



WMTS-516:2014

**Water closet (WC) pan and flushing device with
included macerating and lifting plant**

WaterMark Technical Specification

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PREFACE

This WaterMark Technical Specification was originally prepared by industry and reviewed by the ABCB WaterMark Technical Advisory Committee (WMTAC).

The objective of this WaterMark Technical Specification is to enable product certification in accordance with the requirements of the Plumbing Code of Australia (PCA).

The word 'VOID' set against a clause indicates that the clause is not used in this WaterMark Technical Specification. The inclusion of this word allows a common use clause numbering system for the WaterMark Technical Specifications.

The term 'normative' has been used in this WaterMark Technical Specification to define the application of the appendices to which they apply. A 'normative' appendix is an integral part of a WaterMark Technical Specification.

The test protocol and information in this WaterMark Technical Specification was arranged by WMTAC members to meet the authorisation requirements given in the PCA.

The WaterMark Schedule of Specifications and List of Exempt Products are dynamic lists and change on a regular basis. Based on this function, these lists have been removed from the ABCB WaterMark Certification Scheme document known as Procedures for Certification of Plumbing and Drainage Products and are now located on the ABCB website (www.abcb.gov.au). These lists will be version controlled with appropriate historic references.

ACKNOWLEDGEMENTS

WaterMark Technical Specification WMTS-516:2014 was prepared by industry and reviewed by the ABCB WaterMark Technical Advisory Committee. It was approved by the ABCB on 02 December 2014.

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1 SCOPE

This WaterMark Technical Specification sets out requirements for an electrically operated water closet (WC) pan and flushing device with included macerating and lifting plant.

The WC pan flushes, macerates faecal and other waste material into fine slurry and lifts this to the sanitary drainage system.

The WC pans can be either single or dual flush and pedestal or wall mounted.

NOTE: Where the product includes components or accessories they may be subject to other regulatory requirements e.g., electrical safety and Electromagnetic compatibility (EMC).

These products require certification to WaterMark Level 1.

2 APPLICATION

The WC pan is utilised where access to the sanitary drainage system is difficult due to the level of the fixture or where installation is easier using the lifting plant where additions have been made to the dwelling. These units operate in a manner similar to WC pans as defined in AS 1172 in terms of the general physical appearance and use of mains water for flushing, however, operate in a quite different manner utilising a pump and macerating unit to both aid removal of the waste from the WC pan proper and delivery to the sanitary drainage system. Therefore the units are more efficient in terms of flushing water volume and delivery to the sanitary drainage system and drainline carry.

In accordance with the Plumbing Code of Australia (PCA) WaterMark Scheme Rules the manufacturer must provide a warranty stating the product application limitations. Limitation factors to be taken into account shall include but not be limited to:-

- a) Minimum diameter of rising main;
- b) Maximum vertical lift and maximum horizontal length;
- c) Angle of bends in rising main;
- d) Maximum number of bends in rising main; and
- e) Discharge flow rates (minimum and maximum).

The warranty must be clearly visible and comprehensible to the intending purchaser, installer and user. Application and installation limitations must also be stated within the product installation instruction details.

Appendix A sets out the means by which compliance with this WaterMark Technical Specification shall be demonstrated by a manufacturer for the purpose of product certification.

3 REFERENCED DOCUMENTS

The following documents are referred to in this WaterMark Technical Specification:

ABCB	Procedures for Certification of Plumbing and Drainage Products
AS	
1172.1	Water closets (WC) Part 1: Pans
1172.2	Water closet (WC) pans of 6/3 L capacity or proven equivalent Part 2: Cistern
1976	Vitreous china used in sanitary appliances
2345	Dezincification resistance of copper alloys
AS/NZS	
2845.1	Water supply – Backflow prevention devices Part 1 Materials, design and performance requirements.
4020	Testing of products for use in contact with drinking water
3500	Plumbing and drainage
3500.0	Glossary of terms
3500.1	Water supply
3500.2	Sanitary plumbing and drainage
3500.5	Domestic installations
60335.2.41	Household and similar electrical appliances and safety – Part 2.41 Particular requirements for pumps
EN	
12050.4	Wastewater lifting plants for building and sites — Principles of construction and testing — Part 4: Non-return valves for faecal-free wastewater and wastewater containing faecal matter
NCC	
PCA	Plumbing Code of Australia

4 DEFINITIONS

For the purpose of this WaterMark Technical Specification, the definitions given in AS/NZS 3500.0 apply.

5 MATERIALS

5.1 General

This section specifies requirements for materials utilised in the construction of the various components. Materials shall be adequate for the intended purpose and when in contact with water, be corrosion resistant.

5.2 Vitreous china

Where the WC pan is manufactured from vitreous china it shall comply with AS 1976.

5.3 Stainless steel

Where the WC pan or flushing device component in contact with water is manufactured from stainless steel it shall have a recognised corrosion resistance equivalent to or greater than grade 304, having a surface finish equal to grade 4 – ASTM A480 and or EN 10088.

5.4 Copper alloy

Components manufactured from copper alloy and in contact with water shall be dezincification resistant and comply with AS 2345.

6 MARKING

The Fixture shall be marked with the following:

- a) Manufacturer's name, brand or trademark.
- b) Model Identification.
- c) For dual flush operation, marking that clearly distinguishes full/half flush operation.
- d) Batch identification by the use of serial number or date of manufacture code.
- e) Warning 'Do not include objects that may jam the unit i.e. tampons'.
- f) WaterMark.
- g) Licence number.
- h) Number of the WaterMark Technical Specification, i.e., WMTS 516.

7 PACKAGING

The WC pan and any components or accessories shall be packaged in such a manner so as to avoid damage during transportation and handling.

8 DESIGN

8.1 General

This section specifies the requirements for the design of the system and included components.

8.2 Fixing and support

8.2.1 Pedestal pan

Provision shall be made for the pan to be rigidly fixed to the floor and be able to be removed easily for maintenance. The means of fixing supplied shall be of corrosion resistant materials.

8.2.2 Wall-hung pan

Each wall-hung pan shall be provided with an integral means of building into, or fixing to a wall with brackets, or other separate means of support and shall be capable of passing the load safety test specified in Clause 9.11. Brackets or other means of fixing shall be of corrosion resistant materials.

8.3 Inlet connection ends

The inlet connection end shall be capable of making a watertight joint with the water service.

8.4 Outlet connection ends

The outlet connection ends shall enable connection to the sanitary drainage system pipe work.

8.5 Backflow prevention

The WC pan shall incorporate means of protection of contamination of the water supply from backflow (see Clause 9.3 and Appendix C).

8.6 WC pan flushing

The WC pan shall include a flushing device that when activated delivers flushing volume sufficient to aid in removal of sanitary waste material and cleanse the WC pan bowl after flushing. Flushing volumes shall be in accordance with manufacturer's specifications. WC pans with dual flush systems shall incorporate means to clearly identify to the user full and reduced flush operations.

8.7 Reverse flow

The WC pan shall include in the design a non return valve in the discharge pipe work to prevent reverse flow. This non return valve shall be accessible for maintenance purposes and comply with the requirements of EN 12050.4.

8.8 Pumping system

The WC pan shall include in the design a pumping system capable of lifting waste material to the manufacturer's specification. The pumping system shall comply with the requirements of AS/NZS 60335.2.41.

9 PERFORMANCE REQUIREMENTS AND TEST METHODS

9.1 Materials in contact with drinking water

Components in the water supply pipe work up to and including the back flow prevention device shall comply with AS/NZS 4020.

9.2 Hydrostatic pressure test

When tested in accordance with the Hydrostatic pressure test of Appendix B there shall be no leakage of the inlet water supply pipe work when tested at twice the maximum operating pressure as declared by the manufacturer.

9.3 Backsiphonage test

When tested in accordance with the Backsiphonage test of Appendix C there shall be no backsiphonage.

9.4 Flushing volume test

When tested in accordance with Appendix D the flushing volume shall be in accordance with the manufacturer's nominal flush volume within a tolerance of $\pm 10\%$.

9.5 Splash test

When tested in accordance with Appendix E of AS 1172.1, a pan shall not splash water onto the floor.

9.6 Wetting test

When tested in accordance with Appendix F of AS 1172.1, a pan shall wash the sawdust from all areas more than 50mm below the lower edge of the flushing rim on full and half flush operations.

9.7 WC pan leakage and capacity test

When tested in accordance with Appendix D of AS 1172.1, a WC pan shall not overflow or leak.

9.8 Full flush waste discharge test

When tested in accordance with Appendix E the WC pan shall discharge all of the waste material in two out of three tests.

9.9 Reduced flush waste discharge test

When tested in accordance with Appendix B of AS 1172.1, a WC pan shall discharge all of the paper in at least two out of the three tests.

9.10 WC pan reduced flush liquid contaminant test

When tested in accordance with Appendix H of AS 1172.1 no more than 7% of the dye shall be left in the sump after flushing for reduced flush operation.

9.11 WC pan safety load test

When tested in accordance with Appendix G of AS 1172.1 a WC pan and supporting brackets, where applicable shall be capable of supporting the load and shall not crack, split or craze.

10 TEST SEQUENCE AND TEST SAMPLE PLAN

10.1 Test samples

Samples of each design shall be selected for testing and confirmation of requirements of Clause 8 and 9. The testing can be performed on the one sample.

10.2 Test sequence

Product shall be tested to the performance requirements in the following sequence Clause 9.2 to 9.11.

11 PRODUCT DOCUMENTATION

11.1 General

Technical information relating to the WC pan and correct installation methods shall be readily available to aid the user and installer. The information may be in the form of a technical manual or equivalent document and be written in plain English and supplemented by figures and diagrams as applicable. The information provided shall satisfy the requirements of a warranty as referenced in the PCA and those requirements of the AS/NZS 3500 series of Standards.

11.2 Product data

Product data shall be available that identifies critical product characteristics as a minimum—

- a) Product range and model identification.
- b) Maximum Operating Pressure (MOP) and temperature.
- c) Maximum vertical lift and horizontal length.
- d) Recommended discharge pipework including pipe size and fitting limitations.

11.3 Installation and maintenance instructions

Instructions shall be provided that give full details of installation and maintenance procedures for WC pan including;

- a) References to AS/NZS 3500 Parts 1, 2 and 5 where applicable.
- b) Detailed step by step instruction.
- c) Trouble-shooting guide.
- d) Identification that any maintenance that requires removal of the WC pan must be undertaken by a qualified service technician.
- e) Contact details for after sales service.

APPENDIX A MEANS FOR DEMONSTRATING COMPLIANCE WITH THIS TECHNICAL SPECIFICATION

(Normative)

A.1 SCOPE

This appendix sets out the means by which compliance with this WaterMark Technical Specification shall be demonstrated by a manufacturer under the WaterMark Certification Scheme.

A.2 RELEVANCE

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

A.3 PRODUCT CERTIFICATION

The purpose of product certification is to provide independent assurance of the claim by the manufacturer that products comply with this WaterMark Technical Specification.

The certification scheme serves to indicate that the products consistently conform to the requirements of this WaterMark Technical Specification.

The sampling and testing plan, as detailed in Paragraph A5 and Table A1, shall be used by the WaterMark Conformity Assessment Body. Where a batch release testing program is required, it shall be carried out by the manufacturer as detailed in Paragraph A5 and Table A2.

A.4 DEFINITIONS

A.4.1 Batch release test

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

A.4.2 Production batch

Clearly identifiable collection of units, manufactured consecutively or continuously under the same conditions, using material or compound to the same specification.

A.4.3 Sample

One or more units of product drawn from a batch, selected at random without regard to quality.

NOTE: The number of units of product in the sample is the sample size.

A.4.4 Sampling plan

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

A.4.5 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. The batch is defined by the manufacturer.

A.4.6 Type testing (TT)

Testing performed to demonstrate that the material, component, joint or assembly is capable of conforming to the requirements given in the WaterMark Technical Specification.

A.5 TESTING**A.5.1 Type testing**

Table A1 sets out the requirements for type testing and frequency of re-verification.

A.5.2 Batch release testing

Table A2 sets out the minimum sampling and testing frequency plan for a manufacturer to demonstrate compliance of product(s) to this WaterMark Technical Specification on an ongoing basis. However, where the manufacturer can demonstrate adequate process control to the WaterMark Conformity Assessment Body, the frequency of the sampling and testing nominated by the manufacturer's quality plan and/or documented procedures shall take precedence for the purposes of WaterMark product certification.

A.5.3 Retesting

In the event of a batch release test failure, the products within the batch may be retested at a frequency agreed to with the WaterMark Conformity Assessment Body and only those batches found to comply may be claimed and/or marked as complying with this WaterMark Technical Specification.

TABLE A1
TYPE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5.2	Vitreous china	AS 1976	At any change in materials specification
	5.3	Stainless steel	Clause 5.3	
	5.4	Copper alloy	AS 2345	
Marking	6	Marking	Clause 6	At any change in specification
Packaging	7	Packaging	Clause 6	At any change in specification
Design	8.2.1	Fixing and support-Pedestal pan	Clause 8.2.1	At any change in the design
	8.2.2	Fixing and support-Wall hung pan	Clause 8.2.2/9.11	
	8.3	Inlet connection ends	Clause 8.3	
	8.4	Outlet connection ends	Clause 8.4	
	8.5	Backflow prevention	Clause 8.5/9.3/Appendix C	
	8.6	WC pan flushing	Clause 8.6	
	8.7	Reverse flow	Clause 8.7	
Performance	9.1	Products in contact with water	AS/NZS 4020	At any change in materials, formulation or design or every five years whichever occurs first
	9.2	Hydrostatic pressure test	Appendix B	At any change in design or manufacturing process
	9.3	Backsiphonage test	Appendix C	
	9.4	Flushing volume test	Appendix D	
	9.5	Splash test	AS 1172.1 Appendix E	
	9.6	Wetting test	AS 1172.1 Appendix F	
	9.7	WC pan leakage and capacity test	AS 1172.1 Appendix D	
	9.8	Full flush waste discharge test	Appendix E	
	9.9	Reduced flush waste discharge test	AS 1172.1 Appendix B	

Characteristic	Clause	Requirement	Test method	Frequency
	9.10	WC pan reduced flush liquid contaminant test	AS 1172.1 Appendix H	
	9.11	WC pan safety load test	AS 1172.1 Appendix G	
Product documentation	11	Product data/Installation and maintenance instructions	Product documentation	At any change to installation requirements

TABLE A2
BATCH RELEASE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5.2	Vitreous china	AS 1976	AS 1976
	5.3	Stainless steel	Review materials parts lists and compliance certificates	Each delivery batch
	5.4	Copper alloy	Review materials parts lists and compliance certificates	
Marking	6	Marking	Clause 6	Each pan
Packaging	7	Packaging	Clause 6	Each pan
Performance	9.2	Hydrostatic pressure test	Appendix B	Each pan
	9.4	Flushing volume test	Appendix D	
	9.7	WC pan leakage and capacity test	AS 1172.1 Appendix D	
Product documentation	11	Product data/Installation and maintenance instructions	Product documentation	Each pan

APPENDIX B HYDROSTATIC STRENGTH TEST

(Normative)

B.1 SCOPE

This Appendix sets out the method for determining the ability of components in the water supply pipe work subject to permanent hydrostatic pressure to withstand hydrostatic pressure without leakage or permanent distortion of supply pipework.

B.2 PRINCIPLE

The components subject to permanent hydrostatic pressure within the assembly are subjected to a hydrostatic pressure for a period of time at a determined temperature and inspected for leakage and permanent structural damage.

B.3 APPARATUS

The following apparatus is required:

- a) Water supply sufficient to maintain the required pressure and temperature.
- b) Pressure gauge complying with AS 1349.

B.4 PROCEDURE

- c) Connect the supply water at ambient temperature to the inlet of the WC pan water supply pipe work and purge all the air from the assembly.
- d) Slowly increase the pressure until it reaches the test pressure.
- e) Maintain this pressure for 60 +5, -0 min.
- f) Release the pressure.
- g) Record the test pressure, temperature and duration at this pressure.
- h) Inspect the device for any leaks or permanent distortion or structural damage.

B.5 TEST REPORT

The following shall be reported:

- a) Manufacturer, model type of WC pan and flushing device and description of the components.
- b) Manufacturer's maximum operating pressure.
- c) Test pressure and duration at test pressure.



- d) Any leakage or structural damage.
- e) Reference to this test method, i.e. Appendix B of WMTS-516.

APPENDIX C BACKSIPHONAGE TEST

(Normative)

C.1 SCOPE

This Appendix sets out the method for determining the back-siphonage test on a WC pan with integral flushing device through the inlet water supply pipework.

C.2 PRINCIPLE

The WC pan is filled with water to the overflow level and a vacuum applied to determine the risk factor of back-siphonage.

C.3 APPARATUS

The following apparatus is required:

- a) Coloured water at ambient room temperature.
- b) Vacuum pump and regulators.
- c) Vacuum gauge complying with AS 1349.
- d) Suitable sight glass in the vacuum line system.
- e) Fouling wire in accordance with AS/NZS 2845.1.

C.4 PROCEDURE

- a) Fill the WC pan with coloured water to overflow level.
- b) Open any shut off devices in the inlet pipework, including any electrically operated solenoid valves. Also fowl open any non return valves in accordance with AS/NZS 2845.1.
- c) Locate the sight glass between the valve and the vacuum tank so that any water that is back-siphoned can be observed.
- d) Connect the vacuum pump to the inlet water supply pipework.
- e) With the inlet valve fully open, gradually apply a vacuum of -50 to -55 kPa and sustain for 30 ± 10 , -05 s.
- f) Maintain the water inlet valve in the fully open position and reapply the vacuum three times, rapidly alternating between 0 kPa and -50 to -55 kPa.
- g) Record if there is any backsiphonage through the inlet supply pipework by the appearance of coloured water.



C.5 TEST REPORT

The following shall be reported:

- a) Manufacturer, model type of WC pan and flushing device and average discharge volume.
- b) Any back-siphonage through the inlet water supply pipework.
- c) Reference to this test method, i.e. Appendix C of WMTS-516.

APPENDIX D FLUSHING VOLUME TEST

(Normative)

D.1 SCOPE

This Appendix sets out the method for measuring the volume of the discharge from a dual flush or single flush WC pan.

D.2 PRINCIPLE

The flushing device as supplied with the WC pan is flushed a number of times and is discharged to establish the average discharge volume.

D.3 APPARATUS

The following apparatus is required:

- a) WC pan and flushing device as specified by manufacturer.
- b) A suitable support for WC pan for installation in accordance with the manufacturer's instructions.
- c) A suitable container of 10 L minimum capacity graduated at 0.1 L intervals, or other means of measuring the discharged volume to an equal or greater accuracy.
- d) A water supply having a static water supply pressure of $350\text{kPa} \pm 20\text{kPa}$ and temperature $15 \pm 10^\circ\text{C}$.

D.4 PROCEDURE

The procedure shall be as follows:

NOTE: The testing is conducted at ambient room temperature.

- a) Set up the WC pan and flushing device as specified by the manufacturer with the discharge pipe work set at maximum discharge height.
- b) Connect the water supply.
- c) Flush the WC pan at least three times prior to commencement of testing. Note any malfunction and adjustments made.
- d) Locate the container to collect the water discharging from the WC pan outlet.
- e) Operate the full flush mechanism and collect the discharge and record the volume.
- f) Repeat Steps (d) and (e) a total of five times.

- g) For dual flush cisterns operate the reduced flush mechanism and collect the discharge and record the volume.
- h) Repeat steps (d) and (g) a total of five times.

D.5 TEST REPORT

The following shall be reported:

- a) Manufacturer, model and type of WC pan and flushing device.
- b) Manufacturer's nominal flushing volume/s.
- c) Discharge volume of full-flush and half flush in each of the tests.
- d) Average flush volume.
- e) Any structural or other failures observed during testing.
- f) Reference to this test method, i.e. Appendix D, WMTS-516.

APPENDIX E FULL FLUSH WASTE DISCHARGE TEST

E.1 SCOPE

This Appendix sets out the method for determining the effective discharge of waste material (artificial test pieces/toilet paper) from the WC pan at the manufacturer's maximum discharge height.

E.2 PRINCIPLE

The WC pan to be tested is positioned in a special rig and waste discharge tests conducted to determine the number of test pieces discharged at the manufacturer's maximum discharge height.

E.3 APPARATUS

The following apparatus is required:

- a) WC pan and flushing device as specified by manufacturer.
- b) A suitable support for WC pan in accordance with the manufacturer's instructions and outlet pipework in accordance with manufacturer's specifications.
- c) One or more $50 \pm 4\text{g}$ test specimens ("test specimen") consisting of extruded soybean paste and four loosely crumpled balls of toilet paper ("paper") meeting the requirements of E4. Each test specimen shall be $100 \pm 13\text{mm}$ in length and $25 \pm 6\text{mm}$ in diameter.
- d) A suitable container to collect the test specimen and paper and discharge volume.
- e) A timing device with an accuracy of ± 0.05 seconds.
- f) A water supply having a static water supply pressure of $350\text{kPa} \pm 20\text{kPa}$ and temperature $15 \pm 10^\circ\text{C}$.

E.4 TEST MEDIA

E.4.1 Soybean paste

Nominal specification of test media: 35.5% water, 33.8% soybean, 18.5% rice, and 12.2% salt, and having a density of $1.15 \pm 0.10\text{ g/mL}$ (i.e., density greater than water).

E.4.2 Toilet paper

Each ball of paper is comprised of six sheets of single ply toilet paper conforming to AS 1172.1 B3 (c).

E.5 PROCEDURE

The procedure shall be as follows:

- a) Set up the WC pan and flushing device in accordance with the manufacturer's installation instructions and connect the water supply. The discharge pipework shall be set at the manufacturer's maximum discharge height.
- b) Flush at least three times prior to the commencement of testing.
- c) Measure discharge volume in accordance with Appendix D prior to the commencement of testing.
- d) Using the directing device identified in AS 1172.1 Appendix A1 drop 7 soybean paste test specimens into the bowl.
- e) Using the directing device identified in AS 1172.1 Appendix A1 drop 4 four loosely crumpled balls of toilet paper into the bowl.
- f) Wait $10 \pm$ seconds.
- g) Flush sample collect discharged media in a suitable container positioned at the outlet of the discharge pipe.
- h) Record the presence of waste material in the bowl.
- i) Repeat e) to h) a further three times.
- j) At the completion visually inspect the discharge for adequate maceration by the lack of large particles and waste material is suspended in the mixture to form a slurry.
- k) Flush a further three times.
- l) Flush again and collect the discharge. The discharge shall contain a negligible amount of waste material.

E.6 TEST REPORT

The following shall be reported:

- a) Manufacturer, model type of WC pan and flushing device and discharge volume.
- b) The number of test pieces discharged in each test.
- c) The presence of large particles in the discharge and adequate maceration. The presence of any waste material in the discharge at the completion of the test.
- d) Reference to this test method, i.e. Appendix E of WMTS-516.