



BSI Standards Publication

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

National foreword

This British Standard is the UK implementation of EN 60456:2016+A11:2020. It is derived from IEC 60456:2010, incorporating corrigendum September 2011. It supersedes BS EN 60456:2016, which is withdrawn.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags **[C]** **[C]**.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by **[A11]** **[A11]**.

The UK participation in its preparation was entrusted to Technical Committee CPL/59, Performance of household electrical appliances.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

This publication has been prepared under a mandate given to the European Standards Organizations by the European Commission and the European Free Trade Association and is intended to support essential requirements of the EU legislation detailed in the European foreword. Annex ZA/ZZ describes how the publication relates to the legislation.

For the Great Britain market (England, Scotland and Wales), if the UK Government has designated this publication for conformity with UKCA marking legislation and has not amended the essential requirements of that legislation, Annex ZA/ZZ and any references to EU law in the publication should be read in accordance with the designation as applying to UK legislation in the same way as to EU law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

For the Northern Ireland market, UK law will continue to implement relevant EU law subject to periodic confirmation. References to EU legislation are therefore still valid.

More information on legislation can be found at www.gov.uk.

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Amendments/corrigenda issued since publication

Date	Text affected
31 December 2020	Implementation of IEC corrigendum September 2011: replacement of contents of Subclause 6.3.2
31 January 2021	Implementation of CENELEC amendment A11:2020

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60456:2016+A11

December 2020

ICS 97.060

English Version

**Clothes washing machines for household use - Methods for
measuring the performance
(IEC 60456:2010 , modified)**

Machines à laver le linge pour usage domestique -
Méthodes de mesure de l'aptitude à la fonction
(IEC 60456:2010 , modifiée)

Waschmaschinen für den Hausgebrauch - Verfahren zur
Messung der Gebrauchseigenschaften
(IEC 60456:2010 , modifiziert)

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 60456:2016) consists of the text of IEC 60456:2010 prepared by SC 59D "Home laundry appliances" of IEC/TC 59 "Performance of household and similar electrical appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-12-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-12-14

This document supersedes EN 60456:2011.

Significant technical differences are:

- a) the test procedure to measure power and energy consumption in left-on-mode and the referenced standard has been corrected; (Z.A. 4.9);
- b) deletion of RMS and two sided confidence level formulas (Z.A. 5.2);
- c) corrections in evaluation of water extraction performance (formulas) are integrated (Z.A. 5.4);
- d) corrections in evaluation of spin speed (formulas) are integrated (Z.A. 5.5);
- e) corrections in evaluation of power and energy consumption measurements in left-on-mode (formulas and references) are integrated (Z.A. 5.9);
- f) Table ZA17: Correction of the reported precision;
- g) Annex ZB is re-phrased;
- h) the normative references in Annex ZC are updated;
- i) new Annexes ZZA and ZZB.

This European Standard also specifies, as far as necessary, the test methods which shall be applied in accordance with the COMMISSION DELEGATED REGULATION (EU) No 1061/2010 implementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of household washing machines and in accordance with the COMMISSION REGULATION (EU) No 1015/2010 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for household washing machines.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60456:2010 are prefixed "Z".

Annex ZA sets out the procedure to be applied for testing according to Commission Regulations with regard to energy labelling and ecodesign and provides all necessary links to all relevant clauses of this European Standard.

Annex ZB has been re-phrased and provides control procedures for checking measured values in comparison to values declared by the manufacturer and taking into account any permitted tolerances.

EN 60456:2016+A11:2020 (E)

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports Commission Regulation (EU) No. 1015/2010 and Commission Delegated Regulation (EU) No. 1061/201.

For the relationship with Commission Regulation (EU) No. 1015/2010 and Commission Delegated Regulation (EU) No. 1061/201 see informative Annex ZZA and ZZB, which are integral parts of this document.

Endorsement notice

The text of the International Standard IEC 60456:2010 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A11

This document (EN 60456:2016/A11:2020) consists of the text IEC 60456:2010 prepared by SC 59D "Home laundry appliances", together with the common modifications prepared by CLC/TC 59X "Performance of household and similar electrical appliances".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-07-21
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2023-10-21

Significant technical differences are:

a) the **programme** to be tested for the **combined test series** is the new introduced **eco 40-60 programme**. This **programme** needs to be tested with default settings with the given temperature;

b) the **test loads** that have to be used for testing are full, half and quarter of the **rated capacity** of the **washing machine**. Therefore, a new **quarter load** is introduced and defined to be approximately a quarter of the **rated capacity** (see table ZA15). The **quarter load** is treated as a separate load and not created by dividing **full load** or **half load**;

c) the number of **test runs** per **treatment** for the **combined test series** changed to 3 tests with **full load**, 4 tests with **half load** and 3 tests with **quarter load**;

d) the time between two subsequent **test runs** within one day changed from 2 h to one hour;

e) the normalization run is included in the calculation of the load age. The maximum number of usages for the cotton base load per item is changed to 96 and the weighted average age of the base load is changed to be between 35 and 60 normalisation runs and test runs.

f) rinsing effectiveness is integrated. It is referred to CLC/TS 50677 (see ZA 4.10);

g) temperature inside the load is integrated. It is referred to CLC/TS 50707:2020 (under preparation) (see ZA4.11);

h) the procedure to measure low power modes is modified (see ZA4.9);

i) specific weighting factors are introduced for the calculation of the weighted average value of the **combined test series** and

j) Annex ZB Tolerances and control procedures is deleted. Annex ZB is replaced by an new Annex ZB which defines the testing procedure for multi-drum **washing machines**.

This document also specifies, as far as necessary, the test method for household **washing machines** in accordance with the COMMISSION DELEGATED REGULATION (EU) 2019/2014 of 11 March 2019 supplementing Regulation 2017/1369 of the European Parliament and of the Council with regard to energy labelling of household **washing machines** and household **washer-dryers** and repealing Commission Regulation (EU) No 1061/2010 and Commission Directive 96/60/EC and in accordance with the COMMISSION REGULATION (EU) 2019/2023 of 1 October 2019 laying down ecodesign requirements for household **washing machines** and household **washer-dryers** pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Commission Regulation (EC) No 1275/2008 and repealing Commission regulation EU) No 1015/2010.

EN 60456:2016+A11:2020 (E)

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60456:2010 are prefixed “Z”.

Annex ZA sets out the procedure to be applied for testing according to Commission Regulations with regard to energy labelling and ecodesign and provides all necessary links to all relevant clauses of this European Standard.

This document has been prepared in view of upcoming Standardization Request which will be given to CENELEC by the European Commission and the European Free Trade Association, and supports Commission Delegated Regulation (EU) 2019/2014 and Commission Regulation (EU) 2019/2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

For the relationship with Commission Delegated Regulation (EU) 2019/2014 and Commission Regulation (EU) 2019/2023 informative Annex ZZA and Annex ZZB will be published following the adoption of the Standardization Request.

Endorsement notice

The text of the International Standard IEC 60456:2010 was approved by CENELEC as a European Standard with agreed common modifications

Annex ZA (normative)

Test procedure for a combined test sequence of cotton 40 °C and cotton 60 °C with full load and partial load

ZA.1 General

The intent of the procedures as set out in this Annex is the determination of performance and related parameters for **full load**, **half load** and **quarter load** for an **eco 40-60 programme** for the **test washing machine**.

The test sequence to measure performance parameters is defined as a **combined test series** consisting of 3 **treatments** with 10 **test runs** in total as follows and detailed in Figure ZA.1:

- **treatment full:** 3 test runs;
- **treatment half:** 4 test runs;
- **treatment quarter:** 3 test runs;

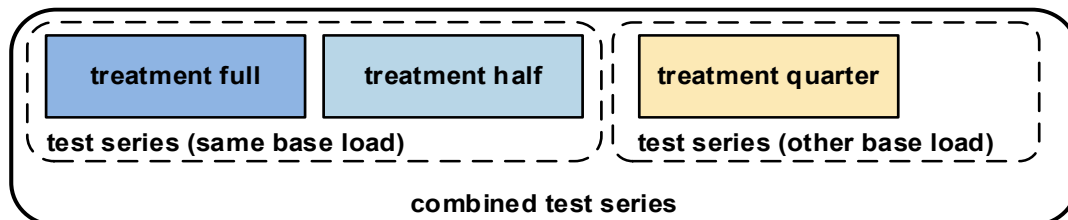


Figure ZA.1 – Relation between treatments, test series and combined test series

The **reference washing machine** is operated in parallel at the defined load size of 5,00 kg with a **test series** consisting of 5 **test runs** at cotton 60 °C.

NOTE Z1 Subclause ZA4.4 describes the parallel **operation** of the reference **washing machine** and the **test washing machine**.

The airborne acoustical noise is measured according to EN 60704-2-4.

Rounding shall only be applied to reported values in Annex ZA.6. If numbers have to be rounded, they shall be rounded to the nearest number according to EN ISO 80000-1:2013, B.3, Rule B. If the rounding takes place to the right of the comma, the omitted places shall not be filled with zeros.

If a value reported in Annex ZA.6 is an intermediate required for use in the calculation of other values then rounding shall only apply to the format of the intermediate in Annex ZA.6; the rounding shall not apply prior to its use in subsequent calculations.

ZA.2 Preparation for testing: Test loads

Subclause 6.4 sets out requirements for the preparation of the **test loads** used in the **test washing machine** and the **reference machine**. All requirements of 6.4 are applied to define the **full load** and the **quarter load** for a **test series**. For the **test runs** with **half load** the **full load** shall be split into two parts. This clause defines the splitting of the **full load** into two **half loads** named **part A** and **part B** as detailed in Table ZA.1.

Table ZA.1 – Half loads: number of items in part A and part B of the cotton test load

Target test load mass at rated capacity [kg]	Target test load mass at partial load [kg]	Number of sheets Part A	Number of pillow cases Part A	Number of towels Part A	Number of strips Part A	Towels adjustment* Part A	Number of sheets Part B	Number of pillow cases Part B	Number of towels Part B	Number of strips Part B	Towels adjustment* Part B
1	0,5	0	1	2	1	add	0	1	2	1	remove
1,5	0,75	0	2	3	1	remove	0	1	4	1	add
2	1	0	2	4	1	add	0	2	5	1	remove
2,5	1,25	0	3	5	1	remove	0	2	6	1	add
3	1,5	1	2	3	2	remove	1	2	2	2	add
3,5	1,75	1	2	5	2	remove	1	2	4	2	add
4	2	1	2	7	2	add	1	2	7	2	remove
4,5	2,25	1	3	7	2	add	1	3	7	2	remove
5	2,5	1	3	9	3	add	1	3	9	3	remove
5,5	2,75	1	4	9	3	add	1	4	9	3	remove
6	3	1	4	12	3	remove	1	4	11	3	add
6,5	3,25	1	5	12	3	remove	1	5	11	3	add
7	3,5	1	6	12	4	remove	1	6	11	4	add
7,5	3,75	2	5	10	4	remove	1	7	11	4	add
8	4	2	5	12	4	remove	1	7	13	4	add
8,5	4,25	2	6	12	4	remove	1	8	13	4	add
9	4,5	2	7	12	5	remove	2	7	11	5	add
9,5	4,75	2	7	14	5	add	2	7	14	5	remove
10	5	2	8	14	5	add	2	8	14	5	remove
10,5	5,25	3	6	14	5	remove	2	9	14	5	add
11	5,5	3	6	16	6	remove	2	9	16	6	add
11,5	5,75	3	7	17	6	remove	2	9	18	6	add
12	6	3	8	16	6	remove	3	9	14	6	add
12,5	6,25	3	8	18	6	add	3	9	17	6	remove
13	6,5	3	9	19	7	remove	3	9	18	7	add
13,5	6,75	3	10	19	7	remove	3	9	20	7	add
14	7	3	10	21	7	add	3	9	23	7	remove
14,5	7,25	4	8	20	7	add	3	12	19	7	remove
15	7,5	4	9	21	8	remove	3	12	21	8	add

* **Part A** and **part B** shall be made entirely from the **full load** without adding or subtracting any towels. If the **full load** has a different number of towels than indicated in Table 2 in 6.4.6.1, then the number of towels in the **half loads A** and **B** will also differ from the number given in Table ZA.1. In this case, add or remove towels as indicated in the relevant "towels adjustment" column:
Add = Add first and all odd numbers of towels in this part (add all even numbers in the other part)
Remove = Remove first and all odd numbers of towels from this part (remove all even numbers from the other part)

For each **half load**, the **conditioned base load mass** shall be recorded.

The increased difference between the **base load mass** of **part A** and **part B** and **test load mass** of **part A** and **part B** due to the mass of any test strips that need to be added according to Table ZA.1 shall be ignored. The requirement for **test load mass** to be within ± 60 g of the **nominal test load mass** does not apply to **half loads**.

For **test load masses** for the whole or half kg ratings which are greater than those specified in Table 2 in 6.4.6.1 ($> 15,00$ kg), the number of items for **part A** and **part B** is defined as follows: