



# **WMTS-477:2016**

## **Rainwater/mains supply changeover devices**

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**WaterMark Technical Specification**

**2016**



**ABC B**





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**WaterMark Technical Specification**

Document formerly known as:-

ATS 5200.477 – 2006 Technical Specification for Plumbing and Drainage Products  
Rainwater/mains supply changeover devices

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**2016**

## **IMPORTANT NOTICE AND DISCLAIMER**

On 25 February 2013 management and administration of the WaterMark Certification Scheme transferred to the Australian Building Codes Board (ABCB). From this date all new technical specifications will be named WaterMark Technical Specifications (WMTS). Within two years all existing ATS will be renamed WMTS. During this initial period both terms may be used and accepted. All new and recertified Certificates of Conformity will reference WMTS. Certificates of Conformity that currently reference ATS will be re-issued referencing the equivalent WMTS during this initial period. The WaterMark Schedule of Specifications lists all current WMTS and, where appropriate, the former ATS name.

This Technical Specification supersedes Standards Australia ATS 5200.477 – 2006.

The rebranding of this Technical Specification has included additional information about the transition as well as changes to specific details including replacing references to Standards Australia and the National Plumbing Regulators Forum (NPRF) with the ABCB, changing the term Australian Technical Specification (ATS) to WaterMark Technical Specification (WMTS), replacing references to technical committees WS-014 and WS-031 with the WaterMark Technical Advisory Committee (WMTAC).

While the ABCB, the participating Governments and other groups or individuals who have endorsed or been involved in the development of the WMTS, have made every effort to ensure the information contained in this document is accurate and up to date, such information does in no way constitute the provision of professional advice.

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The ABCB welcomes suggestions for improvement in the WMTS, and encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact the ABCB via phone on 1300 134 631, email at [watermark@abcb.gov.au](mailto:watermark@abcb.gov.au) or write to the WaterMark Administering Body, ABCB, GPO Box 9839, Canberra ACT 2601.

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## PREFACE

WaterMark Technical Specification WMTS-477: 2016 Technical Specification for plumbing and drainage products, Rainwater/mains supply changeover devices was originally prepared by the Joint Standards Australia/Standards New Zealand Committee WS-031, Technical Procedures for Plumbing and Drainage Products Certification.

The objective of this 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 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 Technical Specification to define the application of the appendices to which they apply. A 'normative' appendix is an integral part of a Technical Specification.

The test protocol and information in this Technical Specification was arranged by committee members to meet the authorization 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 WaterMark Certification Scheme document known as Technical Specification for Plumbing and Drainage Products and are now located on the ABCB website ([www.abcb.gov.au](http://www.abcb.gov.au)). These lists will be version controlled with appropriate historic references.

## **ACKNOWLEDGEMENTS**

Australian Technical Specification ATS 5200.477 – 2006, on which this technical specification is based, was prepared by Standards Australia Committee WS-031, Technical Procedures for Plumbing and Drainage Products Certification. It was approved on behalf of the Council of Standards Australia on 9 November 2005.

The following organisations were represented on Committee WS-031 in the preparation of Australian Technical Specification ATS 5200.477 – 2006.

- AUSTAP
- Australian Electrical and Electronic Manufacturers Association
- Australian Industry Group
- Australian Stainless Steel Development Association
- Building Officials Institute of New Zealand
- Building Research Association New Zealand
- Certification Interests (Australia)
- Copper Development Centre – Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- National Fire Industry Association
- Plastics Industry Pipe Association of Australia
- Plumbing Industry Commission
- South Australian Water Corporation
- Water Services Association of Australia

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## 1 SCOPE

This Technical Specification sets out requirements for manual or automated changeover devices of nominal sizes DN 20/25 and maximum allowable operating pressures up to and including 1600 kPa, which enable the interconnection from a pressurized rainwater tank supply and a water service to designated fixtures and outlets.

Rainwater/mains supply changeover devices are intended to be used in properties that have both rainwater and mains water supply, to enable either water supply to be directed to certain fixtures and outlets, where permitted by the authority having jurisdiction.

## 2 APPLICATION

This Technical Specification will be referenced on the WaterMark Certification Scheme Schedule of Specifications.

Appendix A sets out the means by which compliance with this 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 Technical Specification:

### AS

- 1432 Copper tubes for plumbing, gasfitting and drainage applications
- 1565 Copper and copper alloys—Ingots and castings
- 1572 Copper and copper alloys—Seamless tubes for engineering purposes
- 1646 Elastomeric seals for waterworks purposes (all parts)
- 2136 Method for detecting the susceptibility of copper and its alloys to stress corrosion cracking using the mercurous nitrate test
- 2345 Dezincification resistance of copper alloys
- 2738 Copper and copper alloys—Compositions and designations of refinery products, wrought products, ingots and castings

### AS/NZS

- 1567 Copper and copper alloys—Wrought rods, bars and sections
- 1568 Copper and copper alloys—Forging stock and forgings
- 2845 Water supply—Backflow prevention devices
- 2845.1 Part 1: Materials, design and performance requirements



## AS/NZS

- 3500 Plumbing and drainage
- 3500.0 Part 0: Glossary of terms
- 3500.1 Part 1: Water services
- 3718 Water supply—Tap ware
- 4020 Testing of products for use in contact with drinking water

## ASTM

- A312 Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

## BS EN

- 10088 Stainless steels
- 10088-2 Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes

## 4 DEFINITIONS

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

## 5 MATERIALS

### 5.1 General

This Clause specifies requirements for materials utilized in the construction of the product.

### 5.2 Metallic materials

Metallic materials in contact with water shall be corrosion resistant and for the purposes of this Specification the following materials are considered corrosion resistant:

- (a) Copper, as specified in Clause 5.2.1.
- (b) Copper alloy, as specified in Clause 5.2.2 and 5.2.3.
- (c) Stainless steel, as specified in Clause 5.2.4.

#### 5.2.1 *Copper*

Copper shall comply with the following:

- (a) *Wrought products AS 2738.*

- (b) *Tubular components* Copper tube shall comply with AS 1432.

#### 5.2.2 *Copper alloy*

Copper alloy shall comply with the following:

- (a) *Castings* AS 1565 or capable of passing the requirements of Clause 5.3 provided the alloy contains not less than 58% copper and not more than 1% aluminium.
- (b) *Hot pressings* AS/NZS 1568.
- (c) *Rod for machined parts* AS/NZS 1567 or an alloy complying with AS 2345.
- (d) *Tubular components* Copper alloy tube shall comply with AS 1572 alloy designation C26130. Where bent or stamped in the fabrication process, the tube shall be sufficiently stress-relieved so that it is capable of passing the mercurous nitrate test specified in AS 2136 after all fabrication processes are complete.

#### 5.2.3 *Dezincification-resistant (DR) copper alloy*

Copper alloys in contact with water shall comply with AS 2345.

#### 5.2.4 *Stainless steel*

Stainless steel for manufacture of pipes or tubes shall comply with ASTM A312 grades 304 and 316, or EN 100882 Grade 1.4401 (equivalent to grade designation).

### 5.3 **Plastics materials**

#### 5.3.1 *General*

Plastics materials shall comply with the relevant Standard for the product type or type of plastics used.

##### 5.3.1.1 *UV resistance.*

For outdoor applications the plastic material formulation shall be stabilized by suitable ultraviolet light stabilizers.

### 5.4 **Elastomeric materials**

The materials used for seals or gaskets shall comply with AS 1646.1 and AS 1646.2, AS 1646.3 or AS 1646.4.

## 6 **MARKING**

Each device shall be permanently and legibly marked with the following:

- (a) Manufacturer's name, brand or trademark.

- (b) Pressure classification, PN.
- (c) Direction of flow and identification of connection type i.e., rainwater, mains water.
- (d) WaterMark.
- (e) Licence number.
- (f) Maximum operating temperature.
- (g) The number of this Technical Specification, i.e., WMTS-477.

*NOTE: Where space is limited, the number of the Technical Specification may be in abbreviated form, i.e., S477 where space is limited.*

## **7 PACKAGING**

The device and components shall be packaged in such a manner so as to avoid damage during transportation and handling.

## **8 DESIGN**

*NOTE: Where the device includes components or accessories, they may be subject to other regulatory requirements either related to the device, components or installation type, e.g., electrical safety, electromagnetic compatibility (EMC).*

### **8.1 Integral plumbing components, accessories or fittings**

Where the product includes integral plumbing components, accessories or fittings that require certification as identified in the Plumbing Code of Australia, they shall comply with the applicable requirements of the specification for that product as identified in the WaterMark Schedule of Specifications.

### **8.2 End connectors**

End connectors for connection to metallic or plastics piping systems shall comply with the requirements of the Australian Standard or Technical Specification relevant to the piping system.

### **8.3 Actuator and operating/changeover mechanism**

The operating/changeover mechanism may be of the manufacturer's own design as long as it is capable of passing the endurance test as specified in Clause 9.4.

### **8.4 Backflow prevention**

The device shall be fitted with a dual check valve (dual CV) backflow prevention device certified to AS/NZS 2845.1.

### **8.5 Reverse flow**

The device shall be fitted with a non-return valve to prevent reverse flow to the rainwater tank.

## **9 PERFORMANCE REQUIREMENTS AND TEST METHODS**

### **9.1 Products in contact with drinking water**

Products in contact with drinking water shall comply with AS/NZS 4020. A scaling factor of 0.1 shall be applied.

*NOTE: Rainwater may be used for drinking purposes, where permitted by the authority having jurisdiction.*

### **9.2 Hydrostatic strength test**

When tested in accordance with Appendix B at twice the maximum operating pressure and at the maximum operating temperature, the device shall not leak. At the completion of the test, the device shall be tested for compliance with the functional test of Clause 9.5.

### **9.3 Watertightness test**

When tested in accordance with the watertightness test of AS/NZS 3718, the device shall not leak.

### **9.4 Endurance test**

When tested in accordance with Appendix C, there shall be no leakage, visible or functional failure of any component of the operating mechanism and the operational characteristics of the device shall not exhibit any change (i.e., discharge flow rate, pressure main/rainwater during the cycling period).

### **9.5 Functional test**

When tested in accordance with Appendix D, at the minimum and maximum limitations as stated by the manufacturer, the device shall function correctly under all the specified operating conditions.

## **10 VOID**

## **11 PRODUCT DOCUMENTATION**

### **11.1 Product data**

Product data shall be available. The data shall identify critical product characteristics such as maximum amperage and minimum/maximum pressure range of pumps to be used in conjunction with the device, flow rate and temperature limitations.

## 11.2 Installation and maintenance instructions

### 11.2.1 *Installation instructions*

Installation instructions shall be provided, which shall give full details of installation procedures for the rainwater/mains supply changeover devices, as follows:

- (a) Reference to installation in accordance with AS/NZS 3500.1.
- (b) Detailed step-by-step instructions.
- (c) Details of any special tools or training that may be required to install the product or training.
- (d) Details of commissioning procedures and adjustments required.
- (e) Troubleshooting guide.
- (f) Contact details for after-sales service.

### 11.2.2 *Operating and maintenance instructions*

Operating and maintenance instructions shall include the following:

- (a) Any regular maintenance requirements.
- (b) Spare parts information.
- (c) Troubleshooting guide.
- (d) Contact details for after-sales service.
- (e) Recommended mains and rainwater tank supply pressures.

## **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 Technical Specification is to be demonstrated by a manufacturer under the WaterMark Certification Scheme.

### **A.2 RELEVANCE**

The long-term performance of plumbing systems is 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 Technical Specification.

The certification scheme serves to indicate that the products consistently conform to the requirements of this 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 module is capable of conforming to the requirements given in the 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 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 Technical Specification.

**Table A1—TYPE TESTS**

<b>Characteristic</b>	<b>Clause</b>	<b>Requirement</b>	<b>Test method</b>	<b>Frequency</b>
Materials	5	Material composition, temper, etc.	Relevant Standards	At any change in materials specification
Marking	6	Marking	Review of documentation/physical examination	At any change in design/specification
Packaging	7	Protection against transportation and handling damage		
Design	8.1	Integral plumbing components, accessories or fittings	Applicable specification	At any change in design/specification
	8.2	End connectors	AS or WMTS relevant to the piping system	
	8.3	Actuator and operating/changeover mechanism	Clause 8.3	
	8.4	Backflow prevention	Review of documentation/physical examination	
	8.5	Reverse flow	Review of documentation/physical examination	
Performance	9.1	Products in contact with drinking water	AS/NZS 4020	At any change in materials, formulation or design or every 5 years, whichever occurs first
	9.2	Hydrostatic strength test	Appendix B	At any change in design or manufacturing process
	9.3	Watertightness test	AS/NZS 3718	
	9.4	Endurance test	Appendix C	
	9.5	Functional test	Appendix D	
Product documentation	11	Product data/installation operation and maintenance instructions	Documentation review	At any change factors that require a change in documentation, e.g., amendments to AS/NZS 3500 series of Standards



**Table A2— BATCH RELEASE TESTS**

<b>Characteristic</b>	<b>Clause</b>	<b>Requirement</b>	<b>Test method</b>	<b>Frequency</b>
Materials	5	Composition, temper, etc.	Delivery acceptance tests or supplier's quality certificate to relevant Standard	Each delivery batch
Marking	6	Marking	Visual examination	100%
Performance	9.3	Watertightness test	AS/NZS 3718	Once per batch
	9.5	Functional test (within manufacturer's limits)	Appendix D	

## Appendix B HYDROSTATIC STRENGTH TEST

(Normative)

### B.1 SCOPE

This Appendix sets out the method for determining the ability of a rainwater/mains changeover device to withstand hydrostatic pressures.

### B.2 PRINCIPLE

The device is subjected to a hydrostatic pressure for a period of time and inspected for structural damage.

### B.3 APPARATUS

The following is required:

- (a) Water supply source sufficient to maintain the required pressure.
- (b) Pressure gauge.

### B.4 PROCEDURE

The procedure shall be as follows:

- (a) Mount the device in a suitable jig and connect the water supply to the inlet of mains water supply. Block the other ends with suitable plugs that contain fittings in order to de-air the device.
- (b) Supply water to the device and purge all the air from the device.
- (c) Slowly increase the pressure until it reaches the test pressure.
- (d) Maintain this pressure for the test duration.
- (e) Release the pressure.
- (f) Record the test pressure, temperature and duration at this pressure.
- (g) Inspect the device for any leaks or structural damage.
- (h) Disconnect the supply pressure and reconnect using the rainwater tank inlet.
- (i) Conduct testing as in Steps (b) to (f).

## **B.5 TEST REPORT**

The following shall be reported:

- (a) Manufacturer, model, type and size of device.
- (b) Any leakage or structural damage.
- (c) Reference to this test method, i.e., WMTS-477, Appendix B.

## Appendix C ENDURANCE TEST

(Normative)

### C.1 SCOPE

This Appendix sets out the method for conducting a cyclic test of a rainwater/mains supply changeover device.

### C.2 PRINCIPLE

The device is installed in accordance with the manufacturer's instructions with any included accessories and subjected to a number of cycles of switching from rainwater supply to mains water supply and back, to simulate actual in-field conditions to establish the device's ability to withstand a minimum expected life of 5 years.

### C.3 APPARATUS

The following is required:

- (a) Suitable test rig and appropriate equipment to enable cycling of the device in a reasonable timeframe and record the number of cycles.
- (b) Independent water supply at ambient temperature to feed mains water inlet and rainwater inlet. Rainwater feed inlet may be supplied with normal mains water supply for the purposes of testing.
- (c) Pressure gauges, flow meters and other equipment in order to establish operational characteristics during commissioning and during cycling.
- (d) Means for connecting the water supply to the device to be tested.

### C.4 PROCEDURE

The procedure shall be as follows:

- (a) Install and commission the device in accordance with the manufacturer's instructions.
- (b) With a pressure at the manufacturer's maximum recommended supply pressure applied at the supply inlets and at the manufacturer's recommended maximum flow rate, operate the device in the normal manner through rainwater/mains supply/rainwater for the minimum number of cycles as given in Table C1.

**TABLE C1**  
**ENDURANCE TEST DURATION**

<b>Device type</b>	<b>Number of cycles</b>
Manual operation	5000
Automatic operation	50000

- (c) During the period of cycling observe at regular intervals for any—
- (i) leakage;
  - (ii) visible or functional failure of any component of the operating mechanism; and
  - (iii) change in the operational characteristics of the device, i.e., discharge flow rates and pressure drops for both mains and rainwater supplies.

## **C.5 TEST REPORT**

The following shall be reported:

- (a) Manufacturer and model identification.
- (b) Number of cycles conducted.
- (c) Any physical damage to the device operating mechanism.
- (d) Any failure to activate during an operating cycle.
- (e) Any change in operational characteristics.
- (f) Reference to this test method, i.e., WMTS-477, Appendix C.

## **Appendix D FUNCTIONAL TEST**

**(Normative)**

### **D.1 SCOPE**

This Appendix sets out test methods to verify that the device functions normally under a range of expected operating conditions.

### **D.2 PRINCIPLE**

The device is installed in accordance with the manufacturer's instructions, with any components included, and subjected to a series of conditions to establish its response.

### **D.3 APPARATUS**

The following is required:

- (a) Suitable test rig and appropriate equipment to enable operation of the device.
- (b) Means for connecting the water supply to the device to be tested.
- (c) Independent water supply at ambient temperature to feed mains water inlet and rainwater inlet. Rainwater feed inlet may be supplied with normal mains water supply for the purposes of testing.
- (d) Pressure gauges, flow meters and other equipment in order to establish operational characteristics during commissioning and during evaluation.

### **D.4 PROCEDURE**

The procedure shall be as follows:

- (a) Install and commission the device in accordance with the manufacturer's instructions.
- (b) Adjust the water supplies to the minimum limitations as stated by the manufacturer.
- (c) For each item in Table D1 establish the conditions and note the response of the device. For a normally operated valve, the manufacturer's operating instructions shall be followed for each condition.

**TABLE D1**  
**FUNCTIONAL TEST CONDITIONS**

Item	Mains Water Condition	Rainwater Condition	Demand Condition	Power Condition	Pump Condition	Condition type	Condition output
1	Available	Available	No	On	Functioning	Rainwater + no demand	Idle
2	Available	Available	Yes	On	Functioning	Rainwater + demand	Rain water delivered
3	Available	Not available	Yes	On	Functioning	No rainwater + demand	Mains water delivered at discharge
4	Available	Not available	No	On	Functioning	No Rainwater + no demand	Idle
5	Available	Available	Yes	Off	Functioning	No power + demand	Mains water delivered at discharge
6	Available	Available	Yes	On	Failed	Pump failure	Mains water delivered at discharge
7	Not available	Available	Yes	On	Functioning	Failure of mains supply + demand	Rain water delivered at discharge

## D.5 TEST REPORT

The following shall be reported:

- (a) Manufacturer and model identification.
- (b) Condition type and testing conditions, i.e., inlet pressures, outlet flow rate, etc.
- (c) Testing conditions, i.e., inlet pressures, outlet flow rate, etc.
- (d) Response of the device for all conditions in Step (c) of procedure.
- (e) Any failure to operate in the expected manner.
- (f) Reference to this test method, i.e., WMTS-477, Appendix D.

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