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Electric dishwashers for household use – Methods for measuring the performance

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Lave-vaisselle électriques à usage domestique – Méthodes de mesure de l'aptitude à la fonction

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INTERNATIONAL STANDARD

NORME INTERNATIONALE



Electric dishwashers for household use – Methods for measuring the performance

(standards.iteh.ai)

Lave-vaisselle électriques à usage domestique – Méthodes de mesure de l'aptitude à la fonction

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COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC DISHWASHERS FOR HOUSEHOLD USE –
METHODS FOR MEASURING THE PERFORMANCE**

FOREWORD

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International Standard IEC 60436 has been prepared by subcommittee 59A: Electric dishwashers, of IEC technical committee 59: Performance of household electrical appliances.

This fourth edition cancels and replaces the third edition published in 2004, its Amendment 1 published in 2009 and its Amendment 2 published in 2012.

This edition constitutes a technical revision and includes the following significant technical changes with respect to the previous edition:

- a) Addition of a specification of the reference dishwasher G1222, addition of the microwave oven 752C, inclusion of standby/low power modes and updated cutlery and tableware items.
- b) Combined cleaning and drying: combining the cleaning and drying performance evaluations into one test, along with the energy and water consumption evaluation, prevents an opportunity for circumvention if tests were performed separately. A dishwasher can detect whether soil is present (cleaning evaluation) or not (drying

evaluation) and adjust the cycle to favour performance; combining the tests addresses this.

- c) New dish load items: new dish load items were incorporated which reflect consumer use. New items are: stainless pots, coffee mugs, melamine plastic items, and glass bowl. The new load items provide different shapes which challenge a dishwasher water spray patterns and provide additional surfaces for soil removal assessment.
- d) Detergent: a new detergent “D” is specified which mirrors current tablet formulations available on the market. Detergent type D is phosphate free, with percarbonate instead of perborate bleach and more active enzymes.
- e) Repeatability and reproducibility improvements.
- f) Addition of annexes for the evaluation of soil sensing programmes, rinsing performance, dishwasher filtration and of an annex on the inlet water temperature influence on energy consumption.

The text of this standard is based on the following documents:

FDIS	Report on voting
59A/202/FDIS	59A/203/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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INTRODUCTION

The history of this fourth edition of IEC 60436 is provided as follows:

- Discussion began during the Sydney Australia meeting in September 2008.
- A first working draft was developed and discussed during the Seattle USA meeting in October 2010.
- A questionnaire (59A/149/Q) regarding proposed changes was published January 2011. Responses (59A/153/RQ) were reviewed during a meeting in Bonn Germany April 2011 and published May 2011.
- A Document for Comment (59A/155/DC) was published May 2011. Review of responses (59A/164/INF) began during the Melbourne Australia meeting in October 2011.
- A Committee Draft (59A/168/CD) was published May 2012. Review of responses (59A/170/CC) began during the Oslo Norway meeting in October 2012.
- A second Committee Draft (59A/175/CD) was published May 2013. Review of responses (59A/177/CC) began during the New Delhi India meeting in October 2013.
- Committee Documents for Vote (59A/183/CDV and 59A/184/CDV) were published June 2014. 59A/183/CDV (fragment 1) contained the complete edition 4, except for some Annex U content; 59A/184/CDV (fragment 2) contained additional Annex U content. Review of responses (59A/190b/RVC and 59A/191b/RVC for fragments 1 and 2) began during the Tokyo Japan meeting in October 2014.
- The FDIS document was prepared for publication built upon this history of work.

A Round Robin Test (RRT) has been planned and will be carried out using edition 4. Results from the RRT will be available after the edition 4 is published. Edition 4 updates, if needed, will be incorporated into edition 4 Amendment 1.

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ELECTRIC DISHWASHERS FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

1 Scope

This International Standard applies to electric **dishwashers** for household and similar use that are supplied with hot and/or cold water.

The object is to state and define the principal performance characteristics of electric **dishwashers** for household and similar use and to describe the standard methods of measuring these characteristics.

This standard is concerned neither with safety nor with minimum performance requirements.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60704-2-3, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-3: Particular requirements for dishwashers*

IEC 60705, *Household microwave ovens – Methods for measuring performance*
<http://www.standards.iteh.ai/catalog/standards/sist/9537e7956f28/iec-60436-2015>

IEC 60734, *Household electrical appliances – Performance – Water for testing*

IEC 62301, *Household electrical appliances – Measurement of standby power*

ISO 607, *Surface active agents and detergents – Methods of sample division*

ISO 80000-1:2009, *Quantities and Units – Part 1: General*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1

dishwasher

machine that cleans, rinses and dries **tableware** by chemical, mechanical, thermal, and electric means

Note 1 to entry: A **dishwasher** can have a specific drying **operation** at the end of the **programme**.

Note 2 to entry: Different **dishwasher** types are designated by manufacturers e.g. **free-standing**, **built-in** or **integrated**.

3.1.2

free-standing dishwasher

dishwasher which is intended to be installed without an enclosing structure

3.1.3**built-in dishwasher**

dishwasher which is intended to be installed inside an enclosing structure such as a kitchen cupboard

3.1.4**integrated dishwasher**

built-in dishwasher which is designed to have a board fitted to the **dishwasher** door

3.1.5**test machine**

dishwasher under test

3.1.6**reference machine**

dishwasher used to standardise cleaning and drying performance measurements

Note 1 to entry: A **reference machine** is specified for use in this standard (see Annex I).

3.1.7**test run**

single **cycle** performance assessment

3.1.8**test series**

set of **test runs** which are collectively used to assess the performance

3.1.9**tableware**

dishware, glassware, cutlery and **serving pieces** used according to this standard to test a **dishwasher**

3.1.10**place setting**

set of **tableware** for the use by one person, not including **serving pieces**

Note 1 to entry: A **place setting** is comprised of different items used for breakfast and lunch (type A); and dessert and dinner (type B).

3.1.11**serving pieces**

set of items for preparation and serving of food which can include pots, serving bowls, serving cutlery and a platter

3.1.12**rated dishwasher capacity**

whole number of **place settings** together with the **serving pieces** which can be cleaned and dried in one **cycle** when loaded in accordance with the manufacturer's instructions

Note 1 to entry: The **rated dishwasher capacity** is declared by the manufacturer and expressed as a number of **place settings**.

3.1.13**operation**

each event that occurs during the **dishwasher programme** such as cleaning, rinsing or drying

3.1.14**programme**

series of **operations** which are pre-defined within the **dishwasher** and which are declared as suitable for specified levels of soil and/or type of load and together form a complete **cycle**

3.1.15**cycle**

complete cleaning, rinsing, and drying process, as defined by the **programme** selected, consisting of a series of **operations** until all activity ceases

3.1.16**cycle time**

length of time beginning with the initiation of the **cycle** (of the selected **programme**), excluding any user programmed delay, until all activity ceases (i.e. the end of the **cycle**)

3.1.17**programme time**

length of time beginning with the initiation of the **cycle** (of the selected **programme**), excluding any user programmed delay, until an end of **programme** indicator is activated and the user has access to the load

Note 1 to entry: If there is no end of **programme** indicator, the **programme time** is equal to the **cycle time**.

3.1.18**automatic dispenser**

device activated automatically which injects or dispenses **detergent** or **rinse aid**, one or more times into the **dishwasher** at predetermined points in the **dishwasher cycle**

3.1.19**non-automatic dispenser**

device, usually a fixed cup or cavity on the **dishwasher** door, cover, or **rack**, which deposits a previously measured amount of **detergent** or **rinse aid** into the **dishwasher**

3.1.20**water softener**

device which reduces the hardness of water

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3.1.21**regeneration**

process by which softening capacity is restored to a **water softener**

3.1.22**rack**

support for holding dishware, cutlery, and/or glassware in the **dishwasher**

3.1.23**detergent**

cleaning agent for use in **dishwashers** to aid in the removal of food soils by chemical means

Note 1 to entry: A reference **detergent** in powder form is specified for use in this standard (see 5.7).

3.1.24**rinse aid**

chemical agent added to the water in the last rinsing **operation** to improve the drying effect and reduce water marks

Note 1 to entry: A reference **rinse aid** is specified for use in this standard (see 5.8).

3.1.25**end of cycle mode**

mode that occurs after the completion of the **cycle**, without any further intervention of the user

Note 1 to entry: This mode can persist or may be of limited duration where a **power management system** is present.

3.1.26

left on mode

mode that occurs after the completion of the **cycle**, with the door opened and unlatched, without any further intervention of the user

Note 1 to entry: In some products this mode can be equivalent to **off mode**.

Note 2 to entry: This mode can persist or can be of limited duration where a **power management system** is present.

3.1.27

off mode

mode where the product is switched off using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption

Note 1 to entry: If an appliance is equipped with a **power management system**, the lowest power consumption that can persist will be reached automatically.

Note 2 to entry: This mode can persist while connected to a mains power source.

3.1.28

delay start mode

mode where the user has selected a specified delay to the commencement of the **cycle** (of the selected **programme**)

Note 1 to entry: This mode is only applicable to **dishwashers** that provide a delay start function for the user.

3.1.29

end of cycle mode duration

time for the **dishwasher** to revert automatically to **off mode** after the end of the **cycle** without any further intervention of the operator

Note 1 to entry: End of **cycle** is reached when all activities cease (according to 3.1.15 and 3.1.16).

Note 2 to entry: This mode applies if the **test machine** is equipped with a **power management system**.

3.1.30

left on mode duration

time for the **dishwasher** to revert automatically to **off mode** after the end of the **cycle** with the door unlatched and opened

Note 1 to entry: The **left on mode duration** is declared by the manufacturer.

Note 2 to entry: End of **cycle** is reached when all activities cease (according to 3.1.15 and 3.1.16).

Note 3 to entry: This mode applies if the **test machine** is equipped with a **power management system**.

3.1.31

power management system

system within the **dishwasher** which allows it to revert automatically to **off mode** after the completion of the **cycle**

3.1.32

refrigerated

storage of foods at a temperature of $(4 \pm 3) ^\circ\text{C}$

3.1.33

freeze

storage of foods at a temperature of $(-18 \pm 3) ^\circ\text{C}$