



WMTS-473:2016

Stainless steel/nano-antibiotic PP-R pipe systems for water supply applications

WaterMark Technical Specification

2016



ABCB



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Stainless steel/nano-antibiotic PP-R pipe systems for water supply applications

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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 5200.473 – 2007.

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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General Manager
Australian Building Codes Board
GPO Box 9839
Canberra ACT 2601
Phone 1300 134 631 – Fax 02 6213 7287

PREFACE

WaterMark Technical Specification WMTS-473: 2016 Technical Specification for plumbing and drainage products, Stainless steel/nano-antibiotic PP-R pipe systems for water supply applications 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 5200.473 – 2007, 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 23 May 2007.

The following organisations were represented on Committee WS-031 in the preparation of Australian Technical Specification ATS 5200.473 – 2007.

- Association of Accredited Certification Bodies
- AUSTAP
- Australian Electrical and Electronic Manufacturers Association
- Australian Industry Group
- Australian Stainless Steel Development Association
- BRANZ
- Building Officials Institute of New Zealand
- Certification Interests (Australia)
- Consumer Electronics Suppliers Association
- Copper Development Centre – Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- National Fire Industry Association
- National Plumbing Regulators Forum
- New Zealand Water & 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 specifies requirements for a composite piping system consisting of a stainless steel outer casing bonded to an inner layer of polypropylene (PP-R), which includes a contact layer of nano-antibiotic material. This system is generally intended for use in cold and heated water supply systems at continuous operating temperatures up to 80°C with short exposures up to 100°C and continuous working pressures not exceeding 1.4 MPa.

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

4176 Polyethylene/aluminium and cross-linked polyethylene/aluminium macrocomposite pipe systems for pressure applications

AS/NZS

1462 Methods of test for plastics pipes and fittings

1462.6 Part 6: Method for hydrostatic pressure testing of pipes

3500 Plumbing and drainage

3500.0 Part 0: Glossary of terms

3500.1 Part 1: Water supply

3500.4 Part 4: Heated water services

4020 Testing of products for use in contact with drinking water

EN

12294 Plastics piping systems—Systems for hot and cold water—Test method for leak tightness under vacuum

ISO

3501 Assembled joints between fittings and polyethylene (PE) pressure pipes—Test of resistance to pull out

3503 Assembled joints between fittings and polyethylene (PE) pressure pipes—Test of leakproofness under internal pressure when subjected to bending

10508 Thermoplastics pipes and fittings for hot and cold water systems

15874 Plastics piping systems for hot and cold water installations—Polypropylene

(PP)

15874.1 Part 1: General

ISO

17454 Plastic piping systems—Multilayer pipes—Test method for adhesion of the different layers using a pulling ring.

4 DEFINITIONS

For the purpose of this Technical Specification, the definitions given in AS/NZS 3500.0, AS 4176 and the one below apply.

4.1 Stainless steel/nano-antibiotic plastics composite pipe

A composite pipe consisting of an inner plastic pipe made of nano-antibiotic plastics (mixed with nano-antibiotic grain and thermoplastic plastic) and a polished and welded outer pipe made of stainless steel band.

5 MATERIALS

5.1 Pipes and fittings

5.1.1 *Stainless steel*

Stainless steel shall be grade 316 complying with the relevant ASTM Standard for the product form.

5.1.2 *Polypropylene (PP-R)*

The material for the composite layer shall comply with the requirements of ISO 15874.

6 MARKING

6.1 Pipes

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

- (a) Manufacturer's name or trademark.
- (b) Nominal size in the form—DN.
- (c) Temperature classification in the form of 'cold water' or maximum operating temperature.
- (d) Date of manufacture in the form 070123 (i.e., 23 January 2007), as appropriate.
- (e) WaterMark.
- (f) Licence number.
- (g) The number of this Technical Specification, i.e., WMTS-473.

NOTE: Where space is limited, the number of this Technical Specification may be in abbreviated form, i.e., S473.

6.2 Fittings

Each fitting shall be durably marked with the following:

- (a) Manufacturer's name or trademark.
- (b) Nominal size of the pipe for which the fitting is designed in the form—DN.
- (c) WaterMark.
- (d) Licence number.
- (e) The number of this Technical Specification, i.e., WMTS-473.

NOTE: Where space is limited, the number of this Technical Specification may be in abbreviated form, i.e., S473.

7 PACKAGING

The pipe or fitting shall be packaged in such a manner as to avoid damage during transportation and handling.

8 DESIGN

8.1 Pipes

8.1.1 Classification

For water applications, pipes are classified as PN 14. This relates to a maximum static working pressure of 1.4 MPa at a continuous material temperature not exceeding 80°C for a working life of not less than 50 years.

8.1.2 Dimensions

Pipe dimensions shall comply with the requirements of Table 1.

TABLE 1
DIMENSIONS OF PIPES

Nominal size (DN)	Nominal wall thickness	Wall thickness			Mean outside diameter (mm)		Ovality (max.)
		Inner nano-antibiotic layer (min.)	Outer stainless steel	Plastic (min.)	Min.	Max.	
16	2.0	0.20	0.25 + 0.02	1.53	15.90	16.20	0.013 DN
20	2.0	0.20	0.25 + 0.02	1.53	19.90	20.20	
25	2.5	0.20	0.25 + 0.02	2.03	24.90	25.20	
32	3.0	0.30	0.28 + 0.02	2.34	31.90	32.20	
40	3.5	0.30	0.28 + 0.02	2.84	39.90	40.22	0.015 DN
50	4.0	0.30	0.35 + 0.02	3.30	49.90	50.25	
63	5.0	0.40	0.35 + 0.02	4.20	62.90	63.25	0.017 DN
75	6.0	0.40	0.55 + 0.02	5.05	74.85	75.30	
90	7.0	0.50	0.55 + 0.02	5.95	89.80	90.40	
110	8.0	0.50	0.55 + 0.02	6.70	109.80	110.50	0.018 DN
125	9.0	0.50	0.80 + 0.02	7.70	124.80	125.60	
160	10.0	0.50	0.80 + 0.02	8.70	159.70	160.70	

8.1.3 Pipe lengths

Pipe length shall be 4 m, 6 m, 8 m, or as designated by the customer, with a tolerance of 0, +5 mm.

8.1.4 Freedom from defects

The surface of the pipe shall be smooth without cracks, folding or delamination, acid cleaning or peroxidated iron band, free of obvious soldered points, scratches, dots, dents or welded scars. The mouth of the pipe shall be smooth and free of burrs. The end face shall be vertical to the axis of the pipe.

8.1.5 *Surface finish and colours*

The outer surface of the pipe shall be non-reflective. The inner surface of heated water pipe shall normally be red and that of the cold water pipe shall be white or natural.

8.2 **Fittings**

8.2.1 *End connectors*

End connectors for connection to metallic or plastics piping systems shall comply with the requirements of the AS or WMTS relevant to the piping system.

8.2.2 *Freedom from defects*

Fittings shall be clean, smooth and free from burrs, fins, irregularities and sharp edges that could affect the performance or function of the fitting in service and the safe handling of the fitting during installation and use. There shall be no imperfections that will score the pipe or cause damage to other fittings. The bore of the fittings shall be free from irregularities that may restrict the free flow of fluids. Connection ends shall be parallel within $\pm 2^\circ$ of the appropriate axis of the fitting.

The surfaces of plastic components shall be free from grooves, pinholes, blisters, heat marks or other imperfections that would affect the performance or function of the fitting in service.

Fittings, including components of metallic materials, shall be sound and free from folds, laps blisters, blowholes or other imperfections that would affect the performance or function of the fitting in service. Pitting shall not be present on sealing faces or thread faces. Pitting shall be permissible in other locations provided the minimum wall thickness provisions of the manufacturer's specifications are maintained and the pits will not affect the performance or function of the fitting in service.

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.

9.2 **Pipes**

9.2.1 *Flattening test*

When the deformation of the external diameter reaches 50%, there shall be no breaching upon the inner and outer surfaces, no breaking of the crater, and no detachment between the inner and outer layers.

9.2.2 Adhesion of pipe layers

When tested in accordance with ISO 17454, the minimum adhesive force shall be 30 N/cm for nominal outside diameters less than 32 mm for other sizes it shall be 40 N/cm. The minimum peel strength of each sample in each group shall not be below 50% of the standard value.

9.2.3 Pressure resistance test

When tested in accordance with AS/NZS 1462.6, the pipe shall withstand the pressures as indicated in Table 2.

TABLE 2
TEST PRESSURES

Temperature °C	Test pressure (MPa)	
	Minimum test duration	
	1 h	1000 h
20 ±2	6.7	—
95 ±2	2.5	2.0

9.3 Fittings

9.3.1 Compatibility of fittings with pipe—Pressure resistance

When tested in accordance with AS 1462.6 pipe and fitting assemblies shall withstand an internal pressure as identified in Table 3 with no breaching or leakage.

TABLE 3
TEST PRESSURES

Temperature °C	Test pressure (MPa)	
	Minimum test duration	
	1 h	1000 h
20 ±2	7.51	—
95 ±2	—	1.64

9.3.2 Resistance to leakage when subjected to bending

When tested in accordance with ISO 3503, there shall be no leakage from the assembled joint when subjected to an internal hydrostatic pressure of 1.5 MPa for 1 hour at 23 ±5°C.

9.3.3 Thermal cycling test

When tested in accordance with ISO 10508, there shall be no leakage from the assembled joint.

9.3.4 *Pressure cycling test (cycle pressure shock)*

When tested in accordance with ISO 10508, there shall be no leakage from the assembled joint.

9.3.5 *Leaktightness under vacuum*

When tested in accordance with EN 12294, using the test parameters given in Table 4, the change in vacuum pressure shall be not greater than 5 kPa.

TABLE 4
TEST PARAMETERS

Test parameter	Test values
Test temperature	23°C
Number of test pieces	3
Test pressure	-80 kPa
Test duration	1 h

9.3.6 *Pull-out test*

When tested in accordance with ISO 3501, using the test loads as identified in Table 5, the pipe shall not pull out of the fitting nor shall there be any separation of the fitting components.

TABLE 5
TEST LOAD

Nominal size	Applied force (N)
16	610
20	940
25	1472
32	1930

10 VOID

11 PRODUCT DOCUMENTATION

11.1 **Product data**

Product data, which identifies maximum allowable operating pressure and temperature, shall be available.

11.2 **Installation instructions**

Installation instructions shall be provided, which shall include the following:

- (a) References to AS/NZS 3500.1 where applicable.

- (b) Step-by-step instructions.
- (c) The need for special tools or training.
- (d) Troubleshooting guide.
- (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 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 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.

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

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 this 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

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Composition, temper, etc.	Review materials parts lists and compliance certificates	At any change in materials specifications
Marking	6	Labelling/markings	Review of documentation/physical examination	At any change in design/specification
Packaging	7	Protection of transit damage		
Design	8.1.2	Pipes-Dimensions, table 1	Direct measurement	At any change in design/Specification
	8.1.3	Pipes-Length	Direct measurement	
	8.1.4	Pipes-Freedom from defects	Visual	
	8.1.5	Pipes-Surfaces finish and colours	Visual	
	8.2.1	Fittings-End connectors	Relevant Standard	
	8.2.2	Fittings-Freedom from defects	Visual	
Performance	9.1	Products in contact with drinking water	AS/NZS 4020	At any change in materials, formulation or design or every five years, whichever occurs first
	9.2.1	Pipes-Flattening test	Clause 9.2.1	At any change in design or manufacturing process
	9.2.2	Pipes-Adhesion of pipe layers	ISO 17454	
	9.2.3	Pipes-Pressure resistance test	AS/NZS 1462.6	
	9.3.1	Fittings-Compatibility of fittings with pipe-Pressure resistance	AS/NZS 1462.6	
	9.3.2	Resistance to leakage when subjected to bending	ISO 3503	
	9.3.3	Fittings-thermal cycling test	ISO 10508	
	9.3.4	Fittings-Pressure cycling test (cycle pressure shock)	ISO 10508	
	9.3.5	Fittings –Leaktightness under vacuum	EN 12294	
	9.3.6	Fittings-Pull-out test	ISO 3501	
Product documentation	11	Product data/installation instructions	Documentation review	At any change factors that require a change in documentation e.g., amendments to AS/NZS 3500.1

Table A2— BATCH RELEASE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Composition, temper, etc.	Review materials parts lists and compliance certificates	Once per batch
Marking	6	Labelling/markings	Review of documentation/physical examination	Once per batch
Packaging	7	Protection of transit damage		
Design	8.1.2	Pipes-Dimensions, Table 1	Direct measurement	Once per hour
	8.1.3	Pipes-Length	Direct measurement	Once per hour
	8.1.4	Pipes-Freedom from defects	Visual	100%
	8.1.5	Pipes-Surface finish and colours	Visual	100%
	8.2.1	Fittings – End connectors	Relevant Standard	Once per batch
	8.2.2	Fittings – Freedom from defects	Visual	100%
Performance	9.2.2	Pipes-Adhesion of pipe layers	ISO 17454	Once per batch
	9.2.3	Pipes-Pressure resistance test	AS/NZS 1462.6	Once per batch
	9.3.1	Fittings –Compatibility of fittings with pipe-Pressure resistance	AS/NZS 1462.6	Once per batch

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Canberra ACT 2601
www.abcb.gov.au