
**Bobenski sušilniki za uporabo v gospodinjstvu – Metode merjenja
funkcionalnosti (IEC 61121:2002 + popravek 2003, spremenjen)**

Tumble dryers for household use - Methods for measuring the performance (IEC 61121:2002 + corrigenda 2003, modified)

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**Tumble dryers for household use –
Methods for measuring the performance**
(IEC 61121:2002 + corrigenda 2003, modified)

Sèche-linge à tambour à usage
domestique –
Méthodes de mesure de l'aptitude
à la fonction
(CEI 61121:2002 + corrigenda 2003,
modifiée)

Wäschetrockner für den Hausgebrauch -
Verfahren zur Messung der
Gebrauchseigenschaften
(IEC 61121:2002 + Corrigenda 2003,
modifiziert)

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This European Standard was approved by CENELEC on 2005-03-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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 61121:2002, prepared by SC 59D, Home laundry appliances, of IEC TC 59, Performance of household electrical appliances, together with the common modifications prepared by the Technical Committee CENELEC TC 59X, Consumer information related to household electrical appliances, was submitted to the Unique Acceptance Procedure (UAP) but did not receive sufficient support.

A new draft, including also the corrigenda April 2003 and September 2003 to IEC 61121:2002, allowing to maintain the classification of tumble dryers according to the energy label Directive 95/13/EC, was submitted to the formal vote and was approved by CENELEC as EN 61121 on 2005-03-01.

Significant technical differences are

- a) reference machine in 7.3.2 is neutralized,
- b) an addition to Z1.1 describes factors which shall be used to correct the value for the energy consumption of the appliance found during the test in order to get the correct label value for declaration.

This European Standard supersedes EN 61121:1999 and its amendment A11:2000.

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) 2005-12-01
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- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-12-01

Annexes ZA and ZB have been added by CENELEC.

Clauses, tables and annexes which are additional to those given in IEC 61121 are prefixed “Z”.

Endorsement notice

The text of the International Standard IEC 61121:2002 + corrigendum April 2003 + corrigendum September 2003 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

1 Scope

Add a fourth paragraph:

This European Standard also specifies, as far as necessary, the test methods which shall be applied in accordance with the Commission's Directive 95/13/EC of 23 May 1995 implementing Council Directive 92/75/EEC with regard to energy labelling of household electric tumble dryers and adds clauses defining permitted tolerances to values declared by the manufacturer and control procedures for checking these declared values.

2 Normative references

Replace by:

NOTE Normative references to International Standards are listed in Annex ZB (normative).

5 Rated capacity

Add as first paragraph:

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The rated capacity for measurements to determine values to be declared for the dry cotton cycle according to the Commission's Directive in Clause 1, is the value declared by the manufacturer as highest amount of cotton textiles to be dried, given in the instruction manual or on the energy label supplied with the machine, whatever is higher.

6 General conditions for measurements

Replace 6.1 by:

6.1 General

The measurements shall be carried out on a **tumble dryer** installed and used in accordance with the manufacturer's instructions, except as required by this standard.

For the purpose of energy labelling only those test methods are applicable which are required according to the Commission's Directive mentioned in Clause 1.

If there is more than one option for installation, the one chosen for testing shall be reported.

For the purpose of energy labelling according to the Commission directive mentioned in Clause 1, the measurements shall be carried out on a new machine.

Where the **tumble dryer** is intended for use without a duct (i.e. the **tumble dryer** is intended to be vented into the room), the **tumble dryer** shall be tested as supplied without a duct.

Where the **tumble dryer** is intended for use with a duct and the duct is supplied with the **tumble dryer** (i.e. not as a separate accessory), the **tumble dryer** is tested with this duct, placed in a configuration consisting of three right angle bends as in Figure A.2, as far as possible.

Where the **tumble dryer** is intended for use with a duct and the duct is not supplied with the **tumble dryer**, the **tumble dryer** shall be tested with a duct as specified in Annex A.

Where a manufacturer gives the option to use the **tumble dryer** both with and without a duct, the **tumble dryer** shall be tested without a duct.

The test report shall clearly state which duct configuration, if any, is used in each test.

6.2.1 Electrical supply

Replace the text by:

The supply voltage shall be maintained at 230 V with a relative tolerance of $\pm 1\%$.

The supply frequency shall be maintained at 50 Hz with a relative tolerance of $\pm 1\%$.

6.2.3 Ambient temperature

Replace "(20 \pm 2) °C" by "(23 \pm 2) °C".

6.2.4 Ambient humidity

Replace "(65 \pm 5) %" by "(55 \pm 5) %".

7.2 Usage

Replace the 2nd sentence in the 1st paragraph by:

To minimize the influence of ageing of the textiles, the cotton base load shall consist of items that are well distributed in age for all different parts to give an weighted average age of the load between 30 and 50 test cycles, using the weight per piece as given in Annex B.

An example of how textiles may be exchanged is given in Annex ZA.

7.3.2 Normalisation

Replace the first sentence by:

For **normalisation** wash the test load in a Wascator reference machine as defined in EN 60456 with 15 g/kg of the reference detergent A* in EN 60456.

7.3.3 Conditioning

Replace the 2nd and 3rd sentence by:

Conditioning is carried out to define the nominal mass of the textiles.

Three methods could be used alternatively:

- 1) the textiles are left at least for 15 h in an ambient temperature of (20 ± 2) °C and humidity of (65 ± 5) % unless the weight of the load has changed by less than 0,5 % for two successive measurements. The measurements are carried out at two hour intervals;
- 2) the textiles shall be hung singly and separately so that air can freely circulate. The load is left in an ambient temperature of (20 ± 2) °C and relative humidity (65 ± 5) % for a period of not less than 15 h;
- 3) bone dry method.

7.3.4 Wetting

Add after the fourth paragraph:

For the purpose of the Commission's Directive as specified in Clause 1, the values of the initial moisture content are as given in column B of Table 2.

Delete fifth paragraph.

8.9 Ambient humidity

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Replace: “18 – 22 °C” by „as given in 6.2.3“.

9.1 General

Replace in the note “12” by “12 h”

9.2.1.1 Procedure for automatic dryer

Add the following sentence as the last sentence in 9.2.1.1

If the measured value of the final moisture content for an automatic dryer is below the lower limit of the allowable values defined in Table 3, no correction is made.

10.6 Evenness of drying

In the formula for S_{wr} , replace the symbol $\overline{\mu_j}$ by μ_j :

$$S_{wr} = \sqrt{\frac{1}{k} \sum_{j=1}^k (\mu_{fj} - \mu_j)^2}$$

11 Reporting

Add:

For reporting of the results following tables are recommended to be used:

Table Z1 – Cycle data, parameters and results

Laboratory:	Identification:
Machine identification:	Program setting:
Machine identification for normalisation	Rated capacity:
Machine identification for wetting:	

Cycle: (data for individual cycles are recommended)			1	2	3	4	5	average	s
Date of cycle	m	yr.m.d							
Load identification and average age:	X	cycles							
Mass of conditioned load	m	g							
Total water consumption (measured):	m	l							
Total energy consumption (measured):	m	kWh							
Total program duration (measured):	m	min							
Total water consumption (corrected):	m	l							
Total energy consumption (corrected):	m	kWh							
Total program duration (corrected):	m	min							
Average ambient temperature:	m	°C							
Average ambient humidity	m	%							
Water pressure	m	kPa							
Water hardness:	X	mmol/l							
Water conductivity:	m	mS/m							
Max. temperature outlet air:	X	°C							
Program duration (without cool-down):	X	min							
Initial mass of test load	m	g							
Initial moisture content	m	%							
Final mass of test load	m	g							
Final moisture of test load	m	%							
Condensation efficiency	X	%							
Drying evenness	X	%							

X = recommended m = obligatory

Table Z2 – Basic parameters, equipment and materials

All data below are optional.

Cotton base load		
Sheets:	Supplier/batch:	
Pillowcases:	Supplier/batch:	
Huckaback towels:	Supplier/batch:	
Conditioning method:		
Detergent		
Base detergent A*	Batch/production date	
Perborate	Batch/production date	
TAED	Batch/production date	
Water hardness preparation:		
NAT= natural; Hard = hardened; SOFT = softened; SYN = synthetic		
Water conductivity and preparation:		
NAT= natural; Hard = hardened; SOFT = softened; SYN = synthetic		
Details of duct configuration		

Add a new clause:

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Z1 Tolerances and control procedures

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Z1.1 Energy consumption

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For each drying **program** the value of the energy consumption, determined according to 10.2 on the first appliance shall not be greater than the value declared by the manufacturer plus 15 %.

If the result(s) of the test carried out on the first appliances is (are) greater than the value declared for the drying **program(s)** plus 15 %, the test for the relevant drying **program(s)** shall be carried out on a further three randomly selected appliances.

The arithmetic mean of the values of these three appliances for the relevant drying **program** shall not be greater than the declared value plus 10 %.

For classification (in the scale A to G) according to the energy label Directive 95/13/EC (Annex 4, value C), the measured and corrected energy consumption E according to 10.2 is corrected as follows:

- for a **condenser** dryer by multiplying it by 1,14

$$E_{\text{corr}} = E \cdot 1,14$$

- for a **vented** dryer by the calculation of the equation

$$E_{\text{corr}} = E \cdot 1,14 + 0,08 \left[\frac{\text{kWh}}{\text{h}} \right] \cdot t[\text{h}]$$

where

t is the total program time as measured according to 10.4, expressed in hours.

NOTE Z1 This correction is necessary to maintain the energy label class classification more or less unchanged due to the change in testing conditions compared to EN 61121:1999.

NOTE Z2 E_{corr} is only to be used to calculate the specific energy consumption "C" per kg load as requested in Directive 95/13/EC.

Z1.2 Water consumption

For each drying **program** the value of the water consumption, determined according to 10.3 on the first appliance shall not be greater than the water consumption declared by the manufacturer plus 15 %.

If the result(s) of the test carried out on the first appliances is (are) greater than the value declared for the drying **program(s)** plus 15 %, the test for the relevant drying **program(s)** shall be carried out on a further three randomly selected appliances.

The arithmetic mean of the values of these three appliances for the relevant drying **program** shall not be greater than the declared value plus 10 %.

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Z1.3 Drying time

For each drying **program** the value of the drying time, determined according to 10.4 on the first appliance shall not be greater than the drying time declared by the manufacturer plus 15 %.

If the result(s) of the test carried out on the first appliances is (are) greater than the value declared for the drying **program(s)** plus 15 %, the test for the relevant drying **program(s)** shall be carried out on a further three randomly selected appliances.

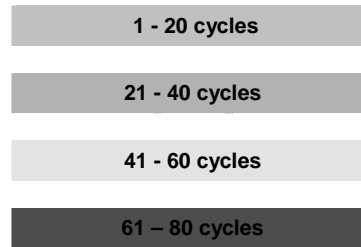
The arithmetic mean of the values of these three appliances for the relevant drying **program** shall not be greater than the declared value plus 10 %.

Add the following Annexes ZA and ZB:

Annex ZA (informative)

Modified cotton base load (Example for 5 kg to achieve the required average age)

Diagram of use (4/4 base load, max. 80 cycles)



While each change after 20 cycles there are parts added, which were pre-treated 5 cycles.

Basic condition	1st change	2nd change	3rd change
sheet 4	pillowc. 5 pillowc. 5 pillowc. 5	sheet 6	pillowc. 7 pillowc. 7 pillowc. 7
pillowc. 3 pillowc. 3 pillowc. 3	sheet 4	pillowc. 5 pillowc. 5 pillowc. 5	sheet 6
sheet 2	pillowc. 3 pillowc. 3 pillowc. 3	sheet 4	pillowc. 5 pillowc. 5 pillowc. 5
pillowc. 1 pillowc. 1 pillowc. 1	sheet 2	pillowc. 3 pillowc. 3 pillowc. 3	sheet 4
4 X towel 4 4 X towel 3 4 X towel 2 4 X towel 1	4 X towel 5 4 X towel 4 4 X towel 3 4 X towel 2	4 X towel 6 4 X towel 5 4 X towel 4 4 X towel 3	4 X towel 7 4 X towel 6 4 X towel 5 4 X towel 4
all parts 1 remove	all parts 2 remove	all parts 3 remove	all parts 4 remove

In this procedure the change of sheets and pillowcases happens part by part but alternating.

Depending on the different weight of the huckaback towels there belong conditioned balance parts to the basic load

Annex ZB (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60456	- ¹⁾	Clothes washing machines for household use - Methods for measuring the performance	EN 60456	2005 ²⁾
IEC 60734	- ¹⁾	Household electrical appliances - Performance - Hard water for testing	EN 60734	2003 ²⁾
IEC 61036	- ¹⁾	Alternating current static watt-hour meters for active energy (classes 1 and 2)	EN 61036	1996 ²⁾
IEC 61591	1997	Household range hoods - Methods for measuring performance	EN 61591	1997
ISO 5167-1	- ¹⁾	Measurement of fluid flow by means of pressure differential devices - Part 1: Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full	EN ISO 5167-1	1995 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at time of issue.

Bibliography

IEC 60704-1	1997	Household and similar electrical appliances - Test code for the determination of airborne acoustical noise -- Part 1: General requirements (NOTE Harmonized as EN 60704-1:1997 (not modified))
IEC 60704-2-6 ³⁾	1994	Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances – Part 2-6: Particular requirements for tumble-dryers (NOTE Harmonized as EN 60704-2-6:1995 (not modified))
IEC 60704-3	1994	Test code for the determination of airborne acoustical noise emitted by household and similar electrical appliances – Part 3: Procedure for determining and verifying declared noise emission values (NOTE Harmonized as EN 60704-3:1994 (not modified))
ISO 3801	1977	Textiles – Woven fabrics – Determination of mass per unit length and mass per unit area
ISO 6330	2000	Textiles – Domestic washing and drying procedures for textile testing (NOTE Harmonized as EN ISO 6330:2000 (not modified))

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³⁾ A new edition of IEC 60704-2-6 is currently in preparation.