



**WMTS-519:2023**

## **Plastic Bodied Flexible Coupling**

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**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 major changes to this revision are as follows: -

- (i) Scope expansion to include fittings from existing limitation of DN225 to DN300
- (ii) Deletion of compression strength and addition of tear strength within Table 5.1.
- (iii) Additional marking requirements included.
- (iv) General update in several areas due to changes to referenced standards since the initial issue (2016)
- (v) Inclusion of compliance Tables A3 and A4

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](http://www.abcb.gov.au)). These lists will be version controlled with appropriate historic references.

## **ACKNOWLEDGEMENTS**

WaterMark Technical Specification WMTS-519:2016 was prepared by industry and reviewed by the ABCB WaterMark Technical Advisory Committee. It was approved by the ABCB on 19 July 2016.

## TABLE OF CONTENTS

1	Scope .....	6
2	Application.....	6
3	Referenced documents.....	6
4	Definitions .....	7
5	Materials .....	7
6	Marking .....	8
7	Packaging .....	8
8	Design.....	8
9	Performance requirements and test methods.....	9
10	Test sequence and test sample plan .....	11
11	Product documentation .....	11
Appendix A	Means for demonstrating compliance with this technical specification....	12
Appendix B	Fitting-flexural strength test .....	16
Appendix C	Fitting-flexural strength endurance test .....	18

## 1 SCOPE

This WaterMark Technical Specification sets out requirements for plastic bodied couplings **up to DN300** with included elastomeric element that provides limited flexibility and are utilised in non pressure rigid pipeline systems. The design of the coupling is such that it allows for movement of the pipeline and prevents damage due to imposed stresses.

The fitting is suitable for installation:

- a) in above and below ground applications
- b) where there are unstable soil conditions, (AS/NZS 3500.2 Appendix G)
- c) in all orientations.

## 2 APPLICATION

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 Specification:

ABCB	Plumbing Code of Australia (PCA)
AS	
2888.8	Methods of testing plastics waste fittings - Method 8: Thermal cycling test
AS/NZS	
1260	PVC-U pipes and fittings for drain, waste and vent application
1462.8	Methods of test for plastics pipes and fittings - Method 8: Method of test for infiltration
1462.11	Methods of test for PVC pipes and fittings - Method for high temperature stress-relief testing of fittings
3500	Plumbing and Drainage
3500.0	Part 0 Glossary of terms
3500.2	Part 2 Sanitary plumbing and drainage
3879	Solvent cements and priming fluids for PVC (PVC-U and PVC-M) and ABS and ASA pipes and fittings
ISO	

34.1	Rubber, vulcanized or thermoplastic — Determination of tear strength — Part 1: Trouser, angle and crescent test pieces
37	Rubber vulcanised or thermoplastic - Determination of tensile stress-strain characteristics
13967	Thermoplastics fittings - Determination of ring stiffness

## 4 DEFINITIONS

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

## 5 MATERIALS

### 5.1 Fitting body

The fitting body shall be manufactured from plastic materials as defined in the standards relating to the material type. For outdoor applications, the plastic material shall be UV stabilised.

### 5.2 Elastomeric element

The elastomeric element that provides the flexibility of the fitting shall be as recommended by the manufacturer for the application, fluids being transported and comply with the requirements included in Table 5.1. Where outdoor use is required, the material shall be suitable for resisting UV ageing and for weathering resistance.

**TABLE 5.1**  
**PHYSICAL PROPERTY REQUIREMENTS**

Property	Unit	Test Method	Criteria (Minimum)
Tensile Strength (min)	MPa	ISO 37	10
Elongation at Break (min)	%	ISO 37	500
<b>Tear Strength</b>	<b>kN/m</b>	<b>ISO 34-1</b>	<b>35</b>

### **5.3 Solvent cement**

Fittings with tapered/interference fit joints manufactured to this WMTS, which are suitable for solvent cement jointing, shall be used with solvent cements and priming fluids complying with AS/NZS 3879 (Type N).

## **6 MARKING**

Markings to be placed on products and packaging, shall as a minimum, be in accordance with Clause 9.6 of the Manual for the WaterMark Certification Scheme.

In addition each fitting shall be permanently and legibly marked with the following:

- a) manufacturer's name, brand or trademark
- b) number of the WaterMark Technical Specification, i.e. WMTS 519.
- c) nominal size of the product.
- d) material of the main part of the product
- e) class of pipe for which the product is intended, ie, SN6.

## **7 PACKAGING**

Each fitting shall be suitably packaged to avoid damage during transportation and handling, and to maintain its physical and dimensional integrity.

## **8 DESIGN**

### **8.1 End connections**

#### **8.1.1 Solvent-welded joints**

Dimensions of solvent-welded joints to connect to PVC-U pipes shall comply with AS/NZS 1260.



## 8.2 Waterway/clear bore

The waterway/clear bore of a fitting shall be determined by its ability to accept passage of a sphere of appropriate diameter as given in Table 5.5 AS/NZS 1260

## 8.3 Freedom from defects

Fittings shall be free from blisters and heat marks. Spigot ends of fittings shall be free from chips and rough edges, and shall have sharp edges removed. Jointing surfaces shall be smooth.

# 9 PERFORMANCE REQUIREMENTS AND TEST METHODS

## 9.1 High temperature stress relief test

When determined in accordance with AS/NZS 1462.11, at a temperature of  $150 \pm 4^\circ\text{C}$  for  $30 + 3, - 0$  min, the high temperature stress relief properties of the plastic bodied component of the fitting shall comply with the following requirements:

- a) There shall be no evidence of inclusions or voids of size greater than 20% of the wall thickness up to a maximum of 1 mm.
- b) Delamination or damage at the injection point shall not have reduced the wall thickness to less than 50% of the specified minimum wall thickness.
- c) The weld line shall not open to a depth of more than 50% of the wall thickness.

NOTE: The weld line is likely to become prominent, and the fitting distorted, but this does not constitute a failure.

- d) Not more than 5% of the total internal and external surface area of the fitting shall exhibit blisters and/or surface delamination.

## 9.2 Thermal cycling

When tested in accordance with AS 2888.8, the fitting shall not:

- a) suffer any cracking, distortion or degeneration of the surface
- b) suffer any leakage when hydrostatically tested, at a pressure of 20 kPa for  $5 \pm 1$  min.
- c) suffer any loss of stiffness greater than 10% of the original value.

### 9.3 Liquid infiltration test

When an assembled fitting is subjected to an internal vacuum or external hydrostatic pressure resulting in a pressure differential of 80 +5, -0 kPa for 60 +5, - 0 min, in accordance with AS/NZS 1462.8, it shall not leak.

### 9.4 Stiffness

When tested in accordance with ISO 13967, the stiffness of products larger than DN80 shall be not less than the corresponding pipe for which the manufacturer specifies the product is fit for. See table 9.1.

**Table 9.1 Fitting stiffness rating**

Pipe Application	Pipe Class	Stiffness (N/m/m)
DWV (AS1260)	SN6	6000

NOTE: This table does not limit the certification of products with other stiffnesses as declared by the manufacturer (Clause 6)

Stiffness values shall be reported without pipework installed. However, for the endurance testing in Appendix B & C, which use the change in stiffness as a criteria, the testing should be conducted before and after the testing in the same condition as the test (ie with or without pipework).

### 9.5 Fitting-Hydrostatic pressure test

When tested in accordance with AS/NZS 1462.8, the assembled fitting shall withstand an internal pressure of 80 +5, -0kPa for 60 +5, -0min without leakage. Testing shall be done without angular or diametral deflection.

### 9.6 Fitting-Flexible strength test

When tested in accordance with Appendix B, at the maximum deflections as specified by the manufacturer in Angular, Rotation, Compression and Tension, the fitting shall not show any visual sign of damage, shall not leak and stiffness shall be maintained within 10% of original value.

### 9.7 Fitting-Flexible strength endurance test

When tested in accordance with Appendix C, at the maximum deflection as specified by the manufacturer in Angular, Rotation, Compression and Tension, the fitting shall not show any

visual sign of damage, shall not leak and stiffness shall be maintained within 10% of the original value.

## **10 TEST SEQUENCE AND TEST SAMPLE PLAN**

### **10.1 Test samples**

Samples of each design shall be selected for testing and confirmation of the requirements of Clause 9. A separate sample shall be utilised for the testing required by Clauses 9.2, 9.6 and 9.7.

### **10.2 Test sequence**

The testing of the sample to Clauses 9.3 to 9.7 shall be undertaken in that order.

## **11 PRODUCT DOCUMENTATION**

### **11.1 General**

Technical information relating to the fitting and correct installation methods shall be readily available to aid the user and installer. The information may be in the form of a technical data sheet or equivalent document, 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 the 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:

- a) product range and model identification
- b) limitations of fitting flexibility
- c) application and limitations.

### **11.3 Installation instructions**

Instructions shall be provided to give full details of installation procedures for the fitting, including:

- a) references to AS/NZS 3500 Parts 2 and 5 where applicable
- b) detailed step by step instruction
- C)** 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 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 Tables A1,A3 and A4 shall be used by the WaterMark Conformity Assessment Body. The batch release testing program shall be carried out by the manufacturer as detailed in Paragraph A5 and Table A2 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 compounds 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 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**

<b>Characteristic</b>	<b>Clause</b>	<b>Requirement</b>	<b>Test method</b>	<b>Frequency</b>
Materials	5	Materials	Review materials parts lists and compliance certificates	At any change in materials specification
Design	8.1	End connections	Clause 8.1	At any change in the design
	8.2	Waterway/clear bore	Clause 8.2	
	8.3	Freedom from defects	Clause 8.3	
Performance	9.1	High temperature stress relief test	AS/NZS 1462.11	At any change in design or manufacturing process
	9.2	Thermal cycling	AS 2888.8	
	9.3	Liquid infiltration test	AS/NZS 1462.8	
	9.4	Stiffness	ISO 13967	
	9.5	Fitting-Hydrostatic Pressure Test	AS/NZS 1462.8	
	9.6	Fitting-Flexural strength test	Appendix B	
	9.7	Fitting-Flexural strength endurance test	Appendix C	
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	Materials	Review materials parts lists and compliance certificates	Each delivery batch
Design	8.1.1	General Dimensions	AS/NZS 1462.1	Once per batch
	8.3	Freedom from defects	Visual Inspection	Once per cavity per hour
	9.1	High temperature stress relief test (Injection moulded Fittings – PVC-U)	AS/NZS 1462.11	One per cavity per production shift.

**TABLE A3**  
**MINIMUM ANNUAL INSPECTION REQUIREMENTS**

Characteristic	Clause	Requirement	Verification method
Design	8.1-8.4	General design/construction	Visual and dimensional examination
Product marking	6	Product marking, use of the WaterMark logo and licence number	Visual inspection of marked product, relevant packaging and documentation
Product documentation	11	Product data/Installation instructions	Product documentation review

**TABLE A4**  
**RE-EVALUATION TESTING**

Characteristic	Clause	Requirement	Test method
Performance	9.5	Hydrostatic pressure test	AS/NZS 1462.8

## **APPENDIX B FITTING-FLEXURAL STRENGTH TEST**

### **(Normative)**

#### **B.1 SCOPE**

This Appendix sets out the method for determining the ability of a fitting to withstand continuous flexural stress.

#### **B.2 PRINCIPLE**

The fitting is subjected to stresses due to deflection in Angular, Angular Rotation and Compression, held for a period of time and inspected for any permanent damage, leakage and loss of stiffness.

#### **B.3 APPARATUS**

The following apparatus is required:

- a) Test rig to retain the sample and maintain a prescribed deflection
- b) End Connections – Watertight end connections to enable hydrostatic pressure testing
- c) Pressure gauge.

#### **B.4 PROCEDURE**

The procedure shall be as follows:

- a) Test hydrostatically at a pressure of 20 kPa for  $5 \pm 1$  min and visually inspect for any leakage.
- b) Test for Stiffness in accordance with Clause 9.4.
- c) Retain assembly in the test rig and restrain one end by the connecting pipework or adaptor.
- d) Apply stress to the opposing end of the assembly to the maximum Angular deflection as specified by the manufacturer.
- e) Maintain this deflection for 24 hours.
- f) Release assembly from deflected position and visually inspect for:
  - i. whether assembly reverts to original position (within 10% of the DN)
  - ii. any damage due to the stresses applied.



- g) Repeat d) to f) for maximum deflection in Angular Rotation, Compression and Tension as specified by the manufacturer.
- h) Test hydrostatically at a pressure of 20 kPa for  $5 \pm 1$  min and visually inspect for any leakage.
- i) Test for stiffness in accordance with Clause 9.4.

## **B.5 REPORT**

The following shall be reported:

- a) manufacturer, model and size of fitting
- b) tested orientation
- c) applied deflection
- d) any leakage
- e) any structural damage
- f) stiffness before and after testing
- g) reference to this test method, i.e., WMTS 519, Appendix B.

## **APPENDIX C FITTING-FLEXURAL STRENGTH ENDURANCE TEST**

**(Normative)**

### **C.1 SCOPE**

This Appendix sets out the method for determining the ability of a fitting to withstand multiple flexural stresses of short durations.

### **C.2 PRINCIPLE**

The fitting is subjected to stresses due to deflection in Angular, Angular Rotation and Compression, held for a short period then repeated for a number of cycles. After the cycling, the fitting is inspected for permanent damage, leakage and loss of stiffness.

### **C.3 APPARATUS**

The following apparatus is required:

- a) Test rig to retain the sample and then apply a stress to maintain a specified deflection for a short period and cycle
- b) End connections – Watertight end connections to enable hydrostatic pressure testing
- c) Pressure gauge.

### **C.4 PROCEDURE**

The procedure shall be as follows:

- a) Test hydrostatically at a pressure of 20 kPa for  $5 \pm 1$  min and visually inspect for any leakage.
- b) Test for stiffness in accordance with Clause 9.4.
- c) Retain assembly in the test rig and restrain on end by the connecting pipework or adaptor.
- d) Apply stress to the opposing end of the assembly to the maximum Angular deflection as specified by the manufacturer.
- e) Maintain for 60 seconds +10 secs.
- f) Release stress of applied deflection.
- g) Maintain for 60 seconds +10 secs.
- h) Repeat e) to h) for a total of 500 cycles.

- i) Release assembly from test rig and visually inspect for any damage due to the stresses applied.
- j) Repeat d) to i) for maximum deflection in Angular Rotation, Compression and Tension as specified by the manufacturer.
- k) Test hydrostatically at a pressure of 20 kPa for  $5 \pm 1$  min and visually inspect for any leakage.
- l) Test for stiffness in accordance with Clause 9.4.

### **C.5 REPORT**

The following shall be reported:

- a) manufacturer, model and size of fitting
- b) tested orientation
- c) applied deflection
- d) any leakage
- e) any structural damage
- f) stiffness before and after testing
- g) reference to this test method, i.e., WMTS 519, Appendix C.