

INTERNATIONAL STANDARD



AMENDMENT 2

Electric dishwashers for household use – Methods for measuring the performance

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IEC 60436:2004/A2:2012

<https://standards.iteh.ai/catalog/standards/sist/67252ce-a2a8-4fea-9c75-c761137a1798/iec-60436-2004-amd2-2012>

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FOREWORD

This amendment has been prepared by subcommittee 59A: Electric dishwashers, of IEC technical committee 59: Performance of household and similar electrical appliances.

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

CDV	Report on voting
59A/152/CDV	59A/160/RVC

The decision, given in the report on voting indicated in the above table, was modified at the SC59A meeting held in Melbourne, Australia on 21 October 2011. In point 8 of the minutes of the meeting, document 59A/162/RM, the decision 1/11 was given to move this amendment directly to publication without passing through the FDIS document stage.

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

This second amendment to the third edition of IEC 60436 (2004) covers the five following issues:

- An illustration for the through-circulation thermal cabinet to indicate the position of temperature sensors and a new position for the basket to prevent partial blockage of the inlet air path which will improve the consistency of the oven drying results. Furthermore an improved calibration procedure of the oven temperatures is included. It applies to Annex G of IEC 60436:2004.
- Revised small bowl specification – the current bowl (named “small serving bowl” as well as “fruit bowl”) is out of production and will become unavailable as the existing stock is depleted. This alternate bowl is necessary. This bowl (“dessert bowl”) has been tested and found to be acceptable. Throughout the standard the names “small serving bowl” and the “fruit bowl” have been changed to “dessert bowl”. This applies to Clause 6, Annex A and Annex B of IEC 60436:2004.
- The inclusion of standby power to cover the relevant low power modes for dishwashers as a new Annex O which references IEC 62301 for the measurement method. This Annex O is based on Annex L of draft 59D/343/CDV for washing machines and has been modified to be suitable for dishwashers.
- A more detailed description on how to calibrate and work with the new microwave oven was introduced with IEC 60436, Amendment 1:2009.
- Alternative replacement cutlery items for Annex A are described in A.2 and A.3.

2 Normative references

Add the following new reference:

IEC 62301, *Household electrical appliances – Measurement of standby power*

3 Terms and definitions

Add the following new definitions:

3.16 off mode

mode where the product is switched off using appliance controls or switches that are accessible and intended for operation by the user during normal use to attain the lowest power consumption that may persist for an indefinite time while connected to a mains power source, and used in accordance with the manufacturer's instructions

NOTE 1 Where there are no controls, the dishwasher is left to revert to a steady state power consumption of its own accord.

NOTE 2 Where the dishwasher has no power switch intended for the user to activate off mode, then off mode is effectively the same as left on mode.

3.17 left on mode

the lowest power consumption mode that may persist for an indefinite time after the completion of the programme and unloading of the machine without any further intervention of the user

NOTE In some products, this mode may be an equivalent power to off mode.

3.18

delay start mode

the average power consumption of the mode where the user has selected a specified delay to the commencement of the programme. This mode is only applicable to dishwashers that provide a delay start function for the user

NOTE Delay start mode is a short duration (temporary) mode so the duration should always be stated with the power or energy consumption. The frequency of use and the duration selected will depend on a number of factors and may vary considerably across individual users.

6.4.1.2 Conversion

Replace the contents of the subclause by the following:

If the power levels of the microwave oven used are not equal to the rated values (780 W and 150 W) according to Annex G but within the given tolerances the heating times shall be corrected as follows:

BOSCH¹ model HMT752F

Approved microwave oven for tests

$$t_{u,1} = \frac{P_1 \cdot t_1}{P_{u,1}} \quad t_{u,1} = \frac{P_1 \cdot Z}{P_{u,1}} \quad (Z.1)$$

$$t_{u,2} = \frac{P_2 \cdot t_2}{P_{u,2}} \quad t_{u,2} = \frac{P_2 \cdot t_2}{P_{u,2}} \quad (Z.2)$$

where

P_1 is 780 W

P_2 is 150 W

t_1 is 4 min

t_2 is 10 min

Z is the recommended time setting in min in the attached data sheet which will be delivered together with the microwave oven as described in G.1

$P_{u,1}$ is the actual max. power level used in W (measured according to IEC 60705)

$t_{u,1}$ is the corresponding heating time to be used in min

$P_{u,2}$ is the actual reduced power level used in W [determined by Equation (Z.3)]

$t_{u,2}$ is the corresponding actual heating time to be used in min.

$$P_{u,2} = \frac{P_{u,1}}{t_p} (t_{on} - t_{up}) \quad (Z.3)$$

where

t_p is the time of the elementary period of the magnetron in the microwave oven at the reduced power level in s;

¹ "Bosch HMT752F" is the trade name of a product supplied by Bosch. This information is provided for the convenience of users of this international standard and does not constitute an endorsement by the IEC of this trademark. Items of the similar specification may be used if they can be shown to lead to equivalent results.

t_{on} is the time the microwave oven is on within the elementary period in s.

t_{up} is 1,6 s, which is the magnetron filament heating-up time

Use levels, which are close to the rated levels.

6.4.1.3 Pre-heating the microwave oven

Replace the contents of the subclause by the following:

Before cooking the milk in the glasses, heat up the microwave oven as follows:

Place six glasses, each filled with 50 ml of water, in the microwave oven;

Place the glasses symmetrically in a circle of 160 mm diameter (centre of the circle = centre of the glass turntable). See Figure 1.

Operate the microwave oven for 4 or respectively Z min depending on the oven type (see above) at a power level of 780 W and then for 10 min at a power level of 150 W, or at the corrected cooking times calculated above for the power level used. The time Z can be found in the technical instructions for the particular microwave.

After pre-cooking, take the water-filled glasses out of the microwave oven.

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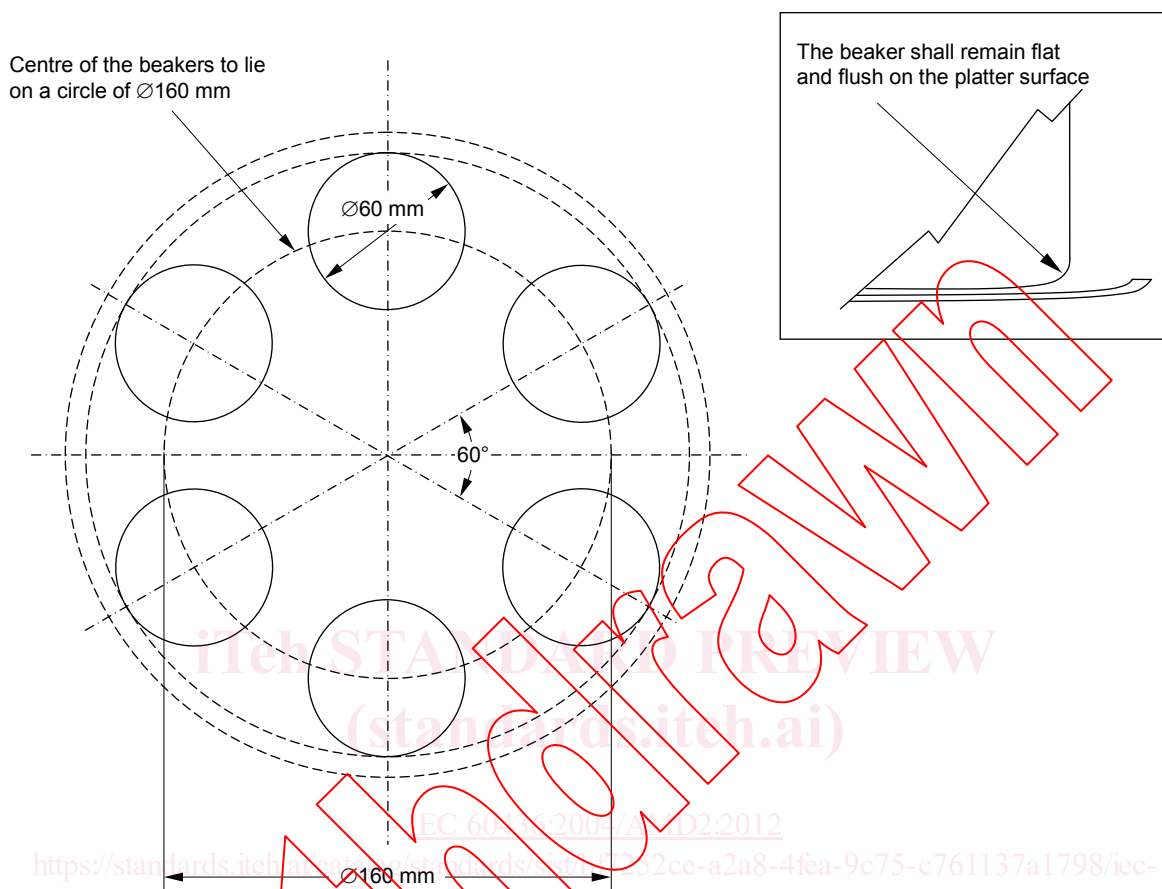
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Figure 1 – Position of the glasses on the microwave turntable

Replace Figure 1 as follows:



A.2 Place setting specifications

In the table, replace rows 7 to 11 with the following new rows:

7	Fork	188 mm	WMF "Signum"	Dessert Fork "1900"	
8	Soup spoon	190 mm	WMF "Signum"	Dessert Spoon "1900"	
9	Knife	209 mm	WMF "Gastro"	Table Knife 18/10 "0800"	
10	Teaspoon	136 mm	WMF "Signum"	Tea / Coffee Spoon "1900"	
11	Dessert spoon	156 mm	WMF "Signum"	Coffee / Tea Spoon "1900"	

Replace the second dashed item after the table by the following:

- Cutlery: approximately 213 g

A.3 Serving piece specifications

A.3.1

In the table, replace row 14 with the following new row:

14	Dessert bowl	130 mm.	Corning #6003899	Corelle®	Winter Frost White
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In the table, replace rows 15 to 17 with the following new rows:

15	Two serving spoons	260 mm	WMF "Supplement"	Chafing Dish Spoon	
16	Serving fork	190 mm	WMF "Supplement"	Serving Fork	
17	Gravy ladle	180 mm	WMF "Supplement"	Gravy Ladle	

Replace the first and second dashed items after the table by the following:

- Crockery: 1 310 g \pm 30 g
- Cutlery: approximately 233 g

Add the following note:

NOTE "Corelle" is a trademark. This information is provided for the convenience of users of this international standard and does not constitute an endorsement by the IEC of this trademark. Items of similar specification may be used if they can be shown to lead to equivalent results.

A 3.2

Replace the first and second dashed items after the table by the following:

- Crockery: 1 950 g \pm 50 g
- Cutlery: approximately 233 g

B.2 Place setting specifications

In the table, replace row 2 with the following new row:

2	Dessert bowl	130 mm	Corning #6003899	Corelle®	Winter Frost White
---	--------------	--------	------------------	----------	--------------------

Replace the first dashed item after the table by the following:

- Crockery + glass: 1 060 g \pm 30 g

B.3.1

In the table, replace row 14 by the following new row:

14	Dessert bowl	130 mm	Corning #6003899	Corelle®	Winter Frost White
----	--------------	--------	------------------	----------	--------------------

Replace the first dashed item after the table by the following:

- Crockery: 980 g ± 25 g

B.3.2

In the second paragraph, replace the first dashed item by the following:

- Crockery: 1 605 g ± 40 g

B.4 Concordance with load items in Annex A

In the table, replace rows 2 and 14 by the following new rows:

2	Soup Plate	2	Dessert Bowl
14	Dessert Bowl	14	Dessert Bowl (same as 2)

F.8

Modify as follows:

A through-circulation thermal cabinet that complies with the specification in G.2 may be obtained from:

Memmert GmbH + Co. KG
 Postfach 1720
 D – 91126 SCHWABACH
 Germany

Tel: + 49 9122 9250
 Fax: + 49 9122 14 585
 sales@memmert.com

F.9

Modify as follows:

A microwave oven that complies with the specification in G.1 may be obtained from:

Bosch-Siemens-Hausgeraete GmbH
 Mr. Kleiber, Abt. FDG/MWD
 Robert-Bosch-Str. 16
 D – 89407 DILLINGEN/DONAU
 Germany

Fax: +49 9071 52 1503
 werner.kleiber@bshg.com

G.1 Microwave oven

Replace the first sentence between brackets by the following:

Examples of products that comply with this specification are BOSCH HMT 752 F and BOSCH HMT 742 C.

G.2 Through-circulation thermal cabinet

Replace the contents of the clause by the following:

(An example of a product that complies with this specification is Memmert UFP 800-DW-D1 [see F.8])

This includes the necessary loading set.

The through-circulation thermal cabinet shall guarantee that the sample of test soil is uniformly dried.

Temperatures shall be recorded during the calibration run.

NOTE 1 All thermal cabinets with a high heating and circulating capacity fulfil these requirements.

NOTE 2 Thermal cabinets with a low heating and circulating output will still meet these requirements if they are filled with fewer items. A reduction of the heating-up period may be taken into consideration.

NOTE 3 "Bosch" and "Mettler" are trade marks. This information is provided for the convenience of users of this international standard and does not constitute an endorsement by the IEC of this trade mark. Items of the similar specification may be used if they can be shown to lead to equivalent results.

The air flow rate shall be provided with internal circulation only and any outside air vents shall be closed. Air flow rate shall be switched onto the setting "max".

The oven shall have a volume of 750 l.

Oven shall have eight wire shelves with a dimension of 1030 mm × 530 mm for loading of 24 place settings.

Performance requirements (to be conducted with unsoiled dishes prior to actual testing; this confirmation should be conducted every 6 months):

Load 24 place settings into the oven as outlined in Figure G.2;

In order to determine if the oven is heating properly, place temperature sensor as outlined in Figures G.1 and G.2.

With a starting temperature of $23\text{ °C} \pm 2\text{ K}$, the oven should reach at each temperature sensor location a temperature of $80\text{ °C} - 10\text{ K}$ for the first time at 60 min after the start.

During the heat rise, the difference between thermocouples at each temperature sensor location shall be within $\pm 5\text{ K}$.

At any time after 90 min the temperature at all measuring points shall be $80\text{ °C} \pm 2\text{ K}$.