



SLOVENSKI STANDARD

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Gospodinjski pralni stroji - Metode za merjenje funkcionalnosti (IEC 60456:2010, spremenjen)

Clothes washing machines for household use - Methods for measuring the performance (IEC 60456:2010, modified)

Waschmaschinen für den Hausgebrauch - Verfahren zur Messung der Gebrauchseigenschaften (IEC 60456:2010, modifiziert)

Machines à laver le linge pour usage domestique - Méthodes de mesure de l'aptitude à la fonction (CEI 60456:2010, modifiée)

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**Clothes washing machines for household use -
Methods for measuring the performance**
(IEC 60456:2010, modified)

Machines à laver le linge pour usage domestique -
Méthodes de mesure de l'aptitude à la fonction
(CEI 60456:2010, modifiée)

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Verfahren zur Messung der Gebrauchseigenschaften
(IEC 60456:2010, modifiziert)

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This European Standard was approved by CENELEC on 2011-03-21. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60456:2010, prepared by SC 59D, Home laundry appliances, of IEC TC 59, Performance of household and similar electrical appliances, together with common modifications prepared by the Technical Committee CENELEC TC 59X, Performance of household and similar electrical appliances, was submitted to the formal vote and was approved by CENELEC as EN 60456 on 2011-03-21.

This document supersedes EN 60456:2005 + A11:2006 + A12:2011

Significant technical differences are

- a) a test procedure for a combined test sequence of cotton 40 °C and cotton 60 °C with full load and partial load is introduced,
- b) a test procedure for measuring power consumption in low power modes is introduced,
- c) a formula to calculate the energy consumption of washing machines including low power modes is added,
- d) the detergent dosage is reduced to 75 % for cotton and synthetic/blends,
- e) the detergent dosage of the reference machine type 1 is adjusted to maintain the washing performance level of the reference machine type 2,
- f) the reference machine type 1 is to be used for testing according to Commission Regulations with regard to energy labelling and ecodesign,
- g) control procedures for checking measured values in comparison to values declared by the manufacturer under consideration of permitted tolerances are updated.

The procedures described in this European Standard were modified substantially compared to EN 60456:2005, e.g. with regard to detergent dosage. Therefore results of tests according to this standard cannot and shall not be directly compared to results of similar procedures of previous versions. Also results based on a specific reference programme shall not be compared to results based on other reference programmes.

This European Standard also specifies, as far as necessary, the test methods which shall be applied in accordance with the COMMISSION DELEGATED REGULATION (EU) No 1061/2010 implementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household washing machines and in accordance with the COMMISSION REGULATION (EU) No 1015/2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household washing machines.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 60456:2010 are prefixed "Z".

Annexes ZA, ZB and ZC have been added by CENELEC.

Annex ZA sets out the procedure to be applied for testing according to Commission Regulations with regard to energy labelling and ecodesign and provides all necessary links to all relevant clauses of this European Standard.

Annex ZB provides control procedures for checking measured values in comparison to values declared by the manufacturer and taking into account any permitted tolerances.

Annex ZC lists normative references.

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Endorsement notice

The text of the International Standard IEC 60456:2010 was approved by CENELEC as a European Standard with **common modifications printed in red letters**.

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1 Scope

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

NOTE 3 This European 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 European Standard does not specify safety requirements for **washing machines**. Safety requirements are specified in IEC 60335-2-7.

2 Normative references

Void.

NOTE Z1: Normative references to the relevant European Standards are listed in Annex ZC (normative).
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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.

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.

3.1.9**manual washing machine**

washing machine where the machine requires user intervention at one or more points during the programme to enable the machine to proceed to the next **operation**

NOTE Examples of user intervention could include manual fill (non automatic water level), transfer of the load between a washing drum and a **spin extractor** drum or manual draining. **Manual washing machines** have special requirements regarding the **programme** which is tested for this document; see Annex M.

3.1.10**automatic machine**

washing machine where the load is fully treated by the machine without the need for user intervention at any point during the **programme** prior to its completion

3.1.11**test run**

single performance assessment as specified in Clause 7 of this document

3.1.12**test series**

group of **test runs** on a **test washing machine** which, collectively, are used to assess the performance of a **washing machine**

3.1.13**operation**

each performance of a function that occurs during the **washing machine programme** such as pre-wash, washing, rinsing, draining or spinning

3.1.14**programme**

series of **operations** which are pre-defined within the **washing machine** and which are declared by the manufacturer as suitable for washing certain textile types

3.1.15**cycle**

complete washing process, as defined by the **programme** selected, consisting of a series of **operations** (wash, rinse, spin, etc.) and including any **operations** that occur after the completion of the **programme**

NOTE Examples of **operations** that may occur after the completion of the **programme** are pumping, monitoring and anti-creasing (where applicable).

3.1.16**spin extraction**

water-extracting function by which water is removed from textiles by centrifugal action. This is included as a function (built in **operation**) of an **automatic washing machine** but may also be performed in a **spin extractor**

3.1.17**spin speed**

rotational frequency of a drum during **spin extraction**

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NOTE A method for determination of **spin speed** is not defined in this standard.

3.1.18**base load**

textile load used for testing without stain test strips or wool shrinkage specimens

3.1.19**test load**

base load used for testing plus stain test strips or wool shrinkage specimens

3.1.20**test load mass**

actual mass of the base load plus stain test strips or wool specimen

3.1.21**nominal test load mass**

mass of dry textiles of a particular type for which the performance of the test washing machine shall be tested (rated capacity or part load). Target value for the conditioned **test load mass**

3.1.22**rated capacity**

maximum mass in kg of dry textiles of a particular type which the manufacturer declares can be treated in the **washing machine** on the **programme** selected

3.1.23**programme time**

programme time is the time from the initiation of the **programme** (excluding any user programmed delay) until the completion of the **programme**. If the end of **programme** is not indicated, the **programme time** is equal to the **cycle time**.

3.1.24**end of programme**

the **programme** is complete when the **washing machine** indicates the end of the **programme** and the load is accessible to the user. Where there is no end of **programme** indicator and the door is locked during operation, the **programme** is complete when the load is accessible to the user. Where there is no end of **programme** indicator and the door is not locked during operation, the **programme** is complete when the power consumption of the appliance drops to some steady state condition and is not performing any function

NOTE An indication of the end of the **programme** may be in the form of a light (on or off), a sound, an indicator shown on a display or the release of a door or latch. In some **washing machines** there may be a short delay from an end of **programme** indicator until the load is accessible by the user.

3.1.25**cycle time**

time from the initiation of the **programme** (excluding any user programmed delay) until all activity ceases. Activity is considered to have ceased when the power consumption reverts to a steady state condition that persists indefinitely without user intervention. If there is no activity after the end of the **programme**, the **cycle time** is equal to the **programme time**

NOTE **Cycle time** includes any activity that may occur after the **programme** is completed. This could include any electronic activity or any additional mechanical activity that occurs for a limited period after any end of **programme** indicator. Any cyclic event that occurs indefinitely is considered to be steady state.

3.1.26**main wash duration**

time from the commencement of the initial water intake for the main wash until the commencement of the initial water intake for the first rinse

NOTE Variations in the laboratory water supply pressure may affect the **main wash duration**. This definition is only applicable to **test washing machines**. The **reference machine** wash time used for calibration of the **reference machine** is defined differently. Refer to Table E.1. [SIST EN 60456:2011](https://standards.iteh.ai/catalog/standards/sist/c4cd273c-ce02-4009-b6fd-6c23df30709/sist-en-60456-2011)

3.1.27**remaining moisture content**

measure for the additional amount of moisture that is contained in the **base load** in relation to the equilibrium condition for **base load** items which have been conditioned in a controlled space (refer to 6.4.5.2)

NOTE This equilibrium condition is defined as 0 % **remaining moisture content** in this document. Hence it is possible for a **base load** or load items to have a negative **remaining moisture content** when treated with a tumble drier. Refer also to Annex G.

3.1.28**off mode**

condition 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 that may persist for an indefinite time while connected to a mains power source and used in accordance with the manufacturer's instructions. Where there are no controls, the washing machine is left to revert to a steady state power consumption of its own accord

3.1.29**left on mode**

lowest power consumption mode that may persist for an indefinite time after the completion of the programme and unloading of the machine without any further intervention of the user

NOTE In some products this mode may be an equivalent power to **off mode**.

3.1.30**rated voltage**

voltage assigned to the appliance by the manufacturer

**3.1.Z1
full load**

test load to be used for a combined **test series** according to Annex ZA, having a nominal mass that is equal to the greatest amount of cotton textiles that may be washed using the standard 60 °C cotton **programme** or the standard 40 °C cotton **programme**, as stated by the manufacturer in the instruction manual or on the energy label supplied with the **test washing machine**, whichever is higher

**3.1.Z2
partial load**

half of the **full load** for cotton textiles

**3.1.Z3
treatment**

combination of **test load** and **programme** to be used for a **test run** within a combined **test series**

3.1.Z4**treatment 60½**

standard 60 °C cotton **programme** with **partial load**

3.1.Z5**treatment 40½**

standard 40 °C cotton **programme** with **partial load**

3.1.Z6**treatment 60**

standard 60 °C cotton **programme** with **full load**

3.1.Z7**unstable left on mode**

condition after opening the door, at the end of the **programme** where the power consumption may change without any intervention by the end-user

3.1.Z8**post programme phases**

phases after the end of **programme** defined to be used for the measurement of **left on mode**

3.1.Z9**post programme phase LU**

phase after the end of **programme** defined to be used for the measurement of the **unstable left on mode**

3.1.Z10**post programme phase LO**

phase after the end of **programme** defined to be used for the measurement of the **left on mode**

3.1.Z11**left on mode duration**

time to revert automatically the machine to **off mode** after the end of the **programme** if the **test washing machine** is equipped with a **power management system**

3.1.Z12**power management system**

system within the **test washing machine** which reverts it automatically to **off mode**

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