for taps designed for use in cold water services only; or

(c) the maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40°C.

The cold water test temperature shall be 20 ± 5 °C.

The water temperature shall be measured within the range 0 mm to 100 mm upstream of the tap's inlet connection.

The system shall be capable of supplying water to the tap at a static pressure of 500 ± 20 kPa and at a pressure during flow conditions sufficient to give a flow rate not less than the nominal flow rating of the tap or 30 L/min, whichever is the lesser.

R.4.3 Measurement of pressure

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

R.4.4 Timing and control equipment

Timing and control equipment shall be used to achieve the following complete cycle:

(a) For a single tap:

  (i) Open to maximum flow and release.

  (ii) Wait 2 s after flow has ceased.

(b) For a mixing tap:

  (i) Temperature mixing device is in the cold-blend position, and the mixing tap is closed.

  (ii) Open to maximum flow and release.

  (iii) Move temperature mix device towards the hot position in approximately 3 s.

  (iv) Wait 2 s after flow has ceased.

  (v) Open to maximum flow and release.

  (vi) Move temperature mixing device towards the cold-blend position in approximately 3 s.

  (vii) Wait 2 s after flow has ceased.

NOTE This test involves two actuations the automatic closing mechanism. The number complete cycles results in the number of actuations of the automatic closing mechanism in accordance with Table 4.1.

R.4.5 Temperature of measurement

All measurements shall be taken at ambient temperature.

R.5 Procedure

The procedure shall be as follows:

(a) Connect the tap assembly to the test rig.

(b) Adjust the supply pressures with each water supply and check that the flow rates in the open position are not less than the specified nominal flow rates for the tap under test. Check that the supply water temperatures are as specified in Clause R.4.2.

(c) Commence operation of the tap, and set so that the tap mechanism opens to at least 95 % of the full range of movement in all directions and that the operating force, torque and opening and closing times are in accordance with Clauses R.4.1 and R.4.4.

(d) Reset the cycle counter to zero.

(e) Commence the cycles.

(f) Check that the prescribed limits are being met throughout the test and also that the tap shuts off water when closed. Record the results and the number of cycles at which these checks occur. Stop the test as the tap fails.

NOTE The rig may be turned off to perform this test.

(g) At the completion of the prescribed number of cycles (see Table 4.1), check the equipment meets the parameters and limits of this test.

(h) Remove the tap assembly and carry out the watertightness test of Appendix E.

No repairs or part replacements shall be carried out before the final watertightness test.

R.6 Test report

The following shall be reported:

(a) Manufacturer, model, size, and type of the tap.

(b) Number of cycles completed.

(c) Result of retesting for watertightness in accordance with Appendix E.

(d) Equipment adjustments and problems experienced during the test.

(e) Statement of conformance or non-conformance to the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix R.

Appendix S
(normative)

Endurance test for electronic opening and closing valves

S.1 Scope

This appendix sets out the method by which electronically operated opening and closing valves are tested for mechanical endurance. The test measures the ability of taps to operate satisfactorily with normal opening and closing and mechanical temperature adjustment applications during the expected life of the tap.

NOTE 1 For the purposes this endurance test, a mixing electronic tap is one where the user can manually mechanically adjust temperature while using the tap. A tap with a pre-mixed temperature is considered a single tap.

NOTE 2 Thermostatic or electronic temperature control is specified in AS 4032.4.

NOTE 3 Push button includes piezo actuation.

Where an outlet is not of unit construction with the tap, it need not be tested under this appendix.

S.2 Principle

The tap is held in a test rig and connected to an appropriate temperature-controlled hot and cold water supply system at a given pressure. A cyclic mechanism to operate the tap in a predetermined sequence within a given time period is connected to the operating mechanism. A device to monitor the system for inconsistencies and breakdown is integrated into the mechanism.

S.3 Application

To simulate temperature changes that occur in actual operation, the single tap is also subjected to alternate supplies of hot and cold water every 55 ± 5 cycles.

Mixing taps shall have the supplies so arranged that during testing both hot and cold water inlets of the mixing tap under test have hot water and cold water supplied to them alternately for 55 ± 5 cycles.

Additional tests are conducted to check power failure mode.

S.4 Apparatus

S.4.1 Test rig

A test rig shall be used that is fitted with a counter to count complete cycles, and capable of the following performance:

(a) Operating the tap through its complete operating sequence and limits of open and closing actuation and temperature selection movements.

(b) For push-button actuation, a minimum operating force of at least 20 N is applied to operate the tap (i.e. opening of flow) in the prescribed test sequence. The force shall be spread evenly over the button and applied in line with the direction of travel. The force may be applied with a contour arrangement. The test rig shall stop if the tap fails to fully open under the operating

force.(c) For non-contact actuation (e.g. infrared), the test rig shall be adapted to activate the tap without contact in the prescribed test sequence.

(d) An operating torque of 2.5 ± 0.5 Nm shall be applied to operate the mixer (i.e. temperature selection) in the prescribed test sequence perpendicular to the lever eliminating any eccentric forces, which may cause abnormal wear on the mixing tap, originating from horizontal or vertical movements of the test rig operating mechanism. The test rig shall stop if an operating torque of 3 Nm is exceeded.

(e) Rotational movement of the test rig operating mechanism shall not exceed 60 ± 5° angular/s.

The force applied shall be physically checked. The method used shall have an accuracy of ± 2 %.

The applied torque and the speed of operation shall be physically checked. The method used shall have an accuracy of ± 10 % for both the torque and the speed of operation.

S.4.2 Water supply system

The heated water test temperature shall be —

(a) 80 ± 3 °C for taps for the hot water supply system;

(b) 40 ± 3 °C for taps designed for use in cold water services only; or

(c) the maximum operating temperature where the manufacturer specifies a maximum operating temperature greater than 40 °C.

The cold water test temperature shall be 20 ± 5 °C.

The water temperature shall be measured within the range 0 mm to 100 mm upstream of the tap's inlet connection.

The system shall be capable of supplying water to the tap at a static pressure of 500 ± 20 kPa and at a pressure during flow conditions sufficient to give a flow rate not less than the nominal flow rating of the tap or 30 L/min, whichever is the lesser.

S.4.3 Measurement of pressure

A pressure gauge conforming to the requirements of AS 1349 and capable of indicating the required test pressure to within ± 2 % of the true value, or digital or analogue pressure gauges of equal accuracy.

S.4.4 Timing and control equipment

Timing and control equipment shall be used to achieve the following complete cycle:

(a) For a single tap:

(i) Actuate to open to maximum flow and release.

(ii) Allow tap to close using its normal mode of operation for taps with automatic shut-off functionality or actuate to close 5 ± 0.5 s after opening actuation.

(iii) Wait 2 s after flow has ceased.

(b) For a mixing tap:

(i) Temperature mix device is in the cold-blend position, the mixing tap is closed.

(ii) Actuate to open to maximum flow and release.

(iii) Move temperature mix device towards hot position in approximately 3.0 s.

(iv) Allow tap to close using its normal mode of operation for taps with automatic shut-off functionality or actuate to close 4 ± 0.5 s after opening actuation.

(v) Wait 2 s after flow has ceased.

(vi) Actuate to open to maximum flow and release.

(vii) Move temperature mix device towards the cold position in approximately 3 s.

(viii) Allow tap to close using its normal mode of operation for taps with automatic shut-off functionality or actuate to close 4 ± 0.5 s after opening actuation.

(ix) Wait 2 s after flow has ceased.

NOTE This test involves two actuations the automatic closing mechanism. The number complete cycles results in the number of actuations of the automatic closing device in accordance with Table 4.1.

S.4.5 Temperature of measurement

All measurements shall be taken at ambient temperature.

S.5 Procedure

The procedure shall be as follows:

(a) Connect the tap assembly to the test rig.

(b) Adjust the supply pressures with each water supply and check that the flow rates in the open position are not less than the specified nominal flow rates for the tap under test. Check that the supply water temperatures are as specified in Clause S.4.2.

(c) Commence the operation of the taps, and set so that the tap mechanism opens to at least 95 % of the full range of movement in all directions and that the operating force, torque and opening and closing times are in accordance with Clauses S.4.1 and S.4.5.

(d) Reset the cycle counter to zero.

(e) Commence the cycles.

(f) Check that the prescribed limits are being met throughout the test and also that the tap shuts off water when closed. Record the results and the number of cycles at which these checks occur. Stop the test as the tap fails.

NOTE The rig may be turned off to perform this test.

(g) At the completion of the prescribed number of cycles (Table 4.1), check that the equipment meets the parameters and limits of this test.

(h) Remove the tap assembly and carry out the watertightness test of Appendix E.

No repairs or part replacements shall be carried out before the final watertightness test.

S.6 Test report

The following shall be reported:

(a) Manufacturer, model, size, and type of the tap.

(b) Number of cycles completed.

(c) Result of retesting for watertightness in accordance with Appendix E.

(d) Equipment adjustments and problems experienced during the test.

(e) Statement of conformance or non-conformance to the test criteria.

(f) Reference to this test method, i.e. AS 3718 Appendix S.

Appendix T
(informative)

Finishes and coatings

T.1 Scope

This appendix sets out methods by which decorative coatings can be checked for suitability.

T.2 Principle

The tap, tap component and/or outlet is held by suitable means and inspected following the requirements set out below.

T.3 Visual examination before and after tests

The exposed surfaces should be examined before and after testing with the naked eye, from a distance of approximately 300 mm and for 10 s, without any magnifying device, in a light (diffused and not dazzling) of an intensity of 700 lx to 1 000 lx.

NOTE This examination represents the relative freedom from spots at which the coating has been penetrated with resultant corrosion of any underlaying metal or exposure of the plastics substrate material.

T.4 Corrosion resistance

Testing for corrosion resistance should be conducted for the period specified in Table T.1, as appropriate for the substrate material.

NOTE Corrosion testing is carried out to evaluate the quality the coatings applied and does not necessarily relate to the service life of the coated item.

Table T.1 — Period for conducting corrosion resistance test

Substrate	Plastic		Metal		
Service condition	CASS	CORR	CASS	ASS	NS
	AS 2331.3.3	AS 2331.3.7	AS 2331.3.3	AS 2331.3.2	AS 2331.3.1
2 h	4 h	3 h × 4 h	4 h	24 h	200 h
1 h	—	—	—	8 h	—

T.5 Performance requirements

After undergoing the applicable test specified in T.4, coatings should not show more than one surface defect in any 650 mm^2 area of significant surface. Surface defects should not be larger than 0.8 mm in any dimension. If widely scattered surface defects are observed after testing (as occasionally occurs), such defects should not significantly deface or adversely affect the function of the coated part.

T.6 Adhesion of electrodeposited and PVD coatings

T.6.1 Metal substrate

When tested by the adhesive tape test or filing test in accordance with AS 2331.4.1, there should be no separation of the coating from the basis metal or separation between layers of the coating.

NOTE 1 The tape test should not be used on thicknesses nickel greater than 20 μm.

NOTE 2 Where required by the user, the thermal shock test in AS 2331.4.1 may be specified.

T.6.2 Plastic substrate

When subjected to Procedure A in accordance with AS 2331.4.5, the coating should, at the completion of thermal cycling, be free of visible defects.

NOTE Thermal cycling is carried out to evaluate the quality the coatings applied and does not necessarily relate to the service life of the coated item.

NOTES

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