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

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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

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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

This European Standard was prepared by the Technical Committee CENELEC TC 59X, Consumer information related to household electrical appliances.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50229 on 1996-12-09.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	1998-03-01
- latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	1998-03-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 92/75/EEC on "Indication by labelling and standard product information of the consumption of energy and other resources by household appliances".

It deals **only** with those test procedures that are required for the Commission Directive as described in the scope of this standard.

It also defines permitted tolerances to values declared by the manufacturer and control procedures for checking these values.

Contents

1 Scope

This European Standard specifies the test methods for measuring the performance of electric clothes washer-dryers for household use as required by the Commission Directive on energy labelling and standard product information. It deals with:

- performance criteria, including energy and water consumption, for the 60 °C cotton wash programme as specified in EN 60456;
- energy and water consumption of the drying cycle based on the „Dry cotton programme" as specified in EN 61121;
- permitted tolerances to values declared by the manufacturer and control procedures for checking these declared values.

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 Standard, but machines for commercial laundries are not included.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 20139	1992	Textiles - Standard atmospheres for conditioning and testing (ISO 139:1973)
EN 60456 + A11 + A12	1994 1995 1997	Electric clothes washing machines for household use - Methods for measuring the performance (IEC 456:1994 modified)
EN 60704-1	1994	Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances Part 1: General requirements (IEC 704-1:1982)
EN 60704-2-4	1994	Part 2: Particular requirements for washing machines and spin extractors (IEC 704-2-4:1989)
EN 60704-2-6	1995	Part 2: Particular requirements for tumble-dryers (IEC 704-2-4:1994)
EN 60704-3	1994	Part 3: Procedure for determining and verifying declared noise emission values (IEC 704-3:1992)
EN 61121 + A11	1993 1995	Methods for measuring the performance of tumbler dryers for household use (IEC 1121:199, modified)

3 Definitions

For the purpose of this Standard, the definitions in clause 3 of EN 60456, except for 3.3, and in clause 3 of EN 61121 apply.

Additional definitions:

3.101 Rated washing capacity
Maximum conditioned load (method specified in EN 20139) of textile material, in kg, which the manufacturer declares can be treated in one complete washing and spinning cycle.

3.102 Rated drying capacity
Maximum conditioned load (method specified in EN 20139) of textile material, in kg, which the manufacturer declares can be treated in one single drying cycle.

4 General notes on measurements

4.1 *List of measurements*

This Standard specifies the following measurements:

- washing performance, see 5.1;
- water extraction efficiency, see 5.2;
- maximum spin speed, see 5.3;
- water and energy consumption and programme times, see 5.4;
- airborne acoustical noise, see 5.5.

4.2 *General conditions for measurements*

See 4.2 of EN 60456 & A11 & A12.

5 Methods of measurements

5.1 *Determination of washing performance*

See 5.1.1 of EN 60456 & A11.

5.2 *Determination of the water extraction efficiency*

See 5.3 of EN 60456 & A11.

5.3 *Determination of the maximum spin speed (rpm)*

See 5.101 of EN 60456/A11.

5.4 *Determination of the water and energy consumption and programme times*

5.4.1 *Washing cycle*

The washing cycle includes: washing and spinning cycles.

5.4.1.1 *Principle of measurement*

See 5.4.1 of EN 60456.

5.4.1.2 *Method of measurement*

See 5.4.2 of EN 60456.

5.4.2 *Complete operating cycle*

The complete operating cycle includes: washing, spinning and drying cycles.

5.4.2.1 *Procedure*

The test shall be carried out according to the following steps:

a) A complete wash programme for 60 °C cotton shall be performed according to 5.1.1.1, 5.1.1.2 and 5.1.1.3 of EN 60456 & A11.

b) Immediately when the washing cycle is finished the strips are removed and the remaining ballast shall be dried to the final moisture as defined in 5.1.1 of EN 61121 for the „Dry cotton programme" under the following conditions:

1) If necessary, the ballast shall be divided in accordance with the instructions given by the manufacturer. If no instructions are given the ballast shall be divided into two equal parts;

2) 5 minutes after finishing the washing cycle the drying of the first part of the ballast shall be started;

3) The other part(s) shall be kept in (a) closed plastic bag(s);

4) When the drying of the first part is finished the final moisture retention shall be determined. If the final moisture retention exceeds the value of 3 % the „Dry cotton programme" shall be restarted from the beginning (not from the cool-down) within 2 minutes until the measured moisture retention comes into the specified range of ± 3 %. This shall be stated in the report;

5) 5 minutes after finishing the drying of the first part of the ballast the drying of the second part shall be started. The condition given in 4) shall be taken into account.

6) The remaining part(s), if any, shall be dried as described in 5).

NOTE: In the case of non-automatic drying the drying time necessary to achieve the values according to 5.1.1 in EN 61121 shall be determined by a pre-test.

5.4.2.2 *Method of measurement*

Programme times, water and energy consumption are measured and determined separately for the washing cycle and the drying cycle during the complete operating cycle as described in 5.4.2.1. The drying time does not include the 5 minutes preparation times as specified in items 2) and 5) of 5.4.2.1 b).

A minimum of five complete operating cycles is required.

If the measured final moisture retention is between - 3 % and + 3 % the values of the drying cycle measured for energy and water consumption and time shall be corrected linearly to the standard value of 0 % according to the formula ...(1) below. If the final moisture retention is below - 3 %, no correction is made.

Depending on the results the correction can be made on each part of the ballast divided according to item 1) of 5.4.2.1 b) or at the end of the total drying process.

$$k = \frac{H_{ia} - H_{fo}}{H_{ia} - H_f} \quad \text{... (1)}$$

where:

H_{ia} is the initial actual moisture retention: water content after the spinning cycle;

H_{fo} is the nominal final moisture retention for „Dry cotton programme“ according to 5.1.1 in EN 61121;

H_f is final moisture retention: water content of the ballast at the end of the drying cycle.

$$H_{ia} = \frac{M_{ia} - M_{ca}}{M_{ca}} \times 100\% \quad \text{... (2)}$$

where:

M_{ia} is the actual mass of the ballast at the beginning of the drying cycle, expressed in kg;

M_{ca} is the actual conditioned mass of the ballast at the beginning of the complete operating cycle, expressed in kg.

$$H_f = \frac{M_f - M_{ca}}{M_{ca}} \times 100\% \quad \text{... (3)}$$

where:

M_f is the mass of the ballast at the end of the drying cycle, expressed in kg.

The arithmetical mean of the values measured and corrected, if necessary, is calculated.

NOTE: Terms, symbols and formula used above are equal or analogous to those used in EN 61121.

5.4.3 *Data to be reported*

a) Name of the cycle tested.

b) Supply voltage at which measurements are made.

c) Energy consumption expressed in kWh. The average value of the five or more operating cycles is reported to the second decimal place of:

1) the washing cycle;

2) the drying cycle;

3) the complete operating cycle.

d) Water consumption measured to the nearest 0,1 litres. The average value of the five or more operating cycles is reported to the nearest whole number of litres of:

1) the washing cycle;

2) the drying cycle;

3) the complete operating cycle.