BS EN 60436:2020+A12:2022
Incorporating corrigenda June 2020 and September 2020

BSI Standards Publication

Electric dishwashers for household use — Methods for measuring the performance

National foreword

This British Standard is the UK implementation of EN 60436:2020+A12:2022. It is derived from IEC 60436:2015, incorporating corrigendum September 2020. It supersedes BS EN 60436:2020+A11:2020, which is withdrawn.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 [X] is indicated in the text by tags. Tags indicating changes to CEN/CENELEC text [if A11 is changing IEC text, delete CEN/CENELEC and just have 'changes to text'] carry the number of the CEN/CENELEC amendment. For example, text altered by CEN/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.

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Published by BSI Standards Limited 2023

ISBN 978 0 539 17567 7

ICS 97.040.40

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2020.

Amendments/corrigenda issued since publication

Date	Text affected
31 July 2020	Implementation of CENELEC corrigendum June 2020: common modification to Table E.1
30 November 2020	Implementation of IEC corrigendum Septem-ber 2020: replacement of Table E.1
30 November 2020	Implementation of CENELEC amend- ment A11:2020: addition of Annexes ZZA and ZZB
31 March 2023	Implementation of CENELEC amend- ment A12:2022

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60436:2020+A12

October 2022

ICS 97.040.40

English Version

Electric dishwashers for household use - Methods for measuring the performance (IEC 60436:2015 , modified)

Lave-vaisselle électriques à usage domestique - Méthodes de mesure de l'aptitude à la fonction (IEC 60436:2015 , modifiée)

Elektrische Geschirrspüler für den Hausgebrauch - Messverfahren für Gebrauchseigenschaften (IEC 60436:2015 , modifiziert)

This European Standard was approved by CENELEC on 2019-09-30. 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.

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Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 60436:2020/A11:2020 E

European Foreword

This document (EN 60436:2020/A11:2020) has been 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)	2021-10-28
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2023-10-28

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For the relationship with EU Directive(s) see informative Annexes ZZA and ZZB, which are an integral part of this document.

European foreword to amendment A11

This document (EN 60436:2020) consists of the text of IEC 60436:2015 prepared by IEC/TC 59, "Electric dishwashers", 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) 2020-09-27
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2023-03-27

This document supersedes EN 50242:2016 and all of its amendments and corrigenda (if any).

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.

EN 60436:2019 includes the following significant technical changes with respect to EN 50242:2016/EN 60436:2016:

— new test load with a bigger variety of materials and shapes, including pots, mugs, plastic items and more bowls;

— new phosphate-free reference detergent reflecting more market relevant composition of ingredients;

— more precise soiling procedure;

— new reference materials;

— new definitions and measurement procedures for low power modes.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60436:2015 are prefixed “Z”.

In this document, the common modifications to the International Standards are indicated in red.

Endorsement notice to amendment A11

The text of the International Standard IEC 60436:2015 was approved by CENELEC as a European Standard with agreed common modifications.

European foreword to amendment A12

This document (EN 60436:2020/A12:2022) has been 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)	2023-04-14
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2025-10-14

This document amends EN 60436:2020.

It includes the following significant changes:

— editorial improvement regarding consistent use of terms;

— realignment of headings (IEC vs EN);

— more precise description of applicable ambient conditions;

— update of milk preparation procedure;

— guidance on use of plastic fork as soiling tool;

— rounding of reported numbers in alignment with amendment of EU energy labelling and ecodesign regulation;

— necessary change of specified ranges for test load weight;

— update of supplier information annex;

— addition of Annex ZC Test report template;

— withdrawal of corrigendum (change of detergent annex);

— amendment of Annex ZA Measurement procedure for low power modes reflecting learnings of round robin test;

— introduction of dated normative references;

— updated Annexes ZZA and ZZB.

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.

This document is read in conjunction with EN 60436:2020/A11:2020 and EN 60436:2020/AC:2020-06.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of Directive(s) / Regulation(s).

For the relationship with Directive(s) / Regulation(s), see informative Annexes ZZA and ZZB, which are an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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Annex ZA
(normative)

Measurement procedure for low power modes

ZA.1 General

Annex ZA sets out determination of **off mode, standby mode, standby mode in condition of networked standby** and **delay start mode**. The first three are steady-state modes that can persist for an indefinite period, while **delay start mode** is a short duration mode associated with active mode (selection and use of a particular **programme**). These are the only four low power modes specified in this document. Other low power modes may exist in some household **dishwashers**, but for the current designs of dishwashers, these are not considered important in terms of duration and energy consumption.

Where low power modes are determined, they shall be determined in accordance with this Annex.

Ensure that the following conditions remain relevant for the duration of the measurement:

— instructions for use regarding installation, **operation** and settings of the **dishwasher** (as applicable) are followed;

— the appliance shall be connected to mains power for the duration of the test;

— no adverse warning indicators (including **rinse aid** and salt indicators, where applicable) are present;

— laboratory supply water is left on at the specified pressure;

— follow manufacturer's instructions regarding the configuration of network connectivity of the **dishwasher** (where applicable);

— ensure that the **network** is connected to the household dishwasher (when required);

— after each appliance interaction wait at least 15 min before commencing with measurements; and

— no interference during measurement by any interaction.

Some dishwashers could require software updates to ensure secure network operations. It is recommended to allow for those updates to be installed and to make a note of it in the test report. Updates may occur or may be requested after activation of network capability and the update process may impact energy during measurement.

Power measurements for **off mode, standby mode, standby mode in condition of networked standby** and **delay start mode** shall be made in accordance with the requirements of EN 50643:2018 and EN 50564:2011. However, subclause 5.3. (procedure) and the requirement defining air speed in EN 50564:2011, 4.2 shall not apply.

Details related to the measurement procedure can be found in Figure ZA.1 describing the test procedure for different types of appliances depending on provided functionalities. The average power is measured in watts and rounded to two decimal places.

The required power consumption can be determined either by measuring the power consumption directly for a certain period of time (not less than 10 min). The data shall be recorded at regular intervals of 1 s or less throughout the test using a data logger or computer. The average power is given in watts and rounded to two decimal places.

Alternatively, the energy consumption may be measured for a certain period of time (not less than 10 min) and the power consumption be calculated by dividing the measured energy consumption (measured in Wh) by the duration of the measurement (in h). The calculated power is given in watts and rounded to two decimal places.

Manufacturers or suppliers may have information on the design and **operation** of their **dishwashers** which would allow an accurate determination of these modes through methods other than the methods specified below. For the purposes of declaration, a manufacturer or supplier may use any method which gives an equivalent result to the methods specified below. For verification purposes, the methods specified below take precedence over any other determination.

Dishwashers with a power management system switch automatically to **off mode** or **standby mode** after a certain period of time following appliance interaction. Relevant appliance interactions to be considered for measurement are:

— after the household dishwasher has been switched on, or

— at the end of any programme and associated activities, or

— after any interaction, directly (i.e. physical) or indirectly (e.g. remote user interface) with the household **dishwasher**, or

— if no other mode, including emergency measures, is triggered.

Appliance interactions during a **programme** or **cycle** shall not be considered for measurement.

NOTE Z1 An interaction with the appliance during a programme/ cycle (e.g. interruption, pause) bears the risk that foreseen operations of a programme/ cycle cannot be completed, resulting in insufficient primary functionalities (e.g. cleaning, drying, regeneration). Furthermore, interrupting a programme could trigger a mode designed to prevent users having unintentional and uninformed access to not sufficiently dissolved detergent or not drained detergent solution.

The test report shall contain a description of the appliance interaction(s), which were applied during the test.

Mode/ condition		Type of appliance: step	Appliance without delay start and without network standby	Appliance with delay start and without network standby	Appliance without delay start and with network standby	Appliance with delay start and network standby	Measured parameter	Reference
standby and off mode	not connected to network (deactivate network connection if activated)	1	connect appliance to power supply	connect appliance to power supply	connect appliance to power supply	connect appliance to power supply		ZA.2 ZA.3
		2	wait at least 15 minutes *	wait at least 15 minutes *	wait at least 15 minutes *	wait at least 15 minutes *		
		3	measure power consumption	measure power consumption	measure power consumption	measure power consumption	standby mode: P_{sm} or off mode: P_{om}	
		4	turn on appliance	turn on appliance	turn on appliance	turn on appliance		ZA.2 ZA.3
		optional	complete programme (any) run	complete programme (any) run	complete programme (any) run	complete programme (any) run	description in test report	
		5	appliance interaction	appliance interaction	appliance interaction	appliance interaction	description in test report	
		6	wait at least 15 minutes *	wait at least 15 minutes *	wait at least 15 minutes *	wait at least 15 minutes *		
		7	measure power consumption	measure power consumption	measure power consumption	measure power consumption	standby mode: P_{sm} or off mode: P_{om}	
	connected to network (if available)	8	-	-	turn on appliance if it is not already turned on	turn on appliance if it is not already turned on		ZA.4
		9	-	-	activate network connection	activate network connection		
		optional	-	-	complete programme (any) run	complete programme (any) run	description in test report	
		optional	-	-	appliance interaction	appliance interaction	description in test report	
		10	-	-	wait at least 15 minutes *	wait at least 15 minutes *		
		11	-	-	measure power consumption	measure power consumption	Network standby: P_{ns}	
		12	turn off appliance if it is not already off	turn off appliance if it is not already off	turn off appliance if it is not already off	turn off appliance if it is not already off		
delay start mode	connected to network (if available)	13		turn on appliance		turn on appliance		ZA.5
		14		-		activate network connection if deactivated		
		15		activate delay start		activate delay start	description in test report	
		16		wait at least 15 minutes *		wait at least 15 minutes *		
		17		measure power consumption		measure power consumption	Delay start: P_{ds}	
* Note: Opening or closing the door by the operator may reactivate the dishwasher to perform auxiliary functions such as display information or interior light. Should an interaction occur, 15 minutes waiting time is needed for the dishwasher to revert to off mode or standby mode or standby mode in condition of networked standby.								

Figure ZA.1 — Measurement procedure for low power modes

ZA.2 Determination of power consumption in off mode

This subclause is only applicable to **dishwashers** providing an **off mode**.

The **dishwasher** under test should switch automatically to **off mode or standby mode** or both. Where **off mode** power is determined, it shall be determined in accordance with Figure ZA.1.

In all cases, **off mode** shall be determined over a period of not less than 10 min. The power consumption of the **off mode** is the average of the measured data.

NOTE Z1 If the dishwasher provides **off mode,** it is expected to be described by the manufacturer.

ZA.3 Determination of power consumption in standby mode

This subclause is only applicable to **dishwashers** providing a **standby mode**.

The d**ishwasher** under test should switch automatically to **off mode or standby mode** or both. Where **standby mode** power is determined, it shall be determined in accordance with Figure ZA.1.

In all cases, **standby mode** shall be determined over a period of not less than 10 min. The power consumption of the **standby mode** is the average of the measured data.

NOTE Z1 If the dishwasher provides **standby mode,** it is expected to be described by the manufacturer.

ZA.4 Determination of power consumption in standby mode in condition of networked standby

This subclause is only applicable to **dishwashers** providing a **standby mode in condition of networked standby**.

For **dishwashers** with network connectivity follow manufacturer's instructions regarding the configuration of the **dishwasher** and ensure that network (e.g. LAN or WLAN) is connected to the household **dishwasher** and activated.

Note Z1 The highest possible power consumption could be reached when the dishwasher is not only connected to the network but also to a remote user interface (i.e. App). Avoid any interaction with the remote user interface during the 15 min waiting time and the measurement.

Where **standby mode in condition of networked standby** power is determined, it shall be determined in accordance with Figure ZA.1.

In all cases, **standby mode in condition of networked standby** shall be determined over a period of not less than 10 min. The power consumption of the **standby mode in condition of networked standby** is the average of the measured data.

NOTE Z2 Ensure that there is no update running during measurement.

The test report shall contain the description of the network connection used.

ZA.5 Determination of power consumption in delay start mode

This mode is only applicable to **dishwashers** providing a delay start function.

Where **delay start mode** power is determined, it shall be determined in accordance with Figure ZA.1.

For determination of this mode, any **programme** can be selected and any user programmed delay is selected by the operator.

If available, network connection shall be activated.

Select any **programme,** set the delay start and activate delay start mode. Power measurements in **delay start mode** shall commence earliest 15 min after the moment the **delay start mode** is activated and shall continue for at least 10 min, therefore delay start setting shall cover on minimum 25 min.

The **programme** name, the delay start setting selected, and the duration of the measurement shall be stated with the measured power value. Where the display changes during the timer countdown, there can be some small variations in power consumption during this mode.

The power consumption of the **delay start mode** is the average of the measured data.

NOTE Z1 For a **dishwasher**, the term latched means that the door is closed, and the door interlock is engaged so that the product could operate if required.

ZA.6 Reporting of results

Table ZA.1 — Data, parameters and results for the low power mode measurements

Laboratory						
Test date/ period						
Test officer						
Test number						
Model/ appliance identification						
	Symbol	Symbol as given in regulation	Unit	Noted (n) Measured (m)	Reported precision	Result
General						
Is **off mode** available?	-	-	-	n	Yes/No	
Is **standby mode** available?	-	-	-	n	Yes/No	
If **standby mode** is available, does it include the display of information or status?	-	-	-	n	Yes/No	
Is **delay start** available?	-	-	-	n	Yes/No	
If **delay start** is available, is **delay start** possible for more than 24h?	-	-	-	n	Yes/No	
Is **network** connection(s) available?	-	-	-	n	Yes/No	
If **network** connection(s) is available, is activation and deactivation of the **network** connection(s) possible?	-	-	-	n	Yes/No	
If **network** connection(s) is available, is **network** connection(s) deactivated by default?	-	-	-	n	Yes/No	
Is the machine automatically switching to **off mode** or **standby-mode** within 15 min?	-	-	-	n	Yes/No	
Measurements						
Power consumption in **off mode** (if applicable)	P_{om}	P_o	W	m	x,xx	
Power consumption in **standby mode** (if applicable)	P_{sm}	P_{sm}	W	m	x,xx	
Description of appliance interaction(s) and optional programme run(s)						
Power consumption in **standby mode** in condition of **network** standby (if applicable)	P_{ns}	P_{sm}	W	m	x,xx	
Description of appliance interaction(s) and optional programme run(s)						
If **delay start** is available, power consumption in **delay start** in **condition of network standby** (if applicable)	P_{ds}	P_{ds}	W	m	x,xx	
Description of delay start setting and selected programme						

Annex ZB
(normative)
Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 Z1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE Z2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60704-2-3	2017	Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 2-3: Particular requirements for dishwashers	EN 60704-2-3	2019
IEC 60705	-	Household microwave ovens – Methods for measuring performance	EN 60705	2015
			+ 1	2018
IEC 60734	-	Household electrical appliances – Performance – Water for testing	EN 60734	2012
ISO 607	1980	Surface active agents and detergents – Methods of sample division	-	-
ISO 80000-1	2009	Quantities and Units – Part 1: General	EN ISO 80000-1	2013

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Annex ZC
(informative)

Template for test report

ZC.1 Test report template

	Test Report		EN60436:2020
	Test number	Date	

Dishwasher Details:		
Test Machine		Reference Machine
	Manufacturer:	
	Brand:	
	Model:	
	Serial No.:	
	Rated Voltage (V):	
	Rated Frequenzy (Hz):	
	Manufacturing date:	
	Name of test programme:	
	Rinse aid dispenser settings:	
	Rinse agent:	
	Detergent:	
	Batch of Detergent:	
	Quantity of detergent for prewash/ mainwash (g):	
	Water softener settings:	
	Regeneration salt (Type and Brand):	

Energy label data			
Energy Efficiency Class:		Rated Capacity (in PS):	
Eco Programme Energy Consumption (EPEC x 100 cycles in kWh/100):		Airborne acoustical noise emission (in dB(A) re 1pW):	
Eco Programme Water Consumption (EPWC in litre/cycle):		Airborne acoustical noise emission class:	
Duration of the Eco Programme (T in h:min) :			

Measured values/ test results	Number of tests n ≥ 5									
	1	2	3	4	5	6	7	8	Ø	Index
Energy Consumption (EPEC in kWh):										
Standard Programme Energy Consumption (**SPEC** in kWh):										
Energy Efficiency Index (EEI):										
Water Consumption (EPWC in l):										
Regeneration operation identified (Y/N):*										
Programme duration (T_t in min; TØ h:min):										
Max. water temp. Cleaning (°C):										
Max. water temp. Rinsing (°C):										
Cleaning Test ($C_{T,i}$):										
Cleaning Ref.($C_{R,i}$):										
Cleaning Performance Index (I_C):										
Cleaning Confidence Interval (ln W_C)										
Drying Test ($D_{T,i}$):										
Drying Ref. ($D_{R,i}$):										
Drying Index (ID) [for calculating lnW_D] :										
Drying Performance Index (I_D) [$D_{R,t}$ is fixed to **0,82**]:										
Drying Confidence Interval (ln W_D)										
	* Note: test runs where regeneration took place within the test series shall be disregarded when increased water, energy consumption and programme time are in line with manufacturer's instructions									

Low Power Modes	Display of information		Activation of network connection		Ø (in W)
Power consumption in:	Yes	No	Yes	No	
Off-Mode (P_0):	☐	☐	☐	☐	
Standby Mode (P_{sm}):	☐	☐	☐	☐	
Networked Standby Mode (P_{ns}):	☐	☐	☐	☐	
Delay Start Mode (P_{ds}):	☐	☐	☐	☐	

Airborne acoustical noise emissions (in dB(A) re 1pW)	Ø (in dB(A)

Laboratory Details:		
Laboratory Name:	Test Officer(s):	
Test date/ period:		

Test Conditions:		
	Tolerance:	Test Value:
Test Voltage (V):	230 V ± 1 %	
Frequency (Hz):	50 Hz ± 1 %	
Crest Factor:	1,34 < CF < 1,49	
Distortion factor (%):	< 2 %	
Ambient Temperature (°C):	23 °C ± 2 °C	
Relative Humidity (%):	55 % ± 5 %	
Water Supply temperature (°C):	15 °C ± 2 °C	
Water supply pressure (kPa):	240 kPa ± 20 kPa	
Water Hardness [mmol / l (Ca+Mg)]:	2,5 mmol / l ± 0,5 mmol / l	

Figure ZC.1 — Test report template

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Annex ZD
(informative)

Uncertainty of Measurement

Following IEC/TR 61923:1997 “Household electrical appliances – Method of measuring performance – Assessment of repeatability and reproducibility”, the below mentioned expanded uncertainties for measurements according to this European Standard were evaluated.

Expanded uncertainties have been assessed based on the 2019/ 2020 dishwasher round-robin test (RRT), where 21 laboratories from Europe and other regions of the world have participated. One of the objectives of the RRT was to verify the robustness and precision of this standard after comprehensive changes, such as new more consumer relevant test dishes, and a new detergent that had been introduced following IEC 60436:2015.

In this RRT two types of household dishwashers were assessed concerning their performance and consumption values. Before being tested in the participating laboratories all test units were specifically checked for stable performance to reduce the impact of manufacturing variance.

Calculations of repeatability and reproducibility per measure were performed excluding statistically identified outliers (2 laboratories). Reproducibility values were used to calculate expanded uncertainties, which are expressed as relative and/or absolute values (Table ZD.1).

Table ZD.1 — Relative and absolute expanded uncertainty[a] of measured values of this European Standard

Measured parameter	Relative expanded uncertainty of measured value	Absolute expanded uncertainty of measured value
Cleaning performance index I_C	10 %	n.a.
Drying performance index I_D (reference value fixed)	6 %	n.a.
Drying performance index I_D (reference value measured)	10 %	n.a.
Total energy consumption[d]	6 %	0,06 kWh
Total water consumption[d]	5 %	0,5 L
Total programme time[d]	2 %	3 min
Low power mode energy consumption	[b]	[b]
Noise (in re 1 pW)	[c]	[c]

[a] The expanded uncertainty only describes the uncertainty of the measuring method while the variance of the product is not included.

[b] RRT 2019/2020 data are not suitable to calculate measurement uncertainty value

[c] Not assessed in this RRT.

[d] Refer to the last paragraph of this annex

As long as the relative expanded uncertainty values cover unavoidable variations of measured consumption values due to tolerances in test conditions given by the standard (e.g. ambient conditions, temperature of water for testing, etc.), the approach of applying percentage values is appropriate. With increasing energy and water efficiency of tested appliances measured consumption values are decreasing and therefore the application of absolute expanded uncertainty may be more suitable to cover the allowed variations in test conditions. Thus, a representation of expanded uncertainties either in relative or in absolute values or as a combination of both were considered by CLC/TC 59X/WG 2 following the analysis of the RRT test results.

Following expanded uncertainties were found to best represent the allowed variation of the test conditions in the standard:

— Expanded uncertainty for the energy consumption: 0,06 kWh for an energy consumption < 1 kWh and 6 % for an energy consumption ≥ 1 kWh;

— Expanded uncertainty for the water consumption: 0,5 L for water consumptions < 10 L and 5 % for water consumptions ≥ 10 L;

— Expanded uncertainty for the programme duration: 3 min for a duration < 150 min and 2 % for a duration ≥ 150 min;

— Expanded uncertainty for the cleaning performance index: 10 %;

— Expanded uncertainty for the drying performance index (with fixed reference value): 6 %. 〈A12〉

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Annex ZZA
(informative)

Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 2019/2017 aimed to be covered

This European Standard has been prepared under a Commission's standardization request 'M/566' / 'C(2020) 4329 final' to provide one voluntary means of conforming to the energy labelling requirements of *Commission Delegated Regulation (EU) No 2019/2017 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of household dishwashers and repealing Commission Delegated Regulation (EU) No 1059/2010 [L 315/134].*

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding requirements of that Regulation and associated EFTA Regulations.

Table ZZA.1 — Correspondence between this European Standard and Commission Delegated Regulation (EU) No 2019/2017 of 11 March 2019 supplementing Regulation (EU) 2017/1369 of the European Parliament and of the Council with regard to energy labelling of household dishwashers and Commission's standardization request (SR) 'M/566' / 'C(2020) 4329 final'

Energy labelling requirements of Commission Delegated Regulation (EU) No 2019/2017 [OJEU L315/134, 5.12.2019)	Clause(s) / subclause(s) of this EN	Remarks / Notes
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Annex IV 4. Low power modes (SR Power consumption of low power modes: delay start mode, network	Annex ZA Measurement procedure for low power modes	

Energy labelling requirements of Commission Delegated Regulation (EU) No 2019/2017 [OJEU L315/134, 5.12.2019)	**Clause(s) / subclause(s) of this EN**	**Remarks / Notes**
standby mode, off mode and standby mode)		
Annex IV, 2nd and 5th introductory paragraphs (SR airborne acoustical noise emissions)	9 Airborne acoustical noise	

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard. 〈A12〉

A12

Annex ZZB
(informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 2019/2022 aimed to be covered

This European Standard has been prepared under a Commission's standardization request (SR) 'M/566' / 'C(2020) 4329 final' to provide one voluntary means of conforming to the ecodesign requirements of *Commission Regulation (EU) No 2019/2022 of 1 October 2019 laying down ecodesign requirements for household dishwashers 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 1016/2010 [l315/267].*

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding requirements of that Regulation and associated EFTA regulations.

Table ZZB.1 — Correspondence between this European Standard and Commission Regulation (EU) No 2019/2022 of 1 October 2019 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 1016/2010 and Commission's standardization request (SR) 'M/566' / 'C(2020) 4329 final'

Ecodesign requirements of Commission Regulation (EU) No 2019/2022 [OJEU L315/267, 5.12.2019]	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Annex III, General conditions applicable to all ecodesign requirements	2 Normative references 3 Terms and definitions 4 List of measurements 5 General conditions for measurements 6 Combined cleaning and drying performance test	
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Ecodesign requirements of Commission Regulation (EU) No 2019/2022 [OJEU L315/267, 5.12.2019]	**Clause(s) / sub-clause(s) of this EN**	**Remarks / Notes**
Annex III 4. Low power modes (SR Power consumption of low power modes: delay start mode, network standby mode, off mode and standby mode)	Annex ZA Measurement procedure for low power modes	

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRIC DISHWASHERS FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60436 has been prepared by subcommittee 59A: Electric dishwashers, of IEC technical committee 59: Performance of household electrical appliances.

This fourth edition cancels and replaces the third edition published in 2004, its Amendment 1 published in 2009 and its Amendment 2 published in 2012.

This edition constitutes a technical revision and includes the following significant technical changes with respect to the previous edition:

a) Addition of a specification of the reference dishwasher G1222, addition of the microwave oven 752C, inclusion of standby/low power modes and updated cutlery and tableware items.
b) Combined cleaning and drying: combining the cleaning and drying performance evaluations into one test, along with the energy and water consumption evaluation, prevents an opportunity for circumvention if tests were performed separately. A dishwasher can detect whether soil is present (cleaning evaluation) or not (drying

evaluation) and adjust the cycle to favour performance; combining the tests addresses this.

c) New dish load items: new dish load items were incorporated which reflect consumer use. New items are: stainless pots, coffee mugs, melamine plastic items, and glass bowl. The new load items provide different shapes which challenge a dishwasher water spray patterns and provide additional surfaces for soil removal assessment.

d) Detergent: a new detergent “D” is specified which mirrors current tablet formulations available on the market. Detergent type D is phosphate free, with percarbonate instead of perborate bleach and more active enzymes.

e) Repeatability and reproducibility improvements.

f) Addition of annexes for the evaluation of soil sensing programmes, rinsing performance, dishwasher filtration and of an annex on the inlet water temperature influence on energy consumption.

The text of this standard is based on the following documents:

FDIS	Report on voting
59A/202/FDIS	59A/203/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The following print type is used in this standard:

– words in **bold** are defined in Clause 3.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

[A12]This edition of the standard EN 60436, Electric dishwashers for household use - Methods for measuring the performance, was developed for the EU energy labelling and ecodesign scheme and therefore based on the principle described in the standardization request M/566 to the European Committee for Standardisation, the European Committee for Electrotechnical Standardisation and the European Telecommunications Standards Institute as regards ecodesign and energy labelling requirements for household dishwashers, household washing machines and household washer-dryers in support of Commission Regulations (EU) 2019/2022 and (EU) 2019/2023 and Commission Delegated Regulations (EU) 2019/2017 and (EU) 2019/2014.

Standardization request M/566, issued by the European Commission, includes the standardization task to develop measures in testing household dishwashers, which ensure that the prospective harmonized standard takes into account improved test conditions and test materials to better reflect the user behaviour and the state of the art at European and international level. [A12]

ELECTRIC DISHWASHERS FOR HOUSEHOLD USE – METHODS FOR MEASURING THE PERFORMANCE

1 Scope

This [C] European [C] Standard applies to electric **dishwashers** for household and similar use that are supplied with hot and/or cold water.

The object is to state and define the principal performance characteristics of electric **dishwashers** for household and similar use and to describe the standard methods of measuring these characteristics.

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

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[A12] EN 60704-2-3:2019, *Household and similar electrical appliances –Test code for the determination of airborne acoustical noise – Part 2-3: Particular requirements for dishwashers*

IEC 60705:2015[1], *Household microwave ovens – Methods for measuring performance*

IEC 60734:2012, *Household electrical appliances – Performance – Water for testing* [A12]

[C] *Text deleted* [C]

[A12] ISO 607:1980, *Surface active agents and detergents – Methods of sample division*

ISO 80000-1:2009, *Quantities and Units – Part 1: General*

EN 50564:2011, *Electrical and electronic household and office equipment – Measurement of low power consumption*

EN 50643:2018, *Electrical and electronic household and office equipment – Measurement of networked standby power consumption of edge equipment* [A12]

3 Terms and definitions

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
dishwasher
machine that cleans, rinses and dries **tableware** by chemical, mechanical, thermal, and electric means

Note 1 to entry: A **dishwasher** can have a specific drying **operation** at the end of the **programme**.

Note 2 to entry: Different **dishwasher** types are designated by manufacturers e.g. **free-standing**, **built-in** or **integrated**.

3.1.2
free-standing dishwasher
dishwasher which is intended to be installed without an enclosing structure

[1] As amended by EN 60705:2015/A2:2018.