WMTS-499:2016
Inline sewer dosing unit (SDU)

WaterMark Technical Specification

2016

ABCB

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ATS 5200.499 – 2008 Technical Specification for Plumbing and Drainage Products
Inline sewer dosing unit (SDU)

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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 5200.499–2008.

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).

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PREFACE

WaterMark Technical Specification WMTS-499:2016 Technical Specification for plumbing and drainage products, Inline sewer dosing unit (SDU) 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). These lists will be version controlled with appropriate historic references.

ACKNOWLEDGEMENTS

Australian Technical Specification ATS 5200.499–2008, 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 7 August 2008.

The following organisations were represented on Committee WS-031 in the preparation of Australian Technical Specification ATS 5200.499–2008.

- AUSTAP
- Australian Industry Group
- Certification Bodies (Australia)
- Copper Development Centre – Australia
- Fire Contractors Federation
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- New Zealand Water and Waste 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 and a design methodology for inline sewer dosing units (SDUs) and the minimum requirements for the connection within the sewer line. These products are intended to temporarily store and batch wise deliver measured volumes of waste water to the sewer line.

These products require certification to WaterMark Level 2.

The basis for both the use of the unit and the design methodology is to supplement reduced water closet (WC) water usage with water from other plumbing fixtures to provide volumes that are similar to the historical design volumes for WCs.

The SDU allows reduced water usage throughout the dwelling while at the same time maintaining sufficient transport volume as to match the original design intent of the sewer line system.

An SDU is used to allow for the delivery of a minimum dosage of waste from the water closet and wastewater carrying medium from throughout the dwelling.

The minimum dosage allows for the application of all water saving devices throughout the dwelling while at the same time ensuring that wastes from the water closet have sufficient carry medium.

The application of an SDU ensures that the sewer line does not receive less than a minimum measured dose. This has positive implications to the design charts and minimum grades as noted in AS/NZS 3500.2 and AS/NZS 3500.5.

The SDU also has applications as—

- a greywater and blackwater mixing device prior to the transport stage through the sewer line to the sewer main; and
- a greywater dosing system for re-use systems to ensure volumetric carry distance and dosage volume consistency.

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

2200 Design charts for water supply and sewerage

3996 Access covers and grates

AS/NZS

1260 PVC-U pipes and fittings for drain, waste and vent application

1462 Methods of test for plastics pipes and fittings

1462.10 Part 10: Method for hydrostatic pressure testing of fittings and elastomeric seal joints for non-pressure applications

3500 Plumbing and drainage

3500.0 Part 0: Glossary of terms

3500.2 Part 2: Sanitary plumbing and drainage

3500.5 Part 5: Domestic installations

2200 Design charts for water supply and sewerage

1172 Water closets (WC)

1172.1 Part 1: Pans

ABCB

Plumbing Code of Australia (PCA)

Procedure for Certification of Plumbing & Drainage Products

4 DEFINITIONS

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

4.1 Nominal storage capacity

The nominal storage capacity is as designated by the manufacturer as a function of the storage volume when charged with clean water. It would normally be greater than 9 L.

5 MATERIALS

5.1 General

This Clause specifies requirements for materials utilized in the construction of the product. Plastic materials shall comply with the relevant Standard for the product type or type of plastics used.

5.2 UV resistance

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

6 MARKING

Each inline sewer dosing unit shall be permanently and legibly marked with the following:

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

(b) WaterMark.

(c) Licence Number.

(d) The number of this Technical Specification, i.e., WMTS-499.

NOTE: Where space is limited the number of the Technical Specification may be in an abbreviated form, i.e., S499.

7 PACKAGING

The SDU shall be packaged in such a manner so as to avoid damage during transportation and handling. This shall include the prevention of entry of contaminants into the unit.

As part of the installation process, each SDU shall be checked for structural integrity from damage.

NOTE: Product documentation should reference specific needs (if any) as specified in the Plumbing Code of Australia (PCA).

8 DESIGN

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 PCA, they shall comply with the applicable requirements of the specification for that product as identified in Procedure for Certification of Plumbing and Drainage Products.

8.2 End connectors

The unit shall be connected to pipework using end connections complying with AS/NZS 1260. Where the SCU and included end connector materials is other than PVC as identified in AS/NZS 1260 and connection is to be made by solvent welding, the joint shall be of equivalent strength to that of PVC/PVC joint.

8.3 Inspection opening

The unit shall have a sealable inspection opening that complies with the requirements of the watertightness test of AS/NZS 1462.10.

The SDU shall meet the Class A loading requirements of AS 3996.

Class A includes areas (including footways) accessible only to pedestrians and pedal cyclists and closed to other traffic (extra-light duty).

Testing for load capacity shall be in accordance with the requirements of AS 3996.

For areas that may include load classifications from Class B to Class G of AS 3996, the manufacturer shall either design the SDU to meet these load requirements, or specify the use of a suitable proprietary access cover or grate to provide the necessary load protection.

8.4 General design

The design of product shall include the following:

(a) The waterway through the unit shall not be smaller at any point than the given inlet and outlet pipe diameters.

NOTE: There should be no restriction through the device.

(b) The batch-wise system shall be free to move and discharge in such a way as to direct the flow in a concentrated pulse delivery. The temporary retention device shall have a lip or outlet that concentrates outflow.

(c) The batch-wise delivery system shall have sufficient end stops to allow the repeated batch-wise delivery while allowing a constant inflow volume in accordance with the fixture unit ratings of AS/NZS 3500.2.

(d) The floor of the enclosure of the SDU shall be shaped in such a way as to not trap residual wastewater or allow for partial blockage. The floor shall have sloped contact surfaces to allow wastewater runoff to continue to the outlet sewer line.

(e) The SDU shall allow for continuous venting through the standard sewer line venting system, as specified in AS/NZS 3500.2 and AS/NZS 3500.5.

(f) The batch-wise storage device shall deliver at least 95% of its storage capacity volume in each batch-wise delivery, to ensure continued delivery of wastewater to the drain.

(g) The wall thickness for units shall be sufficient to withstand the tests specified in Appendix A.

9 PERFORMANCE REQUIREMENTS AND TEST METHODS

9.1 Paper and solids discharge test

When tested in accordance with Appendix B, an SDU shall discharge from the outlet spigot of the unit all of the paper and test pieces in at least 9 out of the 10 tests.

The SDU shall discharge from the outlet spigot of the unit a minimum clean water volume no less than 95% of the nominal storage volume prior to the loading with test pieces, as specified in Appendix B.

9.2 Hydrostatic pressure test

When tested in accordance with the hydrostatic pressure test of AS/NZS 1462.10, at an internal pressure of 85 +5, −0 kPa for 60 +5, −0 min, the assembled fitting shall not leak.

9.3 Endurance test

When tested in accordance with Appendix C, there shall be no visible or functional failure of any component of the operating mechanism.

9.4 Inspection opening and access cover—Load testing

When tested to the load testing requirements of AS 3996, the access cover shall withstand a load classification of Class A. After load testing, the access cover shall be tested and shall comply with the hydrostatic pressure test of Clause 9.2.

10 VOID

11 PRODUCT DOCUMENTATION

11.1 General

Each SDU shall be accompanied with detailed documentation to aid the installer and user in the correct installation, operation and ongoing maintenance of the SDU. The instructions shall be in the form of an owner's manual or equivalent document and be written in plain English and supplemented by figure and diagrams, as applicable.

11.2 Product data

Product data shall be available. As a minimum the following critical product characteristics shall be identified:

(a) The model designation of the SDU.

(b) A statement noting that the system meets the requirements of WMTS-499 and other relevant Standards.

(c) Unit nominal storage volume.

(d) A functional description of the operation of the SDU, including diagrams illustrating the basic design.

(e) A clear statement of the types of materials that can be placed in the SDU and list of household substances that, if placed in the system, may adversely affect the operation of the SDU.

(f) A numbered list of components and an accompanying illustration, photograph, or print in which the components are respectively identified, including—

  (i) design, construction and materials specification for the components; and

  (ii) a process overview of the function of each component and the expected function of the entire system when all components are properly assembled and connected.

(g) Limitations (if any) including, but not exclusive of—

  (i) maximum vertical fall for a stack into the SDU including pipe configuration to dissipate hydraulic velocity if required;

  (ii) any limit on the number of WC upstream of the product;

  (iii) any maximum inflow pip grades; and

  (iv) pipe configurations in and out of the SDU.

11.3 Installation instructions

Installation instructions shall be provided, which shall include, as a minimum, the following:

(a) References to AS/NZS 3500.2 and AS/NZS 3500.5, and the PCA, where applicable.

(b) A sequential installation procedure.

(c) A label(s) that describes the product and references the owner's manual for information. This label shall be affixed to the cistern of any WC that will contribute waste to the system.

(d) Off-loading and unpacking instructions, including safety considerations, identification of fragile components and measures to be taken to avoid damage to the SDU.

(e) Description of visual techniques for the evaluation of end-product quality.

(f) A clear definition of installation requirements, including any applicable plumbing and electrical power requirements, ventilation, air intake protection, bedding, hydrostatic displacement protection, watertightness, slope and miscellaneous fittings and appurtenances.

11.4 Operating instructions

The maintenance instructions shall include the following:

(a) A detailed start-up procedure.

(b) Methods and criteria to be used to identify malfunction or problems.

(c) Operating instructions that describe the proper function, operating and maintenance responsibilities of the owner and authorized service personnel.

(d) A course of action and/or contact details for an appropriate service representative to be contacted in the event that a problem arises or service is required.

11.5 Maintenance instructions

The maintenance instructions shall include the following:

(a) A maintenance schedule.

(b) Repair or replacement instructions in the event that a system possesses flaws that would inhibit proper functioning, and list of sources where replacement components can be obtained.

(c) A detailed procedure for visual evaluation of component functions.

(d) A guide for visually evaluating and narrowing the scope of the problem, based on product characteristics, operation and history.

(e) A sequential method for isolating specific component failure.

(f) A step-by-step guide for repairing or replacing components.

(g) A course of action to be taken if the SDU is to be used intermittently or if extended periods of non-use are anticipated.

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 has 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 frequency of the sampling and testing plan, as detailed in Paragraph A5, 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 Sample

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

A.4.2 Sampling plan

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

A.4.3 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.4.4 Type testing

Testing performed to demonstrate that the material, component, joint or assembly 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.

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

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Relevant Standard	Review materials parts lists and data/test reports	At any change in materials specification
Marking	6	Marking	Review against documentation/physical examination	At any change in design/specification
Packaging	7	Protection from damage during transportation and handling		
Design	8.1	Integral plumbing components, accessories or fittings	Applicable specification	At any change in design/specification
	8.2	End connectors	AS/NZS 1260	
	8.3	Inspection opening	Design review/ Clause 9.2	
	8.4	General design	Design review	
Performance	9.1	Paper and solids discharge test	Appendix B	At any change in materials, formulation or design or every five years, whichever occurs first
	9.2	Hydrostatic strength test	AS/NZS 1462.10	At any change in design or manufacturing process
	9.3	Endurance test	Appendix C	
	9.4	Inspection opening and access cover – load testing	AS 3996	At any change in design or manufacturing process
Product documentation	11	Product data/Installation, operation and maintenance instructions	Documentation review	Any factor that requires a change in documentation, e.g., amendments to AS/NZS 3500 series of Standards

Table A2— BATCH RELEASE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Relevant Standard	Delivery acceptance tests or supplier's test data	Each delivery batch
Marking	6	Markings	Visual examination	100%
Performance	9.1	Paper and solids discharge test	Appendix B	Once per batch
	9.2	Hydrostatic pressure test	AS/NZS 1462.10	

Appendix B PAPER AND SOLIDS DISCHARGE TEST

(Normative)

B.1 SCOPE

This Appendix sets out the method for determining the effective discharge of toilet paper and waste from an SDU.

B.2 PRINCIPLE

The set-up is placed for the paper and test pieces discharge tests and flushed to determine whether the paper and test pieces are fully discharged from the SDU.

B.3 APPARATUS

The following apparatus is required:

(a) An SDU unit as specified by the manufacturer.

(b) Single ply toilet tissue sheet size 115 ±5 × 100 ±5 mm.

(c) A water supply.

(d) 1 m length DN 100 PVC pipe.

(e) DN 100 PVC pipe with a 90° bend.

(f) Solids (artificial test pieces). The four test pieces shall be produced using 25 ±2 mm diameter sausage casing, string, elastomer ‘O’ rings, nominal 10 × 2.5 mm, a metal impulse device (required for use with electronic test device only), a small quantity of water and cotton gauze finger bandage.

(g) The test pieces shall be in accordance with Paragraph C4. Four test pieces shall be used.

(h) A suitable container capable of measuring 1 +0.1 −0 mL.

(i) A suitable container to collect the test pieces and discharge volume.

NOTE: A typical set-up is shown in Figure B1.

B.4 TEST PIECES

The test shall be prepared as follows:

(a) Cut and mark the casing according to Figure B2.

(b) Tie off one end as illustrated in Figure B3, then fill the casing with 37 +2, −0 mL of water and tie off the opposing end.

(c) Expand the rubber 'O' rings and fit over test pieces as illustrated. Verify the test piece in accordance with Figure B4 and cut off surplus casing. The casing shall be completely filled with water.

For durability, the casing shall be covered with a tight-fitting cotton gauze tubular bandage and tied off with a string, beyond the ends of the casing, with intermediate ties in accordance with Figure B6.

(d) Check the test pieces with a gauge complying with Figure B7.

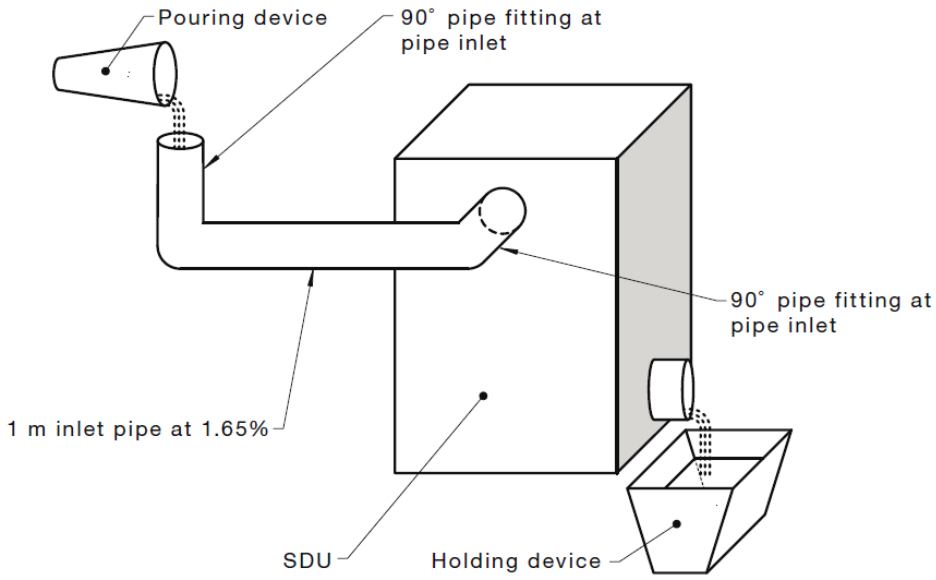


FIGURE B1 TYPICAL PAPER AND SOLIDS DISCHARGE TEST SET-UP

B.5 PROCEDURE

The procedure shall be as follows:

(a) Set up the SDU in accordance with the manufacturer's installation instructions and connect a 1 m length of DN100 PVC pipe with an upturned 90° bend at end. The DN 100 mm pipe shall fall at 1.65% into the SDU. A measuring device capable of introducing 1 L discharges shall be used to introduce water and material to the upturned pipes (see Figure B1).

(b) Pre-condition the SDU's activation function using water three times prior to the commencement of the test.

(c) Introduce discharge water into the 90° upturned bend until the tipping discharge bucket activates and water is released from the unit.

(d) Measure discharge water volume.

(e) After the self-righting of the discharge bucket, add six jointed sheets of paper and two test pieces to each 1 L measure of discharge water.

(f) Introduce discharge water into 90° upturned bend.

(g) Repeat Steps (c) and (d) until SDU retention device activates.

(h) Record whether the toilet paper and test pieces are discharged from the SDU outlet.

(i) Repeat Steps (c) to (f) 10 times consecutively.

B.6 TEST REPORT

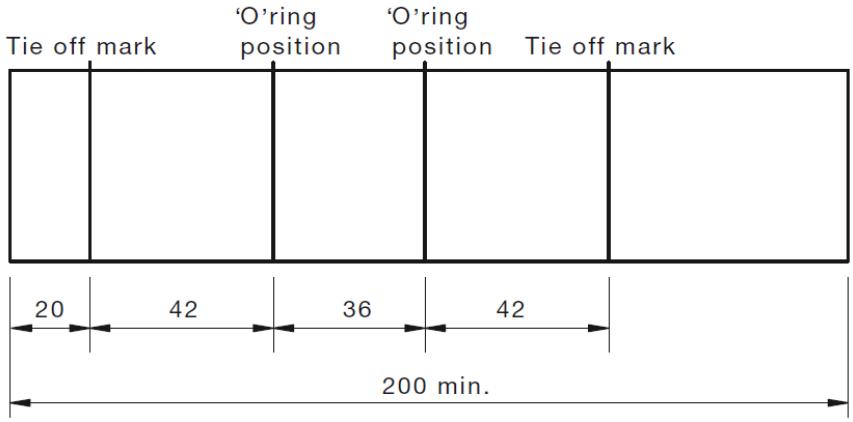
The following shall be reported:

(a) Manufacturer, model, type and nominal capacity of the temporary retention device.

(b) Discharge volume.

(c) Whether the inline sewer dosing unit discharged all the toilet paper and test pieces from the outlet for each flush.

(d) Reference to this test method, i.e., WMTS-499, Appendix B.



NOTE: Mark and cut off to length the natural or artificial sausage skin casing using this template.

DIMENSIONS IN MILLIMETRES
(Nominal ±1 mm)

FIGURE B2 TEST PIECES MEASURING TEMPLATE

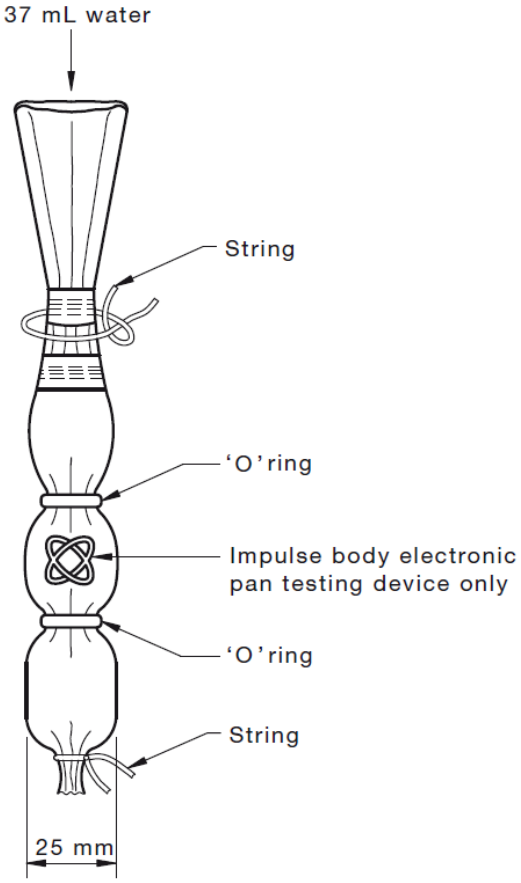


FIGURE B3 TYING POSITIONS OF TEST PIECE

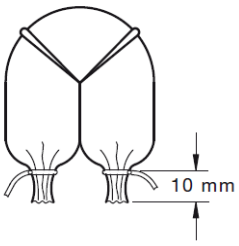


FIGURE B4 VERIFICATION OF FLEXIBILITY OF TEST PIECE

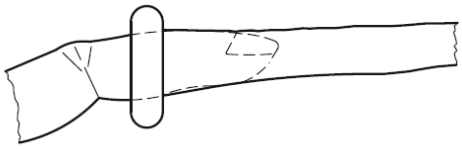


FIGURE B5 ROLL COTTON GAUZE BANDAGE OVER TEST PIECE

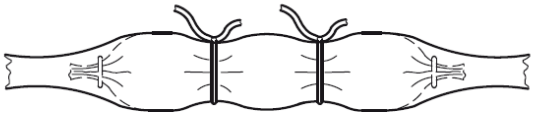


FIGURE B6 TEST PIECE COVERED WITH COTTON GAUZE BANDAGE

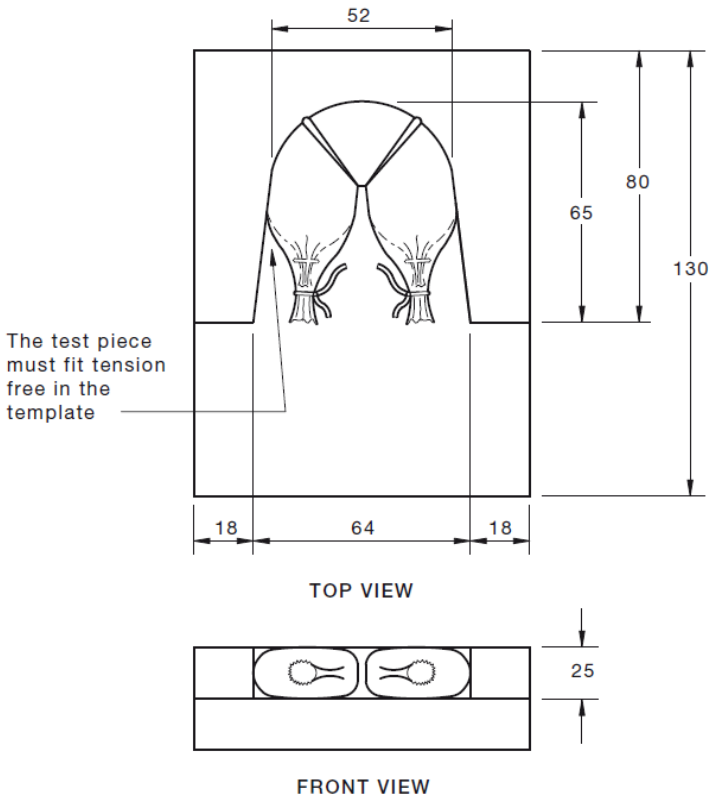


FIGURE B7 GAUGE TO CHECK THE FINISHED CONFIGURATION OF TEST PIECE

Appendix C ENDURANCE TEST

(Normative)

C.1 SCOPE

This Appendix sets out the method for conducting a cyclic test for an SDU 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 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) Recirculating water supply at ambient temperature to feed the inlet.

(c) Pump, counting meters, and other equipment in order to establish operational characteristics during commissioning and during cycling.

(d) Pipe or suitable means for connecting the water supply to the device to be tested.

(e) Water storage device.

(f) Pump suitable to meet, but not exceed, design fixture unit flow rates as noted in AS/NZS 3500.2 and AS/NZS 3500.5.

(g) 1 m inlet pipe at 1.65° grade.

NOTES:

1 A pump(s) sufficient to allow 3 discharge bucket activations per minute should be considered as a guide (this will ensure testing is completed within 14 days)

2 Typical test set-up is shown if Figure C1.

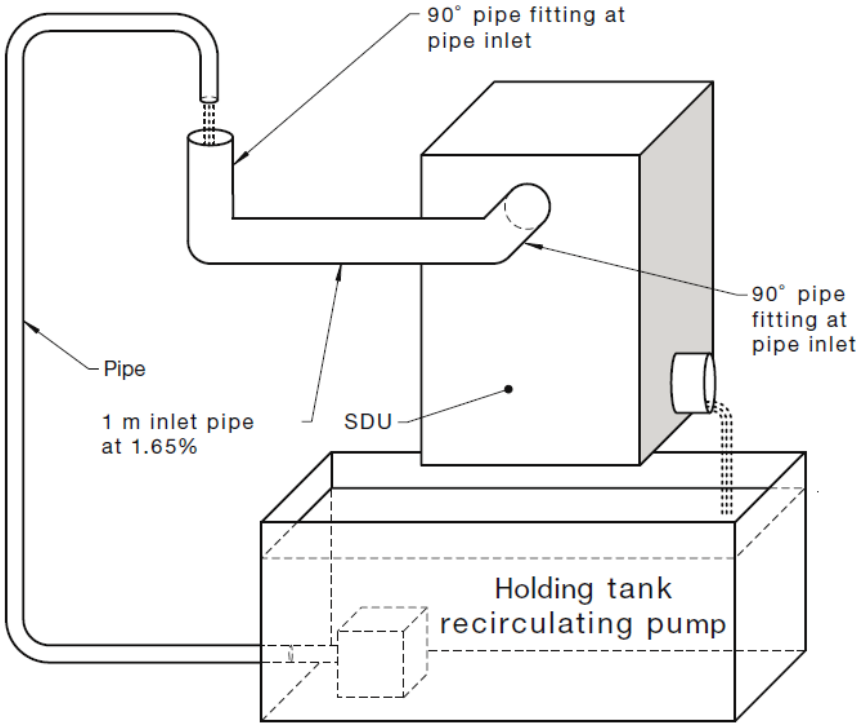


FIGURE C1 TYPICAL ENDURANCE TEST SET-UP

C.4 PROCEDURE

The procedure shall be as follows:

(a) Set up the SDU in accordance with the manufacturer's installation instructions and connect a 1 m length of DN 100 PVC pipe with an upturned 90° bend at end. The DN 100 mm pipe shall fall at 1.65% into the SDU (see Figure C1).

(b) Activate pump(s) and allow for constant dosing until a minimum of 50 000 dosing activations.

(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, that is, 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's 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-499, Appendix C.

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