

Australian/New Zealand Standard™

**Performance of household electrical
appliances—Dishwashers**

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



AS/NZS 2007.1:2005

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.

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Australian Electrical and Electronic Manufacturers Association
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Australian Retailers Association
Business New Zealand
Consumer Electronics Suppliers Association
Consumers' Federation of Australia
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Australian/New Zealand Standard™

Performance of household electrical appliances—Dishwashers

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

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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 2007.1:2003, *Performance of household electrical appliances—Dishwashers*, Part 1: *Energy consumption and performance* on publication.

The AS/NZS 2007 series comprises two Parts, as follows:

AS/NZS

- 2007 Performance of household electrical appliances—Dishwashers
- 2007.1 Part 1: Methods for measuring performance, energy and water consumption (this Standard)
- 2007.2 Part 2: Energy efficiency labelling requirements

The Parts of AS/NZS 2007 are summarized as follows:

- (a) *Part 1* Includes performance test procedures and minimum performance criteria for dishwashers.
- (b) *Part 2* Includes algorithms for the calculation of the energy efficiency star rating and projected energy usage, performance requirements, details of the energy 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.

The overall objective of the AS/NZS 2007 series is to promote high levels of performance, energy efficiency and water efficiency in electric dishwashers.

This Standard includes a number of requirements from the third edition of IEC 60436, published in February 2004, which will bring this Standard closer to the IEC Standard. It also incorporates the following significant changes in comparison to earlier editions of the Standard.

- (i) Test methods have generally been made more repeatable and reproducible.
- (ii) It is intended to phase out the AS/NZS test load by December 2007, until that date, the AS/NZS test load (without serving utensils and bowls) is allowed as an alternative to the IEC test load in this Standard.
- (iii) A ‘test program’ has been defined and it has been clarified that any program can be tested to this Standard, but the performance requirements in Section 4 only apply to the program recommended for a normally soiled load. The program for a normally soiled load is the program mandated for energy efficiency labelling in AS/NZS 2007.2.
- (iv) Definitions in this Standard are now generally aligned with IEC definitions.
- (v) Program time and cycle time have been added to the definitions.
- (vi) 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 M.

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

- (vii) There are improved instructions regarding the use of the reference machine.

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

A summary of differences between this edition and the IEC 60436 Ed. 3 is included in the Foreword.

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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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 dishwasher will give satisfactory performance in service.

For determination of the washing and drying indices, the procedure and timing in Appendices D and E is provided to ensure consistent results. For determination of washing performance in accordance with this Standard, it is essential to use a reference machine.

This Standard is broadly based on IEC 60436:1981, *Methods for measuring the performance of electric dishwashers* and more recently has drawn from work undertaken within the IEC SC59A on a revised international dishwasher test method, which was published in IEC 60436, Edition 3, February 2004. The work within IEC has drawn on both European CENELEC Standard EN 50242 and US industry Standard AHAM DW-1. Acknowledgment is made of the assistance received from all of these Standards.

IEC 60436, Edition 3 uses the Universal 65°C as the reference program, but this is used to determine a relative performance index for declaration by the manufacturer (wash and dry performance is included on the EU energy label). The reference program on the reference machine used in this Standard is Gentle 45°C which is used to set a pass/fail for wash performance, rather than a manufacturer declaration of wash performance as is the case in Europe. IEC 60436, Edition 3 also uses the reference machine to assess drying performance whereas it is not used for assessing drying performance in this Standard.

This Standard has differences from and similarities to IEC 60436, Edition 3 in a number of ways, as follows:

- (a) This Standard allows the use of an IEC load (without serving items) or the original AS/NZS load as an alternative. IEC also allow an AHAM (US) load as an alternative to the 'European' load.

NOTE: The AS/NZS load is to be phased out by December 2007.

- (b) There are slight differences in the ambient humidity requirements between AS/NZS (60%) and IEC (55% or 65% dependent on the soil drying method).
- (c) The food items used for soiling the load in this Standard are slightly different to IEC 60436, Edition 3. AS/NZS more closely resembles the soiling from IEC 60436:1981. AS/NZS still uses tomato juice while the IEC 60436, Edition 3 uses milk treated in a microwave as well as minced meat. Some soil items are slightly different (e.g. tinned spinach versus frozen spinach) and the preparation of some items and the allocation of soils to the load itself are also slightly different.
- (d) AS/NZS cold water supply temperature is 20°C while IEC is 15°C.
- (e) AS/NZS water hardness is soft (45 ppm) while IEC specify both soft (≤ 70 ppm) and hard (250 ppm) water alternatives.
- (f) AS/NZS water pressure is 320 kPa while IEC is 240 kPa.
- (g) AS/NZS reference detergent is based on the old IEC type A (phosphate based with chlorine bleach), while IEC specifies type C detergent (phosphate based with oxygen bleach and enzymes). IEC also have new rinse agent formulations (types III and IV).

NOTE: CENELEC still use detergent B and the older rinse aid formulations at the time of publication.

- (h) AS/NZS requires the manufacturer to specify the amount of detergent to be used, whereas IEC specifies a default detergent quantity where an amount is not specified by the manufacturer. AS/NZS and IEC both specify maximum detergent quantities, which may be used for testing.
- (i) In AS/NZS the reference machine water softener is de-activated while in IEC it is allowed to operate normally (noting that most IEC tests will be done with hard water and tests under AS/NZS use soft water). Most dishwashers in Australia and New Zealand do not have a water softener.
- (j) AS/NZS use the reference machine only for assessing the washing performance while IEC use it for assessing washing and drying performance.
- (k) IEC allow the use of either oven drying or air drying of the soiled load prior to washing while AS/NZS only allow air drying.
- (l) AS/NZS and IEC now specify the lighting conditions for washing and drying evaluations. The viewing cabinet previously mandatory in AS/NZS, has been moved to an informative Appendix L.
- (m) AS/NZS and IEC evaluation scoring systems are now aligned.
- (n) AS/NZS requires filter cleaning between test runs while IEC specify that filters are not cleaned between runs. IEC classify filters into 3 main categories and require a minimum of 5 tests (but could be as many as 10 tests) on each dishwasher, depending on variability and performance without filter cleaning.
- (o) AS/NZS now requires standby power measurements on a number of modes.
- (p) IEC requires that the load be pre-conditioned in a dishwasher with IEC rinse aid prior to use in a performance test. AS/NZS does not specify any particular requirements other than the load is clean prior to use.

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Australian/New Zealand Standard**Performance of household electrical appliances—Dishwashers**

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

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out the method of determining the performance characteristics of electric **dishwashers** intended for household and similar use. This Standard does not specify safety requirements.

In particular this Standard—

- (a) states and defines the principal performance characteristics of electric **dishwashers**, which are—
 - (i) washing performance;
 - (ii) drying performance (irrespective of whether the **dishwasher** has a specific drying **operation** within the selected **program**;
 - (iii) energy and water consumption; and
 - (iv) standby power.
- (b) specifies the standard methods of measuring these characteristics; and
- (c) sets levels of acceptable performance for washing and drying performance.

1.2 OBJECTIVE

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

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

| | |
|-------------|--|
| AS | |
| 2700 | Colour Standards for general purposes |
| 2706 | Numerical values—Rounding and interpretation of limiting values |
| AS/NZS | |
| 2007 | Performance of household electrical appliances—Dishwashers |
| 2007.2:2005 | Part 2: Energy efficiency labelling requirements |
| 6400 | Water efficient products—Rating and labelling |
| 62301 | Household electrical appliances—Measurement of standby power |
| IEC | |
| 60436 | Electric dishwashers for household use—Methods for measuring the performance |