WMTS-528:2019

Plate heat exchangers

WaterMark Technical Specification

Publication History:-

First published as WMTS-528:2019

2019

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PREFACE

This WaterMark Technical Specification was prepared in accordance with the Manual for the WaterMark Certification Scheme, Appendix 4, Protocol for Developing Product Specifications.

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 Products and the WaterMark Schedule of Excluded Products are dynamic lists and change on a regular basis. Based on this function, these schedules 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-528:2019 was prepared by industry and was approved by the Administering Body on XX XX 2019.

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1 SCOPE

This Specification sets out requirements for plate heat exchangers which are utilised in the heated water supply system. These heat exchangers may be utilised as stand-alone water heating systems or as components of water heating systems. Plate heat exchangers are designed in various configurations including number of plates, plate design and size in order to suit the installation.

The plate heat exchangers can be of the following basic types:

a) Brazed or fused plate heat exchangers.

b) Gasketed plate heat exchangers.

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.

AS

3498	Authorization requirements for plumbing products - Water heaters and hot-water storage tanks

AS/NZS

3500.0	Plumbing and drainage, – Part 0: Glossary of terms
3500.1	Plumbing and drainage, – Part 1: Water services
3500.4	Plumbing and drainage, – Part 4: Heated water services
4020	Testing of products for use in contact with drinking water
2845.1	Water supply – Backflow prevention devices, Part 1: Materials, design and performance requirements

NCC

PCA	Plumbing Code of Australia

4 DEFINITIONS

For the purpose of this WaterMark Technical Specification, the definitions given in the WaterMark Scheme Rules, Plumbing Code of Australia (PCA), AS/NZS 3500.0.

4.1 Plate Heat Exchanger (PHE)

A heat exchanger consisting of series of plates joined together to transfer heat between two fluids.

5 MATERIALS

5.1 General

This section specifies requirements for materials utilised in the construction of the product.

5.2 Plates

Plates utilized in the construction of the heat exchanger and in contact with drinking water shall have a PREN of 22 or greater

5.3 Other Materials

Other materials utilised in the construction of the product shall be fit for the intended purpose, comply with the performance requirements of this Specification.

6 MARKING

Markings to be placed on products or packaging shall, be in accordance with the Manual for the WaterMark Certification Scheme.

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

a) Model identification.

b) Identification of connection ends

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7 PACKAGING

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

8 DESIGN

8.1 End connections

End connections shall enable connection to the water supply system pipe work in accordance with AS 3688 Double wall Plate Heat Exchangers

For plate heat exchangers that include a double wall the failure of one wall shall be visibly evident.

9 PERFORMANCE REQUIREMENTS AND TEST METHODS

9.1 Products in contact with drinking water

Products and materials in contact with drinking water shall comply with AS/NZS 4020.

NOTE: The materials of plate heat exchangers shall be suitable for contact with drinking water with regard for their effect on the quality of water.

9.2 Hydrostatic strength test

When tested in accordance with Appendix B, the plate heat exchanger shall not leak or show signs of distortion, splitting, cracking, breakage or other failure when tested at 1.5 times the manufacturers recommended Maximum Operating Pressure (MOP) and at ambient temperature.

10 TEST SEQUENCE AND TEST SAMPLE PLAN

Independent samples covering the range of plate heat exchangers shall be used for testing of the performance requirements of Clauses 9.1 and 9.2.

11 PRODUCT DOCUMENTATION

Information shall be available to aid the installer and user in the correct installation, operation and ongoing maintenance of the product and include critical data on the products, use and application and any limitations.

The documentation shall satisfy the requirements of a warranty as referenced in the PCA and those requirements of the AS/NZS 3500 series of Standards. The information shall be readily available and be in plain English and supplemented by figures and diagrams as applicable.

11.1 Product data

Product data shall be available that identifies the following critical product characteristics as a minimum:

a) Maximum allowable operating pressure and temperature.

b) Jointing methods and adaptation to other piping systems.

c) Product range and model identification.

d) Performance data.

11.2 INSTRUCTIONS

11.2.1 Installation instructions

Instructions shall be provided that give full details of installation procedures for the plate heat exchanger including:

a) Reference to installation in accordance with the PCA, including the installation of any non-integral backflow prevention device and any limitations on the product.

Note: A material or product that is listed on the WaterMark Product Database and is marked in accordance with the WaterMark Certification Scheme is recognised by authorities having jurisdiction as being authorised for use in a plumbing or drainage installation. This is because the material or product complies with the applicable product specification. The installation of an authorised material or product must meet the requirements of the PCA. Where the PCA does not contain installation requirements applicable to the authorised material or product, acceptance of the installation is at the discretion of the authority having jurisdiction.

b) The need for additional control equipment.

c) Detailed step by step instructions.

d) The need for special tools or training.

e) Commissioning procedures and adjustments required.

f) Troubleshooting guide.

g) Contact details for after sales service.

11.2.2 Operating and maintenance instructions

Operating and maintenance instructions shall be provided that include:

a) Any regular maintenance requirements.

b) Spare parts information.

c) Troubleshooting guide.

d) Contact details for after-sales service.

APPENDIX A MEANS FOR DEMONSTRATING COMPLIANCE WITH THIS PRODUCT 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 WaterMark 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

A 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 certifying 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.

A.5.4 Minimum annual inspection requirements

Table A3 sets out the minimum annual inspection requirements to be undertaken.

A.5.5 Re-evaluation testing

Table A4 sets out the requirements for re-evaluation testing.

TABLE A1
TYPE TESTS

Characteristic	Clause	Requirement	Test method	Frequency
Markings	6	Labelling/marking	Review of documentation/physical examination	At any change in design/specification
Packaging	7	Avoid damage during transportation and handling	Review of documentation/physical examination	At any change in design/specification
Design	8.1	End Connections	AS/NZS 3500.1	At any change in the design
	8.2	Double wall heat exchangers	Clause 8.2	
Performance	9.1	Products in contact with drinking water	AS/NZS 4020	At any change in design or manufacturing process
	9.2	Hydrostatic strength test	Appendix B	Every 5 years and at any change in design or manufacturing process
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
Markings	6	Labelling/marking	Clause 6	Each Unit
Performance	9.2	Hydrostatic strength test	Appendix B	Each Unit
Product documentation	11	Product data/Installation and maintenance instructions	Product documentation	At any change to installation requirements

TABLE A3
MINIMUM ANNUAL INSPECTION REQUIREMENTS

Characteristic	Clause	Requirement	Verification method	Frequency
Design	8.1 - 8.2	General design/construction	Visual and component examination	Each Inspection
Product marking	6	Product marking, use of the WaterMark logo and license number	Visual inspection of marked product, relevant packaging and documentation	
Product documentation	11	Product data/Installation and maintenance instructions	Product documentation	

TABLE A4
RE-EVALUATION TESTING

Characteristic	Clause	Requirement	Test method
Performance	9.2	Hydrostatic strength test	Appendix B

APPENDIX B PLATE HEAT EXCHANGER - HYDROSTATIC STRENGTH TEST

(Normative)

B.1 SCOPE

This Appendix sets out the method for determining the ability of components and joints of the plate heat exchanger to withstand hydrostatic pressure without leakage or permanent distortion.

B.2 PRINCIPLE

The components and joints subject to permanent hydrostatic pressure within the plate heat exchanger are subjected to a hydrostatic pressure for a period of time at a determined temperature and inspected for leakage and permanent distortion. Both primary and secondary circuits are tested independently.

B.3 APPARATUS

The following apparatus is required:

a) Water supply sufficient to maintain the required pressure and temperature.

b) Pressure gauge.

B.4 PROCEDURE

The procedure shall be as follows:

a) Connect the supply water at required temperature to the plate heat exchanger primary circuit.

a) Circulate water in the plate heat exchanger for a period of 20 minutes then close shut off valve.

b) Slowly increase the pressure until it reaches the test pressure.

c) Maintain this pressure for 15 +5, −0 min.

d) Release the pressure.

e) Record the test pressure, temperature and duration at this pressure.

f) Inspect the assembly for any leaks or permanent distortion

g) Repeat a) to g) for secondary circuit

B.5 REPORT

The following shall be reported:

h) Manufacturer, model and description of plate heat exchanger.

i) Any leakage or structural damage.

j) Reference to this test method, i.e., WMTS 5xx, Appendix B