AS/NZS 2040.1:2005
(Incorporating Amendment Nos 1, 2 and 3)

Australian/New Zealand Standard™

Performance of household electrical appliances—Clothes washing machines

Part 1: Methods for measuring performance, energy and water consumption

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-015, Quality and Performance of Household Electrical Appliances. It was approved on behalf of the Council of Standards Australia on 29 November 2005 and on behalf of the Council of Standards New Zealand on 9 December 2005. This Standard was published on 22 December 2005.

The following are represented on Committee EL-015:

Australian Consumers' Association
Australian Electrical and Electronic Manufacturers Association
Australian Industry Group
Australian Retailers Association
Business New Zealand
Consumer Electronics Suppliers Association
Consumers' Federation of Australia
Department of Energy, Utilities and Sustainability (NSW)
Department of Industrial Relations (Qld)
Electrical Compliance Testing Association
Energy Efficiency and Conservation Authority of New Zealand
Institution of Professional Engineers New Zealand
National Appliance and Equipment Energy Efficiency Committee
National Association of Testing Authorities Australia
Office of the Chief Electrical Inspector
Office of the Technical Regulator (SA)

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 05251.

AS/NZS 2040.1:2005
(Incorporating Amendment Nos 1, 2 and 3)

Australian/New Zealand Standard™

Performance of household electrical appliances—Clothes washing machines

Part 1: Methods for measuring performance, energy and water consumption

Originated as AS 2040—1977.
Jointly revised and redesignated AS/NZS 2040.1:1998.
Fourth edition 2005.
Reissued incorporating Amendment No. 1 (April 2007).
Reissued incorporating Amendment No. 2 (November 2009).
Reissued incorporating Amendment No. 3 (April 2010).

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-015, Quality and Performance of Household Electrical Appliances, to supersede AS/NZS 2040.1:1998, *Performance of household electrical appliance—Clothes washing machines*. Part 1: *Energy consumption and performance,* on publication.

A3 *This Standard incorporates Amendment No. 1 (April 2007), Amendment No. 2 (November 2009) and Amendment No. 3 (March 2010). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof. Amendment No. 2 forms part of the Standard on publication but does not supersede the version of the Standard incorporating Amendment No. 1 until 1 April 2010.*

The AS/NZS 2040 series is comprised of two Parts, as follows:

AS/NZS	
2040	Performance of household electrical appliances—Clothes washing machines
2040.1	Part 1: Methods for measuring performance, energy and water consumption (this Standard)
2040.2	Part 2: Energy efficiency labelling requirements

The overall objective of the AS/NZS 2040 series is to promote high levels of performance, energy efficiency and water efficiency in clothes washing machines.

A2 The next revision of this Standard will phase out non-drum detergent and will also give consideration to the use of the IEC load as a replacement for the AS/NZS load.

The Parts of AS/NZS 2040 are summarized as follows:

(a) *Part 1* Includes performance test procedures and minimum performance criteria for clothes washing machines.

(b) *Part 2* Includes algorithms for the calculation of the energy efficiency star rating and projected energy usage, performance requirements, details of the energy efficiency label and requirements for the valid application for registration for energy efficiency labelling. It also includes the application form for registration for water efficiency labelling. It has been structured to be suitable for reference in regulatory legislation and to be used in conjunction with Part 1.

This Standard is based on but has significant differences to IEC 60456, Ed. 4 (2003). A summary of differences between this edition and IEC 60456, Ed. 4 is included in the Foreword.

This Standard incorporates the following significant changes in comparison to earlier editions of the Standard:

(i) It has been clarified that any program can be tested to this Standard (i.e. ‘test program’), but the performance requirements in Section 4 only apply to the program recommended for a normally soiled cotton load. The program for a normally soiled cotton load is the program mandated for energy efficiency labelling in AS/NZS 2040.2.

(ii) Program time and cycle time have been added to the definitions.

(iii) Power measurements on a number of standby modes are now required. Standby modes have been added to the definitions and examples of the types of standby modes have been added in Appendix O.

NOTE: The impact of communication by appliances over a network is under consideration.

(iv) A recommendation to purchase all test materials from the sources referred to at http://www.energyrating.gov.au website has been added to minimize variations in test results. These materials will be used for check testing.

(v) To test a clothes washing machine to the requirements of this Standard, the number of test runs on a single machine has been reduced from three to one.

(vi) The test voltage is now limited to 230 V, except for products marked for 240 V only.

(vii) Silicone type anti-sudsing agents are now specified in place of synthetic sebum.

(viii) Spectrophotometer specifications have been revised.

Amendment 4 to the previous edition of this Standard introduced a rinse performance requirement for clothes washing machines. Performance is determined by measuring the mass, per kilogram of rated load, of a marker (PBIS) present in the rinse liquor that is retained in the damp load at the end of the program.

Introduction of a rinse performance requirement facilitated the introduction of mandatory water efficiency rating and labelling. Without a rinse performance requirement higher water efficiency ratings could be achieved by reducing rinse performance to levels that may not meet the needs of washing machine users.

The rinse performance requirements are required for the registration of clothes washing machines for the new water efficiency labelling scheme of AS/NZS 6400. Regulatory authorities advise that rinse performance requirements will not become mandatory for energy labelling until 1 July 2006 but they can be included in new registrations immediately.

For complete details of the rinse performance test method development program, including the trial of several different test methods, refer to the report entitled '*Method for the Determination of Rinse Performance in Clothes Washers—Summary Report*' available from: http://www.energyrating.gov.au website in the electronic library.

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.

CONTENTS

Page

Page

FOREWORD

For comparative testing, the most reliable results will be obtained from the methods of measurement given in this Standard when the measurements are conducted in the same laboratory, at one time, by the same operators. However, compliance with the performance and test requirements of this Standard should ensure that a clothes washing machine will give satisfactory performance in service.

This Standard is broadly based on IEC 60456, Ed. 4 (2003), *Clothes washing machines for household use—Methods for measuring the performance.* This Standard has differences from and similarities to IEC 60456, Ed. 4 in a number of ways, as follows:

(a) Specific minimum performance requirements for washing, spinning, rinsing and severity of washing are included (the latter are not specified by the IEC).

(b) The water hardness is specified as 0.45 mmol/litre (45 ppm) (that specified in IEC 60456 is 2.5 mmol/litre (250 ppm) (0.5 mmol/litre is under consideration).

(c) The cold water temperature is 20°C (that specified in IEC 60456 is 15°C).

A2 (d) A particular phosphate-based detergent is used for other than drum type machines.

(e) Only IEC Type B phosphate-based detergent is used for drum type machines (IEC 60456, Ed. 4 nominates Type A* for drum machines, Type B has been deleted).

(f) AS9 soil **swatches** are used (IEC specifies four separate soil swatches which include carbon, blood, red wine and chocolate).

(g) A mixed cotton and polyester/cotton load is used (IEC specifies only sheets, hand-towels and pillowcases for a cotton load).

(h) Each AS9 soil batch is calibrated against a reference batch (soil batch calibration is not specified by IEC but there are other performance controls on each batch).

(i) The laboratory reference machine is not used to normalize results (IEC specifies a Wascator machine to normalize results).

(j) The water extraction (spin) index is based on bone dry mass (IEC index is based on normalized mass with a nominal 6% moisture content but the IEC Standard allows the bone dry method as a method to determine the mass of load items).

(k) Whiteness retention test (informative) is included (not specified by IEC).

(l) Rinse performance testing relies on measurement of a chemical marker remaining in the rinse liquor extracted from the damp clothes load at the end of the program (IEC measure residual alkalinity of the rinse liquor extracted).

(m) There is a separate IEC Standard for noise.

(n) Standby power measurements are now required on a number of modes (not specified by IEC).

(o) Spectrophotometer specification is broader (IEC only allow D/8 geometry).

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard

Performance of household electrical appliances—Clothes washing machines

Part 1: Methods for measuring performance, energy and water consumption

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies the method of determining the performance characteristics of electric **clothes washing machine**s intended for household and similar use.

This Standard is not intended for the evaluation or comparison of the performance of detergents or other laundry aids.

This Standard does not specify safety requirements.

Examples of appliances covered by this Standard are both horizontal and vertical axis single bowl machines, twin tub units and the washing function of combination washer/dryer units.

In particular, this Standard—

(a) states and defines the principal performance characteristics of electric **clothes washing machine**s, which are—

  (i) soil removal;

  (ii) water extraction;

  (iii) severity of washing;

  (iv) energy and water consumption;

  (v) degree of vibration;

  (vi) rinse performance; and

  (vii) standby power.

(b) specifies the standard methods of measuring these characteristics; and

(c) sets levels of acceptable performance.

1.2 OBJECTIVE

The objective of this Standard is to provide test laboratories and others interested in performance testing with test methods and minimum performance requirements so that the performance of **clothes washing machine**s can be measured, compared and evaluated.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS
2706 Numerical values—Rounding and interpretation of limiting values