



WMTS-518:2017
**Rehabilitation of existing Non
Pressure Pipelines by the use of
Cured In Place Pipe (CIPP)**

WaterMark Technical Specification

2017





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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

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 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-518:2016 was prepared by industry and reviewed by the ABCB WaterMark Technical Advisory Committee. It was approved by the ABCB on 18 May 2016.

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1 SCOPE

This Technical Specification sets out requirements and test methods for cured-in-place pipes (CIPP) used for the rehabilitation of above and below ground non pressure drainage and sewerage pipelines.

The CIPP consists of a resin system in combination with a compatible fibrous/woven material which is installed within the damaged pipeline, inflated against the pipe substrate and cured in place filling any cracks and voids.

The process may be applied to metallic and non metallic non pressure piping systems in pipe sizes DN 40 to DN 1000 in the rehabilitation of existing pipe work in the field above and below ground.

These products require certification to WaterMark Level 2.

2 APPLICATION

In accordance with the 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 those items listed within AS/NZS 3500.2, Clause 2.3 Selection and Use of Materials and Products. The warranty must be clearly visible and comprehensible to the intending purchaser and user. The application limitations must also be stated within the product installation instruction details.

Appendix A sets out the means by which compliance with the Specification is demonstrated by a manufacturer for the purpose of product certification.

Appendix B identifies those activities undertaken to ensure CIPP is applied in the field under controlled conditions.

Installation shall be undertaken by personnel trained by the CIPP manufacturer or a registered training organisation and be licensed in the jurisdiction where the installation is undertaken.

3 REFERENCED DOCUMENTS

The following documents are referred to in this Specification:

AS/NZS

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

ISO

11296.4 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks, Part 4 Lining with cured-in-place pipes

4 DEFINITIONS

For the purpose of this WaterMark Technical Specification, the definitions given in ISO 11296.4 and AS/NZS 3500.0 apply.

5 MATERIALS

5.1 Lining tube

The lining tube components shall include materials complying with ISO 11296.4 Table 1.

5.2 Material characteristics

The resin system shall be tested and comply with the requirements of ISO 11296.4 Table 2.

6 MARKING

The outside of each lining tube or its packaging shall be permanently and legibly marked with the following:

- a) Manufacturer's name, brand or trademark
- b) The date of manufacture or batch identification
- c) Use by date
- d) Outside Diameter of pipe
- e) Wall thickness
- f) Lining tube structure and resin system
- g) Licence number
- h) Number of the WaterMark Technical Specification, i.e., WMTS-518.

7 PACKAGING

The lining tube shall be supplied in a manner so as to avoid damage during transportation and handling.

8 DESIGN

8.1 Wall thickness

The design thickness of the CIPP is largely a function of the condition of the existing pipe. The manufacturer shall include within specifications, nominal wall thicknesses for each nominal size of rehabilitated pipe.

8.2 Freedom from defects/workmanship

The installation of the CIPP may be inspected visually, or by closed-circuit television if visual inspection cannot be accomplished. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be accounted for and be unobstructed.

8.3 CIPP specification

The manufacturer of the CIPP shall make available a specification and procedures that includes the items identified in Clause 11.

8.4 Colour

The final colour of the CIPP shall be of a colour that is clearly distinguishable from the pipeline being rehabilitated.

9 PERFORMANCE REQUIREMENTS AND TEST METHODS

9.1 Wall thickness

The wall thickness of installed pipe shall be tested and comply with the requirements of ISO 11296.4 Table 4.

9.2 Mechanical characteristics

When tested in accordance with the methods identified in ISO 11296.4 Table 5 pipe shall comply with the identified requirements.

9.3 Chemical resistance

When tested in accordance with the methods identified in ISO 11296.4 Table 6 pipe shall comply with the identified requirements.

10 TEST SEQUENCE AND TEST SAMPLE PLAN

10.1 Test samples

Samples for testing to Clause 9.2 and 9.3 shall be taken from actual or simulated samples. When simulated samples are used consideration shall be given to the curing conditions normally encountered in the field.

10.2 Test Sequence

Void.

11 PRODUCT DOCUMENTATION

11.1 General

Technical information relating to the CIPP system 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 Plumbing Code of Australia (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 and as a minimum include—

- a) Application in terms of pipe size, fittings
- b) Technical data of materials utilised and Material Safety Data Sheets (MSDS)
- c) Maximum and minimum CIPP thickness
- d) CIPP stiffness
- e) Maximum and minimum temperature limitations
- f) Life expectancy.

11.3 Installation instructions

Instructions shall be provided that give full details of application procedures for the CIPP including;

- a) Storage handling and transport of pipe components and materials
- b) Equipment to be used
- c) Inspection of pipeline
- d) Removal of line obstructions
- e) Cleaning of pipeline
- f) Bypassing of pipeline
- g) Installation of CIPP
- h) Pressurising CIPP
- i) Curing
- j) Final inspection and testing
- k) Occupational Health and Safety.

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 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 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	Composition	ISO 11296.4 Table 1/2	Any change in material specification
Markings	6	Labelling/markings	Review of documentation/physical examination	Any change in design/specification
Packaging	7			
Design	8.1	Wall thickness	Clause 8.1	At any change in design/specification
	8.2	Freedom from defects/workmanship	Clause 8.2	
	8.3	CIPP specification	Clause 8.3	
	8.4	Colour	Clause 8.4	
Performance	9.1	Wall thickness	ISO 11296.4 Table 4	At any change in materials or formulation
	9.2	Mechanical characteristics	ISO 11296.4 Table 5	
	9.3	Chemical resistance	ISO 11296.4 Table 6	
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 series of Standards

TABLE A2
BATCH RELEASE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Markings	6	Labelling/markings	Review of documentation/physical examination	Each Installation
Design	8.2	Freedom from defects/workmanship	Clause 8.2	Each Installation
Performance	9.1	Wall thickness	ISO 11296.4 Table 4	Each Installation

APPENDIX B REQUIREMENTS FOR REHABILITATION BY USE OF CIPP

(Normative)

B.1 SCOPE

This Appendix specifies the process verification tests for a CIPP system used for rehabilitation of non pressure piping systems. The process verification tests aim at ensuring that adequate procedures are used in field application.

B.2 CIPP PROCEDURES

The CIPP installer shall have in place documented procedures for all stages of the processes. These procedures are adapted to suit specific applications.

B.3 CIPP MATERIAL

CIPP materials shall comply with the type test requirements of Appendix A Table A1 and shall be utilised in accordance with the CIPP manufacturer's application specifications (see Clause 11). These specifications shall be incorporated into the CIPP procedures.

B.4 PROCESS VERIFICATION

A sample of the CIPP which has been processed in accordance with these production procedures shall be tested and meet the requirements of Clause B.6.

B.5 SAMPLES

Samples shall be fabricated from material taken from the CIPP. Samples should be large enough to conduct the testing.

B.6 PROCESS VERIFICATION TESTS

Sections of CIPP or sample plates as specified in the test method shall be used as samples for the tests identified below.

B.6.1 Workmanship/visual appearance

The installation may be inspected visually if appropriate, or by closed-circuit television if visual inspection cannot be accomplished. Variations from true line and grade may be inherent because of the conditions of the original piping. No infiltration of groundwater should be observed. All service entrances should be accounted for and be unobstructed

B.6.2 Wall thickness

Make a minimum of eight measurements at evenly spaced intervals around the circumference of the pipe to ensure that minimum and maximum thicknesses have been determined. Deduct from the measured values the thickness of any plastic coatings or CIPP layers not included in the structural design of the CIPP. The average thickness should be calculated using all measured values and shall meet or exceed minimum design thickness. The minimum wall thickness at any point shall not be less than 80% of the specified design thickness.

B.6.3 Short term flexural modulus

Where required by contract the properties of the CIPP shall comply with the Short-term flexural modulus requirements of Table 5 ISO 11296.2 when tested in accordance with ISO 178.

B.6.4 REWORK

Where non conforming products are to be reworked then this shall be done in accordance with the prequalified procedures and the CIPP system installation instructions.

B.7 RECORDS

Records of the verification testing shall include as a minimum;

- a) Company name
- b) General description of CIPP processes ie. Size of pipe, pipe material, substrate, total time of installation, volume of material used
- c) Description of the samples used for verification testing
- d) Test results
- e) Person and company taking responsibility for verification process and testing
- f) A physical reference sample.

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Australian Building Codes Board
GPO Box 2013
Canberra ACT 2601
www.abcb.gov.au