

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Clothes washing machines for household use – Methods for measuring the performance

Machines à laver le linge pour usage domestique – Méthodes de mesure de l'aptitude à la fonction



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CLOTHES WASHING MACHINES FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

FOREWORD

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IEC 60456 edition 5.1 contains the fifth edition (2010-02) [documents 59D/358/FDIS and 59D/360/RVD], its corrigendum (2011-09) and its amendment 1 (2022-12) [documents 59D/486/CDV and 59D/496/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60456 has been prepared by subcommittee 59D: Home laundry appliances, of IEC technical committee 59: Performance of household and similar electrical appliances.

This fifth edition constitutes a technical revision.

Experience with the use of the fourth edition of IEC 60456, together with some revised test conditions and the need for a more globally applicable standard, are the main reasons for this fifth edition.

This edition includes the following significant technical changes from the previous edition.

- Modified test load mass requirement for cases where rated capacity of test machine is not declared. Test load mass determination in case rated capacity is not declared was changed to remove the ambiguity in edition 4 and to encourage declaration.
- Introduction of soft water option.
- Expanded stain/soil set (for assessment of washing performance).
- Improved method of loading and folding test load items to better suit vertical axis, horizontal axis and twin tub systems.
- Revised and amended reference machine specification reflecting full qualification of new Electrolux Wascator CLS.
- New reference programmes for lower temperatures and vertical axis systems. New informative annex comparing reference programmes to typical household programmes.
- Refined rinsing efficiency method.
- Introduction of low power modes "Off" and "Left On" (for assessment of energy consumption).
- New annex about uncertainty of measurements.

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

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CLOTHES WASHING MACHINES FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

1 Scope

This International Standard specifies methods for measuring the performance of clothes **washing machines** for household use, with or without heating devices utilising cold and/or hot water supply. It also deals with appliances for water extraction by centrifugal force (**spin extractors**) and is applicable to appliances for both washing and drying textiles (**washer-dryers**) with respect to their washing related functions. This International Standard also covers **washing machines** which specify the use of no detergent for normal use.

NOTE 1 Tumble dryer performance is assessed to IEC 61121.

The object is to state and define the principal performance characteristics of electric household **washing machines** and **spin extractors** and to describe the test methods for measuring these characteristics.

NOTE 2 This international standard applies also to **washing machines** for communal use in blocks of flats or in launderettes. It does not apply to **washing machines** for commercial laundries. This International Standard is not intended to be used for the comparative evaluation of detergents.

NOTE 3 This International Standard does not specify acoustical noise requirements for **washing machines**. Acoustical noise measurements are specified in IEC 60704-1 and IEC 60704-2-4.

NOTE 4 This International Standard does not specify safety requirements for **washing machines**. Safety requirements are specified in IEC 60335-2-7.

2 Normative references

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

IEC 60335-2-7, *Household and similar electrical appliances – Safety – Part 2-7: Particular requirements for washing machines*

IEC 60734, *Household electrical appliances – Performance – Hard water for testing*

IEC 62053-21, *Electricity metering equipment (a.c.) – Particular requirements – Part 21: Static meters for active energy (classes 1 and 2)*

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

IEC Guide 109, *Environmental aspects – Inclusion in electrotechnical product standards*

ISO 31-0:1992, *Quantities and units – Part 0: General principles*

ISO 2060, *Textiles – Yarn from packages – Determination of linear density (mass per unit length) by the skein method*

ISO 2061, *Textiles – Determination of twist in yarns – Direct counting method*

ISO 7211-2, *Textiles – Woven fabrics – Construction – Methods of analysis – Part 2: Determination of number of threads per unit length*

EN 12127, *Textiles – Fabrics – Determination of mass per unit area using small samples*

3 Terms, definitions and symbols

3.1 Terms and definitions

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

3.1.1

washing machine

appliance for cleaning and rinsing of textiles using water which may also have a means of extracting excess water from the textiles

3.1.2

test washing machine

washing machine that is subjected to part or all of the requirements in this document in order to determine its performance

NOTE **Test washing machine** may include washing machines according to 3.1.7, 3.1.8, 3.1.9 and/or 3.1.10.

3.1.3

reference machine

specially constructed **washing machine** of known performance which is used to increase repeatability and reproducibility of results

NOTE It may be used to provide a known performance level within a laboratory against which to compare selected performance parameters on test washing machines as defined in this document – refer 5.4.2.

3.1.4

washer-dryer

washing machine which includes both a **spin extraction** function and also a means for drying the textiles, usually by heating and tumbling

NOTE This document only covers the operations which relate to the **washing machine** function – see Scope.

3.1.5

spin extractor

separate water-extracting appliance in which water is removed from textiles by centrifugal action (**spin extraction**)

3.1.6

standard extractor

spin extractor used to remove water remaining in the base load at the completion of the programme where a rinse performance measurement is required

3.1.7

vertical axis washing machine

washing machine in which the load is placed in a drum which rotates around an axis which is vertical or close to vertical. For the purposes of this document, vertical axis is where the angle of the axis of rotation is more than 45 degrees to horizontal. Where the drum does not rotate, the washing machine shall be classified as a vertical axis washing machine.

NOTE The classification of vertical axis or horizontal axis in this document is only used to define the placement of the load into the drum.

3.1.8

horizontal axis washing machine

washing machine in which the load is placed in a drum which rotates around an axis which is horizontal or close to horizontal. For the purposes of this document, horizontal axis is where the angle of the axis is less than or equal to 45 degrees to horizontal.