WMTS-520:2016
Semi-Flexible Metallic Hose Assemblies

WaterMark Technical Specification

2016

ABCB

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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. The WaterMark Schedule of Specifications lists all current WMTS and, where appropriate, the former ATS name.

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

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-520:2016 was prepared by industry and reviewed by the ABCB WaterMark Technical Advisory Committee. It was approved by the ABCB on 17 February 2016.

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1 SCOPE

This Technical Specification sets out requirements for semi-flexible metallic hose assemblies for use with both heated water up to 90°C and cold-water supplies, used for applications above ground, that are accessible and not submerged. Nominal sizes range from DN 20 to DN 400 with a working pressure of 1200 to 2500 kPa. The product may be used with drinking water and non-drinking water.

These products require certification to WaterMark Level 1.

2 APPLICATION

Typical products covered by the Technical Specification include:

a) Expansion joints

b) Seismic joints

c) Offset connectors

d) Misalignment connectors

This Technical Specification is not applicable to flexible connectors covered by the scope of AS/NZS 3499. Hose assemblies compliant with this Technical Specification are not designed to be consistently flexed in use, or function as the connection to end-of-line fittings.

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 Technical Specification:

ABCB	Procedures for Certification of Plumbing and Drainage Products
AS	
1432	Copper tubes for plumbing, gasfitting and drainage applications
2345	Dezincification resistance of copper alloy
2738	Copper and copper alloys - Compositions and designations of refinery products, wrought products, ingots and castings
3688	Water supply - Metallic fittings and end connectors

4041	Pressure Piping
4631	Limited flexibility connectors for gas
ASTM	
A380	Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
AS/NZS	
3500 .0	Plumbing and drainage - Glossary of terms
3500.1	Plumbing and drainage - Water services
3500.4	Plumbing and drainage – Heated water services
3500.5	Plumbing and drainage - Housing installations
3499	Water supply - Flexible hose assemblies
4020	Testing of products for use in contact with drinking water
CGA	
G4.1	Cleaning equipment for oxygen service
ISO	
10380	Pipework - Corrugated Metal Hoses and Hose Assemblies
NCC	
PCA	Plumbing Code of Australia

4 DEFINITIONS

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

4.1 Hose assembly

A hose assembly intended for use as part of a pipe work system including to connect a fixture, fitting, valve, appliance or similar equipment, that is capable of being flexed or bent in a specified direction without damage. The hose assembly may consist of an inner and an outer reinforcement braid or sleeve with secured end fittings to ensure watertightness.

4.2 Installation warranty

A statement by the manufacturer or supplier of a product, which states that the product is suitable for use under specified conditions. The conditions may be limits on water pressure, water quality, water temperature, repetitive movement or flexation after installation; or any other operational circumstances.

4.3 Misalignment

A condition in which two points, intended to be connected, will not mate due to being out of alignment with each other.

5 MATERIALS

5.1 General

All materials in contact with drinking water must be corrosion resistant. All tube reinforcement, such as metallic braiding and crimp fittings, must be corrosion resistant.

The following materials will be deemed to be corrosion resistant:

a) Plastic materials as described in Clause 5.2.

b) Copper as described in Clause 5.3.

c) Copper alloy as described in Clause 5.4.

d) Stainless steel as described in Clause 5.5.

5.2 Plastic and elastomeric material

Plastic and elastomeric materials used in metallic hose assemblies, or their components, must meet all of the performance requirements of this Technical Specification.

5.3 Copper

Copper must demonstrate compliance with the following:

a) Wrought products—AS 2738.

b) Tubular components— AS 1432.

5.4 Copper alloy

Copper alloy is to contain less than 4.5% lead, and its composition shall comply with a relevant ISO, EN, ASTM, AS or NZS Standard, and the following:

a) Copper alloys, where used in contact with drinking water are to be dezincification-resistant in accordance with AS 2345.

5.5 Stainless steel

Stainless steel metallic hose must comply with ISO 10380 and:

a) Stainless steel in contact with water must be a minimum of 316/316L grade.

b) Stainless steel not in contact with water must be a minimum of 304/304L grade.

5.6 Materials in contact with drinking water

All materials used in hose assemblies in contact with drinking water shall comply with AS 4020.

6 MARKING

Hose assemblies shall be marked permanently and legibly with the following:

a) Manufacturer's name, brand or trademark.

b) WaterMark.

c) Watermark Licence number.

d) Batch identification.

e) Number of the WaterMark Technical Specification, i.e., WMTS XXX.

f) Maximum allowable test pressure.

g) Maximum working temperature.

h) Maximum operating pressure, PN.

i) Product description

The marking of each hose for use with drinking water may be placed on a blue data plate attached to each hose assembly. The use of a blue data plate is to signify the hose's application with drinking water.

Hose assemblies for non-drinking water applications shall be marked in accordance with the requirements for non-drinking water services in AS/NZS 3500.1.

7 PACKAGING

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

7.1 Cleaning

Products shall be cleaned post manufacture in accordance with CGA G4.1-2004.

8 DESIGN

8.1 General

The maximum allowable pressure of the hose assembly shall be no greater than the lowest maximum allowable pressure of each component.

The flexibility type of the hose assembly is to be determined in accordance with ISO 10380.

8.2 End connections

The design configuration of end connections is at the discretion of the manufacturer subject to compliance with the performance requirements of this Technical Specification. All end connectors must be able to make a watertight joint when connected and secured in accordance with the manufacturer's instructions. Acceptable end connections can be screwed or flanged, or be part of a quick connect device or union.

Threaded end connections apart from those intended to be used for a specific connection design, must comply with AS 3688.

Flanged end connections must comply with the relevant standard for the connecting appliance.

8.3 Welding

Welding shall be in accordance with AS 4041. Joints are to be designed to eliminate deposit traps and crevices. All welds must be passivated. Passivation must be conducted in accordance with ASTM A380.

9 PERFORMANCE REQUIREMENTS AND TEST METHODS

9.1 General

Test samples are to have a flexible length of not less than 500mm or 5 x DN, whichever is the greater.

Upon testing, failure is defined as leakage, permanent deformation or localised decrease in the hose radius by more than 50%.

9.2 Hydrostatic strength test

Precondition a straight sample at the manufacturer's maximum working temperature for 30mins. Subject the sample to twice the manufacturer's working pressure for 30mins. The sample may be allowed to cool during the test period. At the completion of the test, the hose assembly shall not leak or show indication of any other failure.

9.3 Watertightness test

When tested in accordance with the Pressure Proof - Hydraulic Test of ISO 10380 the hose assembly shall not leak or show indication of any other failure.

9.4 Tensile stress resistance

When tested in accordance with the Resistance to Pull Test of AS 4631, the hose assembly shall not leak. After the force is removed the hose assembly shall be tested to clause 9.3.

9.5 Flexibility test

The hose assemblies shall be tested in accordance with the Pilable Test and Cantilever Bend Test of ISO 10380 as relevant to the type of flexibility of the hose assembly. For each DN selected for testing, 1 sample shall be tested.

The stroke length in mm for the Cantilever Bend Test for >DN300 to DN400 shall be as per Table 1.

Table 1 – Stroke Length

	DN350	DN400
Flexibility Type 1 - Stroke mm	110	120
Flexibility Type 2 - Stroke mm	85	95

Hose dimensions to supplement ISO 10380 Table 2 are provided below in Table 2.

Table 2 – Hose Dimensions

	Bend Radius mm			
	Pliable Test - Type		Cyclic Test - Type	
	1 & 2	3	1 & 2	3
DN350	820	-	2800	3500
DN400	920	-	3200	4000

10 TEST SEQUENCE AND TEST SAMPLE PLAN - VOID

11 PRODUCT DOCUMENTATION

11.1 Product data

Data that includes the following critical operating characteristics shall be provided with the product:

a) Product range and model identification.

b) Maximum and minimum allowable operating pressure and temperature.

c) Maximum and minimum bend radius.

d) Flexibility type and/or allowable range of movement.

11.2 Installation instructions

Instructions shall be provided, which shall give full details of installation procedures for the flexible assembly. The instructions shall include clauses reflecting the requirements of the Plumbing Code of Australia, including any limitations on the product's use, but including as a minimum the following:

a) References to AS/NZS 3500 where applicable.

b) Detailed step-by-step instruction.

c) The need for special tools or training.

d) Contact details for after-sales service.

11.3 Installation warranty

All products shall be supplied with an installation warranty in the form of a statement as per the requirements of the Plumbing Code of Australia. The warranty may be attached to the product, printed on the packaging or included as part of the installation instruction.

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 this WaterMarkTechnical 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 WaterMarkTechnical 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

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Materials	Review materials parts lists and compliance certificates	At any change in materials specification
	5.6	Materials in contact with water	AS/NZS 4020	At any change in materials, formulation or design or every five years whichever occurs first
Design	8.2	End connections	Relevant Standards	At any change in materials, formulation or design
Performance	9.2	Hydrostatic strength test	Clause 9.2	At any change in design or manufacturing process
	9.4	Tensile stress resistance test	AS 4631	
	9.5	Flexibility test	ISO 10380	
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	At any change in materials specification
	5.4 a)	DR	AS 2345	Each batch
Marking	6	Marking	Visual inspection	Each batch
Design	8.2	End connections	Dimensional inspection relevant to connection type	Each batch
Performance	9.3	Watertightness test	ISO 10380	Each hose assembly

APPENDIX B PRODUCT PERFORMANCE TEST METHOD

(Normative)

Product performance testing shall be carried out in accordance with the standard methods nominated in Clause 9, and summarised in Table A1 and A2. Refer to referenced standards.

Australian Building Codes Board

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