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Amendment to clauses 2, 5, 6, 7, 8, 9 & annex F and addition of clause 17 & annexes ZB, ZC, ZD, ZE & ZF

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EUROPEAN STANDARD

**EN 60456/A13**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2003

ICS 97.060

English version

## **Clothes washing machines for household use - Methods for measuring the performance**

Machines à laver le linge  
pour usage domestique -  
Méthodes de mesure  
de l'aptitude à la fonction

Waschmaschinen  
für den Hausgebrauch -  
Verfahren zur Messung  
der Gebrauchseigenschaften

### **iTeh STANDARD PREVIEW**

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This amendment A13 modifies the European Standard EN 60456:1999; it was approved by CENELEC on 2002-12-03. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

## **CENELEC**

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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## Foreword

This amendment was prepared by WG 1, Washing machines, of 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 amendment A13 to EN 60456:1999 on 2002-12-03.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-06-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2003-06-01

This amendment improves the reproducibility of the test method for the determination of the washing efficiency of washing machines. It does not modify the test procedure in principle but specifies much more precisely the test conditions. Modifications of IEC 60456 and IEC 61121 presently under consideration by IEC/SC 59D are taken into account as far as possible.

It additionally introduces the common ambient conditions for washing machines, tumble dryers and dishwashers.

In future the new reference detergent is called generally "IEC A\*".

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this amendment, Annexes ZA, ZB, ZC, ZD and ZE are normative and Annex ZF is informative.

Annexes ZA to ZF have been added by CENELEC.

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## 2 Normative references

**Delete** the date of publication of IEC 60734.

**Add:**

IEC 62053-21 Electricity metering equipment (a.c.) – Particular requirements  
Part 21: Static meters for active energy (classes 1 and 2)

DIN 53923 Prüfung von Textilien – Bestimmung des Wasseraufnahmevermögens von textilen  
Flächengeweben (Testing of textiles – Determination of water absorption of textile  
fabrics)

## 5 Rated capacity

**Add** as first paragraph:

The rated capacity for measurements to determine values to be declared for the 60 °C cotton cycle according to the Commission's Directive on energy labelling is the value declared by the manufacturer as highest amount of cotton textiles to be washed, given in the instruction manual or on the energy label supplied with the machine, whatever is higher.

## 6 General conditions for measurements

### 6.1 General

**Add** the following three paragraphs after the first one:

The measurements shall be carried out on a new machine installed and used in accordance with the manufacturer's instructions, except if required otherwise by this standard.

Before commencing a series of tests machines shall run two complete cycles, at maximum temperature (e.g. 95 °C); the first cycle without load and with 50 g of the reference detergent IEC A\*. The second one without load and without detergent.

Washing performance, spinning extraction, time and water and energy consumption shall be tested in the same cycle.

#### 6.2.1 Electrical supply

**Add** as the last paragraph:

The voltage stabiliser used shall ensure that the normal operation of the washing machine does not cause undue distortion of the voltage waveform.

#### 6.2.2 Water supply

**Delete** in second line of the first paragraph: "- Method B".

#### 6.2.3 Ambient temperature

**Replace** (20 ± 5) °C by (23 ± 2) °C.

## 7 Materials

### 7.1.1 Cotton base load

**Replace** the first paragraph including the specifications of the sheets, pillowcases and hand towels as follows:

The cotton **base load** shall consist of sheets, pillowcases and hand towels conforming with the specifications given in Annex ZB.

**Replace** the last paragraph as follows:

An item shall not be used more than **80 cycles** (not counting pre-treatment and the normalization between two test series).

To minimise the influence of ageing of the textiles, the **base load** shall consist of items that are evenly distributed in age for all different parts (sheets, pillowcases and hand towels) to give a weighted average age of the load between 30 and 50 cycles, using the nominal weights given in Annex ZB. How the average age of the load can be calculated is given in Annex ZE, examples how the textiles may be exchanged are given in Annex ZF.

The age-distribution is to be reported.

### 7.2 Preparation of the base load

#### 7.2.1 Preparation of textiles

**Replace** the first paragraph as follows:

New textile items shall be pre-treated before their first use by five normalisation processes according to 7.2.2 but using 15 g/kg of the reference detergent IEC A\* followed by conditioning according to 7.2.3.

#### 7.2.2 Normalisation of textiles

**Replace** the first paragraph by the following:

Wash the textiles in the Cotton 60 °C program of a reference **washing machine** without detergent.

#### 7.2.3 Conditioning of textiles

**Replace** the present text by the following:

The textiles are left for at least 15 h in an ambient temperature of  $(20 \pm 2)$  °C and at an ambient humidity of  $(65 \pm 5)$  % RH unless the weight of the load has changed less than 0,5 % between two successive measurements. These measurements are carried out at two hour intervals.

As an alternative the bone-dry method of Annex F of EN 60456 may be used. After drying the textiles have to be left at least 5 hours at ambient temperature according to 6.2.3 to take up water before being used for tests.

If the bone-dry method is used, it shall be reported.

### 7.3 Soiled test strips

#### 7.3.1 Characteristics

**Add** two new paragraphs before NOTE 1:

Washed soiled test strips shall fulfil the performance limits (ratios of Y-values) as defined in Annex ZC.

The storage conditions including deadline of use for soiled test strips shall be given by the manufacturer. If no conditions are given the soiled test strips shall be kept vacuum packed in a refrigerator and shall be used within 1 year after production.

## 8 Instrumentation and accuracy

### 8.1 Mass

**Replace** the sentence by the following:

The measurements shall be accurate to  $\pm 0,1$  %.

### 8.8 Electrical energy

**Add** the following paragraph at the end of the subclause:

Energy meters shall fulfil EN 61036 type 1 specification(s).

### 8.11 Optical reflectance

**Replace** the title and the text as follows:

#### 8.11 Reflectance measurement for soiled test strips

Optical measurements of the different types of washed test strip specimens are made with a spectral photometer. The measuring conditions are as indicated below:

Measuring instrument	: spectral photometers that provide reflectance data at a minimum of sixteen wavelengths spaced at 20 nm intervals or closer between 400 nm and 700 nm
Parameter	: tristimulus value Y (CIE Nr. 15.2 , 1986)
Illuminant/observer	: D65/10°
Measuring geometry	: D/8°
UV filter	: UV barrier at 420 nm, i.e. measurement without UV radiation
Measuring diameter	: minimum 20 mm
Gloss/specular	: excluded, i.e. measurement with open gloss/specular trap
Calibration	: has to be done each time the spectral photometer is switched on or at least once per working day: white standard: barium sulphate tablet or ceramic tile; black standard: black body. For general handling of the device and for further information about calibration the operation instruction for use shall be observed.

NOTE 1 The spectral photometer should be tested at least once a year for its operation efficiency.

NOTE 2 CIE= Commission Internationale de l'Eclairage (International commission on illumination),  
CIE Central Bureau, Keogelgasse 27, A-1030 Vienna/Austria, Tel: +43 (01) 714 31 87, Fax: +43 (01) 713 0838,  
E-mail: [iecb@ping.at](mailto:iecb@ping.at)

## 9 Washing performance

### 9.3 Procedure

#### 9.3.1 General

**Add** the following new paragraphs at the end of the subclause:

Soiled test strips from the same batch shall be used for the reference machine and for the washing machine under tests.

All handling of the load and the strips shall be equal. Both the reference machine and the machine under test shall be loaded in the same way from bottom to top putting in all articles in a flat way. The detailed procedure is described in ZD.4.

#### 9.3.2 Cotton test load

**Add** a new paragraph after the NOTE:

The machines are loaded in the way as described in Annex ZD.

#### 9.3.4 Test

**Add** at the beginning:

The reference machine shall perform a start up cycle before each cycle.

The machine under test shall be at ambient temperature before starting a cycle.

For energy label purposes only one cycle per day shall be done, unless it is verified that all parts of the machine under test are at ambient temperature.

The dispenser, if any, of the machine under test and of the reference machine is cleaned and dried before each cycle. It shall be ensured that in the reference machine the detergent is totally dispensed during the water intake for the main wash.

**Add** to the present 4<sup>th</sup> paragraph ("After the completion of the washing program, all soiled test strips..) the following sentence:

Washed and ironed soiled test strips are to be stored in the absence of light at ambient temperature according to 6.2.3. until reflectance measurements are done.

**Add** a new NOTE:

NOTE 3 Instead of ironing, the strips can be stretched and rolled on an airy roll between two pieces of fabric, or be fastened to hang in the dark.

**Add** in the first sentence of the last paragraph:

The reflectance measurements, performed according to 8.11, are carried out...



Add a new Clause 104:

**104 Data to be reported for reference machine and machine under test**

The layout of the tables of 104.1, 104.2 and 104.3 is recommended.

**104.1 Cycle data, parameter and results**

<b>Laboratory:</b>		<b>Identification:</b>						
<b>Machine identification:</b>		<b>Program selected:</b>						
<b>Reference machine identification:</b>		<b>Flowmeter identification:</b>						
<b>Cycle:</b> (data for individual cycles are recommended)		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>average</b>	<b>s</b>
Date of cycle	yr.m.d.							
Mass of conditioned load (without strips):	g							
Water consumption during main wash:	l							
Total water consumption:	l							
Total energy consumption:	kWh							
Ambient temperature:	°C							
Water hardness:	mmol/l							
Water inlet temperature:	°C							
Max. temperature during main wash:	°C							
Min. temperature during main wash:	°C							
Program duration main wash:	min							
Total program duration:	min							
Spin speed:	rpm							
Mass of base load after spin extraction:	g							
Final humidity of base load	%							
<b>Reflectance after wash</b>								
Y Carbon black/Oil	%							
Y Blood	%							
Y Cocoa	%							
Y Red wine	%							
Y Sum	%							
<b>Performance ratio:</b>								

= mandatory

= recommended

**104.2 Basic parameters, equipment and materials**

Recommended.

<b>Cotton base load</b>		
Sheets:	Supplier/batch:	
Pillowcases:	Supplier/batch:	
Hand towels:	Supplier/batch:	
<b>Conditioning method:</b>		
<b>Detergent</b>		
Base detergent A*	Batch/production date	
Perborate	Batch/production date	
TAED	Batch/production date	
<b>Soiled strips:</b>	Supplier/batch:	
Dates of production/deadline of use (yr.m.d):		
<b>Photocolorimeter:</b>	Manufacturer/type:	
Measuring diameter (mm):		
<b>Water hardness preparation:</b>		
NAT= natural; HARD = hardened; SOFT = softened; SYN = synthetic		

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**104.3 Reporting on age distribution of the load**

	Nominal weight as given in Annex ZB	Number of items used for the indicated number of cycles				Weighted average age per type
		1 - 20	21-40	41-60	61 - 80	
Towels						
Pillowcases						
Sheets						
Weighted overall average age						

## Annex A

**Add** after the second paragraph:

Water inlet sieves have to be cleaned regularly.

**Add** after Table A.2:

For the 60 °C cotton program the following extra conditions shall be fulfilled:

- total water consumption: (98 ± 3) l;
- final moisture content: (85 ± 4) %, standard deviation < 4 %;
- energy consumption: (1,8 ± 0,1) kWh.

NOTE If these values are exceeded reason may be found in laboratory practice of treating the load.

## Annex F

**Replace** under item g) in the first dash 1,08 by 1,06.

**Add:**

NOTE The factor of 1,06 was determined to be accurate for the defined load within MT14 of SC 59D.

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