SLOVENSKI STANDARD
oSIST prEN 50229:2014

01-junij-2014

Nadomešča:
SIST EN 50229:2008

Električni pralno-sušilni stroji za uporabo v gospodinjstvu - Metode za merjenje lastnosti

Electric clothes washer-dryers for household use - Methods of measuring the performance

Elektrische Wasch-Trockner für den Hausgebrauch - Prüfverfahren zur Bestimmung der Gebrauchseigenschaften

Lavantes-séchantes électriques à usage domestique - Méthodes de mesure de l'aptitude à la fonction

Ta slovenski standard je istoveten z: **prEN 50229:2014**

ICS:

97.060	Aparati za nego perila	Laundry appliances

oSIST prEN 50229:2014 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 50229

April 2014

ICS 97.060

Will supersede EN 50229:2007

English version

Electric clothes washer-dryers for household use - Methods of measuring the performance

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This draft European Standard is submitted to CENELEC members for CENELEC enquiry.
Deadline for CENELEC: 2014-09-05.

It has been drawn up by CLC/TC 59X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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CENELEC

European Committee for Electrotechnical Standardization
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Ref. No. prEN 50229:2014 E

Contents

Page

Foreword

This document [prEN 50229:2014] has been prepared by CLC/TC 59X “Performance of household and similar electrical appliances”.

This document is currently submitted to the Enquiry.

This document will supersede EN 50229:2007.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

NOTE Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

1 Scope

This European Standard specifies the test methods which shall be applied in accordance with the Commission Directive 96/60/EC of 19 September 1996 implementing Council Directive 92/75/EEC with regard to energy labelling of household combined washer-driers.

It deals with

– performance criteria for the **complete operation cycle** of a 60 °C cotton wash programme as specified in EN 60456:2011 and a **drying cycle** based on the "Dry cotton programme" as specified in EN 61121:2013,

– permitted tolerances for the verification procedure.

This European Standard is concerned neither with safety nor with performance requirements.

NOTE **Washer-dryers** for communal use in blocks of flats or in launderettes are within the scope of this European Standard, but machines for commercial laundries are not included.

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.

EN 50564:2011, *Electrical and electronic household and office equipment – Measurement of low power consumption*

EN 60456:2011, *Clothes washing machines for household use – Methods for measuring the performance (IEC 60456:2010, mod.)*

All clauses containing requirements for the "combined test series" and references to "Annex ZA" in EN 60456:2011 shall not be applied.

EN 60704-2-4, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-4: Particular requirements for washing machines and spin extractors (IEC 60704-2-4)*

EN 60704-2-6, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-6: Particular requirements for tumble dryers (IEC 60704-2-6)*

EN 60704-3, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 3: Procedure for determining and verifying declared noise emission values (IEC 60704-3)*

EN 61121:2013, *Tumble dryers for household use – Methods for measuring the performance (IEC 61121:2012, mod.)*

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purpose of this document, the terms and definitions in EN 60456:2011, 3.1, apply, except for 3.1.15, 3.1.22, 3.1.25 and 3.1.Z1 to 3.1.Z12.

Additional definitions:

3.1.1
washer-dryer
washing machine which includes both a spin extraction function and also a means for drying the textiles, usually by heating and tumbling

3.1.2
rated washing capacity
maximum mass in kg of dry textiles which the manufacturer declares can be washed in the **washer-dryer**

3.1.3
rated drying capacity
maximum mass in kg of dry textiles which the manufacturer declares can be dried in the **washer-dryer**

3.1.4
complete operation cycle
complete washing and drying process, as defined by the required programmes, consisting of a **washing cycle** and a **drying cycle set**

3.1.5
washing cycle
complete washing process, as defined by the required programme, consisting of a series of different operations (wash, rinse, spin)

3.1.6
drying cycle
complete drying process, as defined by the required programme, consisting of a series of different operations (heat, cool down)

3.1.7
drying cycle set
set of **drying cycles** in which a **rated drying load** and a **residual drying load** are dried

Note to entry 1: Usually a **drying cycle set** consists of two or more **drying cycles** involving the **rated drying load** and the **residual drying load** but when a **washer-dryer** has a **rated drying capacity** equal to its **rated washing capacity** the term **drying cycle set** applies to the cycle in which the **rated drying load** is dried.

3.1.8
automatic drying
drying process which automatically switches off when a certain moisture content of the load is reached

3.1.9
partial load
part of the test load used during a single **drying cycle**

Note to entry 1: Usually the **rated drying capacity** of a **washer-dryer** is smaller than its **rated washing capacity**. In this case, for a **complete operating cycle** the **test load** for washing must be divided into **partial loads** to perform the drying tests.

Note to entry 2: **Partial load** is a general term that means either **rated drying load** or **residual drying load**.

Note to entry 3: If, for a particular **washer-dryer** the **rated drying capacity** is equal to the **rated washing capacity**, the term **partial load** means the entire **base load**.

3.1.10
rated drying load
part of the **base load** having a mass after conditioning equal to the **rated drying capacity** of the **washer-dryer** except for the case where the **rated drying capacity** is equal to the **rated washing capacity** in which case the **rated drying load** shall have the same mass as the **base load**

Note to entry 1: Under circumstances where the **rated drying capacity** is less than half the **rated washing capacity**, more than one **rated drying load** will need to be prepared from the **base load**

3.1.11
residual drying load
remaining part of the **base load** after the **rated drying load(s)** has been removed

Note to entry 1: If, for a particular **washer-dryer** the **rated drying capacity** is equal to the **rated washing capacity**, there will be no **residual drying load**.

3.1.12
final moisture content
moisture content of a test load at the end of a **drying cycle**

3.1.13
additional drying
supplementary drying of the test load applied when the selected drying programme fails to achieve a **final moisture content** of 3,0 % or less

3.2 Symbols

The symbols used in this European Standard listed in Table 1.

NOTE It should not be assumed that the symbols in 3.2 of EN 60456:2011 and 3.2 of EN 61121:2013 apply to this European Standard.

131 **Table 1 — List of symbols**

Symbol	Unit	Definition
L	l	Water consumption
E	kWh	Energy consumption
t	min	Programme duration
T	°C	Temperature
W	g	Mass of load
μ	%	Moisture content
S	rpm	Maximum spin speed
K	kg	Rated capacity
X	%	Reflectance value
n	-	Number of test strips in a test run
s	-	Standard deviation
C	-	Sum of average reflectance for each soil for a single test run
M	-	Number of soil types per stain test strip
$\overline{C}$	-	Sum of average reflectance for all soils for all test runs
B	-	Number of test runs in a test series
Q	-	Ratio of sum of reflectance for the test washing machine against the sum of the reflectance for the reference machine.
P	-	Confidence interval
F	-	Student T factor $t_{w-1,\ 0,05}$
W	-	Number of degrees of freedom in the Student T factor
Index		**Definition**
w		**Washing cycle**
d		**Drying cycle**
wd		**Complete operation cycle**
i		Initial value
f		Final value
0		Conditioned
N		Nominal value for **partial load** amounts and target final moisture
p		**partial load**
m		Measured value
Add		result of **additional drying** program runs required to reach final moisture target
s		specific value calculated by division with the **rated washing capacity**
a		Soil type
j		Test strip
k		Test run

t	Machine on test
r	Reference machine
c	Cold water
h	Hot water
M	Main wash
Superscripts	**Definition**
$\overline{\square}$ *(Bar)*	Average value for a test series (mean value).

4 Requirements

4.1 General

This document describes test methods for the measurement of following performance parameters:

- washing performance;
- water extraction performance;
- water consumption for washing;
- water consumption for drying;
- energy consumption for washing;
- energy consumption for drying;
- programme time for washing;
- programme time for drying;
- maximum spin speed.

NOTE While this document describes the general procedure for the measurement of these parameters, much of the necessary and specific detail is contained in EN 60456:2011 and EN 61121:2013.

Any claims of performance referring to this document for these parameters shall be measured in accordance with the requirements of this document (refer to Clause 7 for details).

4.2 Rated capacity

The **rated washing capacity** shall be declared by the manufacturer or supplier as the maximum mass of cotton textiles, to be washed in the cotton programme, at 0,5 kg intervals given in any user information.

The **rated washing capacity** for any textile type shall not exceed the maximum mass of dry laundry, in kilograms, to be used in the **washer-dryer** in accordance with IEC 60335-2-7.

If the **rated washing capacity** is not declared, it shall be deduced from the volume of the drum according to EN 60456:2011, N.2.

The **rated drying capacity** shall be declared by the manufacturer or supplier as maximum mass of cotton textiles, to be dried in either a drying only cycle or a combined washing and **drying cycle** without interruption, whichever is higher, at 0,5 kg intervals given in any user information.

The **rated drying capacity** for any textile type shall not exceed the maximum mass of dry laundry, in kilograms, to be used in the **washer-dryer** in accordance with 3.1.9 of IEC 60335-2-11:2008.

If the **rated drying capacity** is not declared, it shall be deduced from the volume of the drum according to EN 61121:2013, Annex E.

4.3 Dimensions

See 4.3 of EN 60456:2011.

5 Test conditions, materials and instrumentation

5.1 General

The tolerances specified for parameters within this document (using the symbol "±") indicate the allowable limits of variation from the specified parameter outside which the test or results shall be invalid. The statement of tolerance does not permit the deliberate variation of these specified parameters.

Unless otherwise specified, the **reference machine** shall be considered a **test washing machine** with respect to conditions, materials and equipment specified.

5.2 Ambient conditions

5.2.1 Electricity supply

Supply voltage and frequency shall be in accordance with EN 60456:2011, 5.2.1.

5.2.2 Water supply

5.2.2.1 General

The measured total water hardness, water temperature and water pressure of water supplied to **washer-dryers** shall comply with the following requirements and shall be reported. This water is generally referred to as laboratory supply water in this document.

5.2.2.2 Water hardness

For all treatments of the **test load** prior to a **test series** and all **test runs** in accordance with this document, water having a total water hardness of (2,5 ± 0,2) mmol/l shall be used.

Normalization of a **base load** prior to use in a **test series** (refer to EN 60456:2011, 6.4.4) shall always be done using laboratory supply water with the same total water hardness as that used for the subsequent **test series**.

Total water hardness is determined and expressed in mmol/l of $CaCO_3$ equivalent.

If total water hardness needs to be adjusted, it shall be prepared according to IEC 60734.

Measurements of total water hardness shall be undertaken on water that is representative of the laboratory supply water used for tests.

5.2.2.3 Water temperature and water pressure

Water temperature and water pressure shall meet the requirements given in EN 60456:2011, Subclauses 5.2.2.3 and 5.2.2.4.

5.2.3 Ambient temperature and humidity

The ambient temperature and ambient humidity shall be in accordance with 5.2.3 in EN 61121:2013.

5.3 Test materials

The specifications for base loads, stain test strips and detergent used for testing **washer-dryers** shall be in accordance with 5.3 of EN 60456:2011.

5.4 Equipment

The specification for the reference machine is given in 5.4.2 of EN 60456:2011. Only the type 1 reference machine according EN60456:2011, Annex D shall be used.

Specifications for other specialized test equipment required for **washer-dryer** testing to this document, including the spectrophotometer, equipment for conditioning the **base load** and the iron shall be in accordance with Subclauses 5.4.3, 5.4.4 and 5.4.6 of EN 60456:2011 and in accordance with 5.5 of EN 61121:2013. Where these two standards give different values, the smaller value shall apply.

A checklist of other laboratory equipment which may be required for **washer-dryer** testing is provided in 5.4.8 of EN 60456:2011.

5.5 Instrumentation and accuracy

Instruments used and measurements made according to this document shall comply with the specifications given in Subclauses 5.5.2 and 5.5.3 of EN 60456:2011.

6 Preparation for testing

The **washer-dryer** shall be at laboratory ambient temperature at the beginning of each **complete operation cycle**. It shall be accepted that this requirement has been met if the **washer-dryer** has been left open and standing at the stable laboratory ambient temperature for not less than 10 h.

Prepare the **washer-dryer** for testing according to EN 60456:2011, 6.2.1 and Subclauses 6.3 and 6.4 of EN 61121:2013.

Prepare the reference machine for testing according to EN 60456:2011, 6.2.2.

Prepare and place the detergent for the **washer-dryer** and the reference machine according to EN 60456:2011, 6.3.

Prepare cotton test loads for the **washer-dryer** and reference machine according to EN 60456:2011, 6.4.

If the **rated washing capacity** of the **washer-dryer** is greater than its **rated drying capacity**, it will be necessary after the washing performance test to divide the base load into two or more parts: the **rated drying load(s)** and the **residual drying load**. To enable this separation to be made in a timely manner, mark or otherwise identify the items in the base load that will be used to make up the **rated drying load(s)**. The compositions of **rated drying loads** shall be as described in EN 61121:2013, 6.5.6.1. If the base load does not contain all the items needed for the **rated drying load**, use the alternative compositions as described in Annex A.

If the **rated drying capacity** of the **washer-dryer** is equal to its **rated washing capacity**, the base load will not need to be split after the washing performance test; the whole base load shall be dried in a single **drying cycle**.

NOTE It is recognized that in this special case, the base load will be slightly smaller than the **rated drying capacity**.