AS 4032—1995

Australian Standard®

Thermostatic mixing valves—Materials, design and performance requirements

STANDARDS AUSTRALIA

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The following interests are represented on Committee WS/26:

Association of Certification Bodies

AUSTAP

Committee for Plumbing Product Authorizations

Department of Planning and Development, Vic.

Institute of Hospital Engineering Australia

Master Plumbers and Mechanical Contractors Association of N.S.W.

Metal Trades Industry Association of Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee WS/26 on Thermostatic Mixing Valves to supersede AS 4032—1992. At the time of publication thermostatic mixing valves were not manufactured in Australia.

Thermostatic mixing valves are included in the Schedule of Specifications of SAA MP52—1993, *Manual of authorization procedures for plumbing and drainage products,* with a revised implementation date of June 1996. Type testing of thermostatic mixing valves to AS 4032 requirements highlighted some areas of concern which were addressed in Amendment Nos. 1 and 2 issued on 15 February 1993 and 19 September 1994, respectively, pending the complete revision of this Standard in the light of comments received from the CSIRO and the Norwegian Building Research Institute, as well as manufacturers in Germany, United Kingdom and Sweden.

The objective of this Standard is to provide manufacturers with requirements for thermostatic mixing valves that give reasonable protection to users against exposure to high or excessive fluctuations in mixed-water temperatures caused by variations, including shut-off, in the cold water supply.

In the preparation of this Standard, reference has been made to BS 1415, *Mixing valves*, Part 2: *Specification for thermostatic mixing valves*, Draft CEN prEN 1111, *Sanitary tapware—Thermostatic mixing valves—General technical specification for high pressure application*, and detailed submissions from European manufacturers and other relevant documents. The assistance gained from these sources is acknowledged.

Table 4.1 is based on results published by Dr J P Ball, Industrial Injuries and Burns Unit, Medical Research Council, UK.

The principal changes to this edition are as follows:

(a) The exclusion of Class B thermostatic mixing valves for non-ablutionary purposes.

(b) The limitation of the nominal sizes to not larger than DN 32.

(c) Clarification of marking requirements.

(d) Rationalization of material requirements.

(e) Modification of performance requirements, comprising—

  (i) the option of testing either one or two identical thermostatic mixing valve(s) in the appropriate sequence for the performance tests shown in Figure 5.1;

  (ii) a reduction and rationalization of the loadings for the torque tests to verify the durability of the water volume control and temperature override control;

  (iii) integral cross-flow prevention devices and integral isolating valves with tests that have been incorporated into the general watertightness test;

  (iv) the endurance of the thermostatic element which has been extensively revised and now includes the operating mechanism, with the thermal shut-off test now being conducted every 5000 cycles rather than each cycle to reflect actual service conditions;

  (v) sensitivity of temperature control;

  (vi) thermal shut-off test; and

  (vii) the sequence of performance tests, including the introduction of a watertightness test at the end of the performance test sequence to verify the integrity of the valve and components.

(f) Rationalization of product data requirements.

(g) Installation, commissioning and maintenance instructions are now specified in the following:

AS
3500 National Plumbing and Drainage Code
3500.1 Part 1: Water supply
3500.4 Part 4: Hot water supply systems

(h) Informative guidelines for measurement of noise emission.

(i) The watertightness test method, extensively revised and simplified.

(j) The sensitivity of temperature control test, rationalized and simplified to adopt similar principles to the draft European Standard.

(k) The temperature stability and flow temperature tests updated and simplified to reflect the revised performance requirements.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

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Originated as AS 4032—1992.
Second edition 1995.

FOREWORD

The type and nominal size of thermostatic mixing valves and ancillary equipment (if any) are selected with the consideration of factors that include the following:

(a) General information includes—

(i) nominal size (DN), number and type of water inlets, outlet(s) and connections;

(ii) minimum and maximum dynamic pressures and operating temperatures for hot and cold water;

(iii) for one or more water outlets, the minimum and maximum flow rates; and

(iv) whether provided with integral isolating valves or cross-flow prevention devices or both.

(b) Ancillary equipment for pressure control devices with respect to—

(i) maximum dynamic pressure ratio (hot to cold or cold to hot); and

(ii) maximum continuous working pressures for hot and cold water.

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SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies requirements for the design, construction, testing and performance of thermostatic mixing valves of nominal sizes not larger than DN 32, for use with hot water at a supply temperature not exceeding 90°C and hot and cold water with continuous working pressures not exceeding 1400 kPa*.

The principal element of the testing procedures is that the thermostatic mixing valve under test shall not permit the discharge of water from the outlet with a temperature more than 2°C in excess of the nominated discharge temperature. Discharges of water with a temperature in excess of this but which comply with the cumulative time/temperature factors given in Table 4.1 are acceptable.

NOTE: Manufacturers may negotiate with the certifying body hot water supply temperatures up to 99°C, or hot and cold water continuous working pressures greater than 1400 kPa or both, if considered desirable, to assess temperature stability of the mixed water (see Clauses 1.7 and 5.2 and Appendix H).

1.2 APPLICATION This Standard is established to provide manufacturers, system designers, relevant authorities and others with performance requirements for thermostatic mixing valves. When used for ablutionary purposes, thermostatic mixing valves complying with this Standard provide the user with reasonable protection against scalding or excessive temperature fluctuations due to variations of pressures and temperatures of the hot and cold water supplies, including partial and total shut-off of the cold water supply.

The performance criteria and operating range of the valve shall be nominated by the manufacturer (see Clauses 1.7 and 5.2).

NOTE: Diagrams in this Standard are typical and chosen without prejudice.

1.3 REFERENCED DOCUMENTS The documents referred to in this Standard are listed in Appendix A.

1.4 DEFINITIONS For the purpose of this Standard, the definitions below apply.

1.4.1 Component—the part, or a subassembly of parts, that contributes to the construction of a total assembly by choice or design which will offer variations of fitment for the application of the major element of the product, whether produced by that same manufacturer or not. The component shall be deemed a vital part of the total assembly and shall not inhibit the product from complying with the relevant Australian Standard, or the appropriate specification, when submitted for type-testing.

1.4.2 Cyclic actuator—a device capable of activating the valve under test through the cycles of movements specified in the relevant Appendix to simulate normal usage over a relative short period of time.

* 100 kPa = 1 bar