

Tumble dryers for household use — Methods for measuring the performance

The European Standard EN 61121:2005 has the status of a
British Standard

ICS 97.060

National foreword

This British Standard is the official English language version of EN 61121:2005. It was derived by CENELEC from IEC 61121:2002 + corrigenda 2003. It supersedes BS EN 61121:1999 which will be withdrawn on 1 December 2007.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by common modification tags **[C]** **[C]**.

The UK participation in its preparation was entrusted by Technical Committee CPL/59, Performance of household electrical appliances, to Subcommittee CPL/59/1, Performance of home laundry appliances, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 31 and a back cover.

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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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CENELEC

European Committee for Electrotechnical Standardization
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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
- 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.

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INTRODUCTION

This third edition has been developed in light of experience with use of the second edition of IEC 61121. Other changes include some minor revisions to the test conditions and alterations to the test load to ensure that this remains harmonised with the IEC 60456 load for clothes washers.

In summary, the main changes are as follows.

1) General:

- more terms have been defined and some previous definitions have been streamlined, in addition to the correction of some symbols and equations;
- where possible, definitions and terms have been used in common with IEC 60456;
- the content has been organised into a more logical and simple structure, and repetitive sections have been removed.

2) The conditions of measurement:

- the wording of various sections has been revised to reduce ambiguity;
- limits have been defined for water conductivity for auto-sensing dryers that are sensitive to conductivity, as well as methods to adjust conductivity where necessary;
- specifications of a nominal exhaust duct were included.

3) Reproducibility and repeatability of test results:

- revision of the specification for the cotton test load to include suitable test materials which are currently available on the market;
- more careful definition of the process and conditions for **pre-treatment, conditioning and normalisation**.

4) Test methods:

- accuracy of measurement has been defined for all instruments;
- limits and interpretations of the allowable final moisture content for each type of dryer are now defined;
- practical advice regarding the test procedure has been given with the aim of reducing ambiguity.

TUMBLE DRYERS FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

1 Scope

This International Standard is applicable to household electric **tumble dryers** of the **automatic** and **non-automatic** type, with or without a cold water supply and incorporating a heating device.

The object is to state and define the principal performance characteristics of household electric **tumble dryers** of interest to users and to describe standard methods for measuring these characteristics.

This standard is concerned neither with safety nor with performance requirements.

☐ 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

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

3 Definitions and symbols

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

3.1

tumble dryer

appliance in which textile material is dried by tumbling in a rotating drum, through which heated air is passed

3.2

air vented tumble dryer

tumble dryer with a fresh-air intake which is heated and passed over the textile material and where the resulting moist air is exhausted into the room or vented outside

3.3

condenser tumble dryer

tumble dryer in which the air used for the drying process is dehumidified by cooling

NOTE Combinations of the above-mentioned types are possible.

3.4

automatic tumble dryer

tumble dryer which switches off the drying process when a certain moisture content of the load is reached

NOTE This may include conductivity or temperature sensing

3.5

non-automatic tumble dryer

tumble dryer which does not switch off the drying process when a certain moisture content of the load is reached, usually controlled by a timer, but may also be manually controlled

3.6

pre-treatment

successive washing, rinsing, spinning and drying of a new test load prior to its first use to avoid rapid changes of characteristics during the tests

3.7

normalisation

successive washing, rinsing, spinning and drying of a test load after a pre-determined number of cycles to bring the test load to a normal state

3.8

conditioning

treatment of test load to assure homogenous condition

3.9

programme

series of operations which are pre-defined and which are declared as suitable for drying certain types of textiles

3.10

cycle

complete drying process, as defined by the **programme** selected, consisting of a series of different operations (heat, cool down etc.)

3.11

rated capacity

mass in kg of dry textiles of a particular defined type, which the manufacturer declares can be treated in a specific **programme**

3.12 List of symbols

μ_f	actual final moisture content of the test load (%)
μ_{f0}	nominal final moisture content (%) given in table 3, without tolerances
μ_{fi}	actual final moisture content of the test load after the i:th cycle (%)
μ_{fj}	actual final moisture content of the j:th individual piece of textile in a cycle (%)
μ_i	actual initial moisture content (%)
μ_j	arithmetic average of $\mu_{(f, j)}$ for all individual load items
μ_{i0}	nominal initial moisture content (%) given in table 2, without tolerances
μ	arithmetical average of μ_f for all i cycles
C	condensation efficiency (%)
E_m	measured energy consumption kWh
E	corrected energy consumption kWh
L_m	measured water consumption (l)
L	corrected water consumption (l)
n	number of cycles
s_b	standard deviation as a measure of the variability between cycles in one test series
S_w	average drying evenness
s_{wr}	standard deviation for the evenness of drying within a load
W	rated capacity for the programme (g)
W_0	conditioned mass of the test load (g)
W_f	mass of the test load after drying, "the final mass"

W_i	mass of the test load after wetting (but before drying), "the initial mass"
W_w	mass of the condensed water
t_m	measured programme time
t	corrected programme time

4 Dimensions

Height a_1	= vertical dimension measured from the lower edge (on the floor) to the upper edge of the top, with the door closed. If adjustable levelling feet are provided, they shall be moved up and down to determine minimum and maximum possible heights.
Height a_2	= maximum vertical dimension measured from the lower edge (on the floor) to a horizontal plane at the maximum height of the tumble dryer with the door open. If adjustable levelling feet are provided, they shall be moved up and down to determine minimum and maximum possible heights.
Width b	= horizontal dimension, between the sides, as measured between two parallel vertical planes against the sides of the tumble dryer, including all projections.
Depth c_1	= horizontal dimension as measured from a vertical rear plane against the tumble dryer and the most prominent part of the front, knobs and handles not being taken into account, with the door closed.
Depth c_2	= horizontal dimension as measured from a vertical rear plane against the tumble dryer and the most prominent part of the front knobs and handles not being taken into account, with the door open.
Drum volume	= the volume of the drum in which textiles are placed, determined as the inside volume of the drum, in litres, after subtraction of ribs or other inward protrusions, etc.

5 Rated capacity

Ⓒ 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. Ⓒ

If the **rated capacity** is not declared by the manufacturer, the **rated capacity** shall be deduced from the volume of the drum according to the following ratios:

- for cotton textiles: 1 kg / 24 l;
- for easy-care textiles: 1 kg / 60 l.

Where the manufacturer gives a range of values for the **rated capacity** for a particular textile type, the maximum value shall be used.

NOTE For different

t textiles the **rated capacity** of an appliance may be different.

6 General conditions for measurements

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 Resources and ambient conditions

6.2.1 Electricity supply

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 $\pm 1\%$. 

6.2.2 Water supply

For all processes on the test load a water hardness of not higher than $(2,5 \pm 0,2)$ mmol/l shall be used. Water hardness shall be reported. If water hardness needs to be adjusted, IEC 60734 shall be followed.

The temperature of the cold water supply, if required, shall be (15 ± 2) °C. The measured water temperature shall be reported.

The pressure of the water supply during water intake at each appliance water inlet shall be maintained at (240 ± 50) kPa throughout the test. The measured water pressure shall be recorded.

For testing conductivity controlled automatic **tumble dryers**, water with a conductivity of (75 ± 15) mS/m at 20 °C shall be used. If the water conductivity is not within the range of this requirement, it can be adjusted as described in annex D. The conductivity shall be reported.