



WMTS-042:2016

Roll-grooved jointing systems

WaterMark Technical Specification

2016



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Roll-grooved jointing systems.

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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 5200.042 – 2004.

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-042: 2016 Technical Specification for plumbing and drainage products, Roll-grooved jointing systems 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 5200.042 – 2004, 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 8 October 2004.

The following organisations were represented on Committee WS-031 in the preparation of Australian Technical Specification ATS 5200.042 – 2004:

- AUSTAP
- Australian Electrical and Electronic Manufacturers Association
- Australian Industry Group
- CSIRO Manufacturing and Infrastructure Technology
- Certification Interests (Australia)
- Consumer Electronics Suppliers Association
- Copper Development Centre—Australia
- Gas Appliances and Services Association
- Master Plumbers Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- National Fire Industry Association
- 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 sets out requirements for a roll-grooved jointing system that incorporates a ductile iron body coupling with included elastomeric seal to join copper or stainless steel tubes and metallic fittings. The roll-grooved profile may be either factory manufactured or field applied.

Roll-grooved jointing systems are for use where the normal operating temperature does not exceed 95°C, with peaks up to 110°C for short periods of time.

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 Specification:

AS

1432	Copper tubes for plumbing, gasfitting and drainage applications
1565	Copper and copper alloys—Ingots and castings
1572	Copper and copper alloys—Seamless tubes for engineering purposes
1646	Elastomeric seals for waterworks purposes
1646.1	Part 1: General requirements
1646.2	Part 2: Material requirements for pipe joint seals used in water and wastewater applications—Specifies by prescriptive formulation
1646.3	Part 3: Material requirements for pipe joint seals used in water and wastewater applications with the exception of natural rubber and polyisoprene compounds
1831	Ductile cast iron
2136	Method for detecting the susceptibility of copper and its alloys to stress corrosion cracking using the mercurous nitrate test
2345	Dezincification resistance of copper alloys
2738	Copper and copper alloys—Compositions and designations of refinery products, wrought products, ingots and castings
3688	Water supply—Copper and copper alloy body compression and capillary fittings and threaded-end connectors

AS/NZS

- 1568 Copper and copper alloys—Forging stock and forgings
- 3500 Plumbing and Drainage
 - 3500.0 Part 0: Glossary of terms
 - 3500.1 Part 1: Water services
 - 3500.4 Part 4: Heated water services
- 3707 Method for testing pressure cycling resistance of pipes and fittings
- 4020 Testing of products for use in contact with drinking water

ASTM

- A183 Standard specification for carbon steel track bolts and nuts
- A395 Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures
- A536 Standard Specification for Ductile Iron Castings
- A403 Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings

4 DEFINITIONS

For the purpose of this Technical Specification, the definitions given in AS/NZS 3500.0, AS 3688 and ASTM A403 apply.

5 MATERIALS

5.1 General

This Clause specifies requirements for the materials used to manufacture the coupling and fittings used in roll-grooved systems.

Materials used in contact with water shall be corrosion resistant. For the purposes of this Technical Specification, the following materials are considered corrosion resistant:

- (a) Copper as specified in Clause 5.3.1.
- (b) Copper alloy as specified in Clause 5.3.2.
- (c) Stainless steel as specified in Clause 5.3.4.

5.2 Coupling

5.2.1 *Body*

The body of the fitting shall be manufactured from ductile cast iron complying with ASTM A395 grade 65-45-15 and ASTM A536 grade 65-45-12 (equivalent to AS 1831, minimum grade 450-10).

5.2.2 *Elastomeric gasket*

The gasket material used as the seal in the coupling shall comply with AS 1646.1 and—

- (a) AS 1646.2; or
- (b) AS 1646.3.

5.2.3 *Fasteners*

Fasteners used to assemble the coupling shall be heat-treated carbon steel conforming to the physical properties of ASTM A183 with a minimum tensile strength of 758 MPa and be protected from corrosion by electro-zinc plating.

5.3 Fittings

5.3.1 *Copper*

Copper shall comply with the following:

- (a) Wrought products shall comply with AS 2738.
- (b) Tubular components shall comply with AS 1432.

5.3.2 *Copper alloy*

Copper alloy shall comply with the following:

- (a) *Castings* shall comply with AS 1565 or be capable of passing the requirements of Clause 3.3 provided that the alloy contains not less than 58% copper and not more than 1% aluminium.
- (b) *Hot pressings* shall comply with AS/NZS 1568 or be manufactured of an alloy complying with AS 2345.
- (c) *Rod for machined parts* shall comply with AS/NZS 1567 or be manufactured of an alloy complying with AS 2345.
- (d) *Tubular components* shall comply with AS 1572 alloy designation C26130. Where bent or stamped in the fabrication process, the tube shall be sufficiently stress relieved so that it is capable of passing the mercurous nitrate test specified in AS 2136 after all

fabrication processes are complete. For the purpose of this test, the entire tube component shall be tested before any coating or plating operation.

5.3.3 *Dezincification-resistant (DR) copper alloy*

Copper alloys in contact with water shall comply with AS 2345.

5.3.4 *Stainless steel*

Stainless steel shall be grade 304 or 316 complying with the relevant ASTM Standard for the product form.

6 MARKING

Fittings and couplings shall be legibly marked with the following;

- (a) Manufacturer's name, brand or trademark.
- (b) WaterMark.
- (c) Licence number.
- (d) The number of this Specification, i.e., WMTS-042.

In addition, the coupling shall be legibly marked with the nominal size (tube outside diameter).

7 VOID

8 DESIGN

8.1 Fittings

8.1.1 *General design and dimensions*

8.1.1.1 *Copper and copper alloy body fittings*

The general design and dimensions of the fitting shall comply with the requirements of AS 3688.

8.1.1.2 *Stainless steel body fittings*

The general design and dimensions of fitting shall comply with the relevant requirements of ASTM A403.

8.1.2 *Roll-grooved connection ends*

Roll-grooved connection ends shall comply with the dimensional requirements as detailed in (see Figure 1)—

- (a) Table 1 for copper alloy tube systems; or

(b) Table 2 for stainless steel tube systems.

8.1.3 *Adaptor connection ends*

End connectors for connection to either copper or copper alloy pipes or fittings shall comply with AS 3688.

Other connection ends shall comply with the requirements of the Australian Standard that is relevant to the connection.

8.1.4 *Fabricated fittings*

Fittings with fabricated joints shall be capable of complying with the performance requirements of Clause 9.3.

8.2 **Coupling**

8.2.1 *Adjustment*

The design of the coupling housing shall include an angled pad so as to allow offset and accommodate for minor inconsistencies of the roll-grooved profile and ensure a rigid joint.

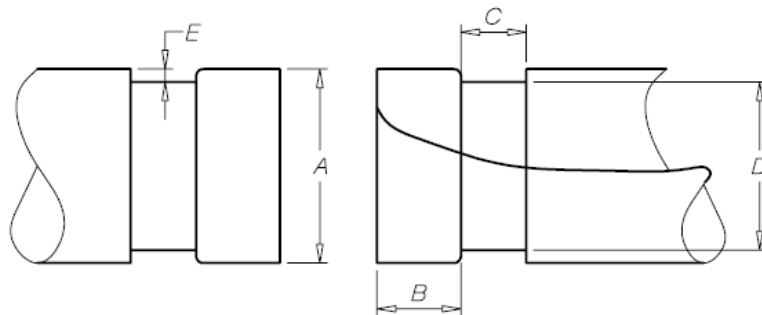


FIGURE 1 DIMENSIONS OF ROLL-GROOVED CONNECTION ENDS

TABLE 1
DIMENSIONS OF THE ROLL-GROOVE FOR COPPER TUBE (AS 1432) SYSTEMS

Nominal size	Mean outside diameter (A) mm		Gasket seat (B) mm	Groove width (C) mm	Groove diameter (D) mm	Groove depth (E) mm	Allowable flare diameter mm
	Min.	Max.	±0.76	+0.76/-0	+0/-0.5	Ref. only	Max.
DN 50	50.67	50.80	15.87	7.62	48.21	1.25	53.06
DN 65	63.35	63.50	15.87	7.62	60.88	1.27	65.83
DN 80	76.02	76.20	15.87	7.62	73.56	1.27	78.51
DN 100	101.35	101.60	15.87	7.62	98.78	1.35	103.88
DN 125	126.75	127.00	15.87	7.62	123.67	1.60	128.77
DN 150	152.10	152.40	15.87	7.62	149.05	1.60	154.66

TABLE 2
DIMENSIONS OF ROLL-GROOVE FOR STAINLESS STEEL TUBE (IPS SIZES) SYSTEMS

Nominal size	Mean outside diameter (A) mm		Gasket seat (B) mm	Groove width (C) mm	Groove diameter (D) mm	Groove depth (E) mm	Allowable flare diameter mm
	Min.	Max.	±0.76	±0.76	+0	Ref. only	Max.
DN 50	59.72	60.93	15.88	8.74	57.15 (-0.38)	1.6	63.0
DN 65	72.29	73.76	15.88	8.74	69.09 (-0.46)	1.98	75.7
DN 80	88.11	89.79	15.88	8.74	84.94 (-0.46)	1.98	91.4
DN 100	113.51	115.44	15.88	8.74	110.08 (-0.51)	2.11	116.8
DN 125	140.51	142.72	15.88	8.74	137.03 (-0.56)	2.13	143.8
DN 150	167.51	169.9	15.88	8.74	163.96 (-0.56)	2.16	170.9
DN 200	218.29	220.7	19.05	11.91	214.40 (-0.64)	2.34	223.5
DN 250	272.26	274.7	19.05	11.91	268.28 (-0.69)	2.39	277.4
DN 300	323.06	325.5	19.05	11.91	318.29 (-0.76)	2.77	328.2

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. A scaling factor of 0.1 shall be applied.

9.2 Fitting body hydrostatic test

When tested in accordance with the pressure test of AS 3688, the fitting body shall not leak.

9.3 Strength of fabricated fittings

When tested in accordance with the strength of fabricated joints test of AS 3688, the joint shall not leak.

9.4 Joint pressure resistance test

The joint shall not leak when the coupling is assembled in accordance with the manufacturer's instructions and tested with a pressure of 1.5 times the specified working pressure at both ambient and 95°C.

NOTE: The working pressure at 95°C is the re-rated working pressure.

9.5 Pressure cycling test

When the coupling is assembled in accordance with the manufacturer's instructions and tested in accordance with AS/NZS 3707, at the working pressure and water temperature of 95°C, the pressure resistance of the assembled joint shall be such that there shall be no leakage in the joint or fitting after 50 000 cycles.

NOTE: The working pressure at 95°C is the re-rated working pressure.

10 VOID

11 PRODUCT DOCUMENTATION

11.1 Product data

Product data shall be available, which shall identify critical product characteristics such as the following:

- (a) Application.
- (b) Working pressure.
- (c) Dimensions.

- (d) Temperature or other limitations.

11.2 Installation instructions

Installation instructions shall be provided. The instructions shall—

- (a) be consistent with AS/NZS 3500.1 and AS/NZS 3500.4;
- (b) detail the procedures for assembling roll-grooved joints;
- (c) detail the methods of forming a roll-grooved end on a pipe on site; and
- (d) recommend the tools and equipment to be used to perform a roll-grooved end.

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 is 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 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 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 test failure, the products within the batch shall be tested at an appropriate acceptable quality level (AQL) and only those batches found to comply may be claimed and/or marked as complying with this Specification.

Table A1—TYPE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Materials	Review materials parts lists and compliance certificates	On change of material
Design	8.1	Design and dimensions	AS 3688	On change of design
	8.2 and 8.3	End connections	Table 1 or 2/Relevant Standard	
Performance	9.1	Products in contact with water	AS/NZS 4020	On change of joint materials
	9.2	Fitting body hydrostatic test	AS 3688	On change of joint design
	9.3	Fabricated joints	AS 3688	
	9.4	Pressure resistance test	AS 3688	
	9.5	Cyclic pressure test	AS 3707	
Product documentation	11	Product documentation	Documentation review	At any change to requirements

Table A2—BATCH RELEASE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Materials	5	Relevant Standard	Review compliance certificates	On each delivery batch
Marking	6	Legibility	Visual	100%
Design	8.1	Design and dimensions	AS 3688	Once per batch
	8.2 and 8.3	End connections	Table 1 or 2/ Relevant Standard	
Performance	9.3	Fabricated joints	AS 3688	
	9.4	Pressure resistance test (coupling only)	AS3688	

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