

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Household and similar electrical appliances – Safety –  
Part 2-5: Particular requirements for dishwashers**

**Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-5: Règles particulières pour les lave-vaisselle**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

#### Part 2-5: Particular requirements for dishwashers

#### 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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This part of International Standard IEC 60335 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This consolidated version of IEC 60335-2-5 consists of the fifth edition (2002) [documents 61/2099/FDIS and 61/2130/RVD], its amendment 1 (2005) [documents 61/2788/FDIS and 61/2813/RVD] and its amendment 2 (2008) [documents 61/3639/FDIS and 61/3679/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 5.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

The French version of this standard has not been voted upon.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments. It was established on the basis of the fourth edition (2001) of that standard.

NOTE 1 When "Part 1" is mentioned in this standard, it refers to IEC 60335-1.

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for electric dishwashers.

When a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. When this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

- requirements: in roman type;
- *test specifications: in italic type;*
- notes: in small roman type.

Words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and associated noun are also in bold.

The following differences exist in the countries indicated below.

- 6.1: Appliances may be of class 0I, if the rated voltage does not exceed 150 V (Japan).
- 20.102: A 30 000 cycle endurance test is carried out on door interlocks (USA).
- 25.7: The supply cord is required to have a free length of at least 1,5 m (USA).
- Annex AA: The detergent and rinsing agent are different (USA).
- Annex BB: Different tests are carried out (USA).

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result 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.

2 | NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of the amendment 2 be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

## INTRODUCTION

It has been assumed in the drafting of this International Standard that the execution of its provisions is entrusted to appropriately qualified and experienced persons.

This standard recognizes the internationally accepted level of protection against hazards such as electrical, mechanical, thermal, fire and radiation of appliances when operated as in normal use taking into account the manufacturer's instructions. It also covers abnormal situations that can be expected in practice and takes into account the way in which electromagnetic phenomena can affect the safe operation of appliances.

This standard takes into account the requirements of IEC 60364 as far as possible so that there is compatibility with the wiring rules when the appliance is connected to the supply mains. However, national wiring rules may differ.

If an appliance within the scope of this standard also incorporates functions that are covered by another part 2 of IEC 60335, the relevant part 2 is applied to each function separately, as far as is reasonable. If applicable, the influence of one function on the other is taken into account.

- 2 | When a part 2 standard does not include additional requirements to cover hazards dealt with in Part 1, Part 1 applies.

NOTE 1 This means that the technical committees responsible for the part 2 standards have determined that it is not necessary to specify particular requirements for the appliance in question over and above the general requirements.

This standard is a product family standard dealing with the safety of appliances and takes precedence over horizontal and generic standards covering the same subject.

NOTE 2 Horizontal and generic standards covering a hazard are not applicable since they have been taken into consideration when developing the general and particular requirements for the IEC 60335 series of standards. For example, in the case of temperature requirements for surfaces on many appliances, generic standards, such as ISO 13732-1 for hot surfaces, are not applicable in addition to Part 1 or part 2 standards.

An appliance that complies with the text of this standard will not necessarily be considered to comply with the safety principles of the standard if, when examined and tested, it is found to have other features which impair the level of safety covered by these requirements.

An appliance employing materials or having forms of construction differing from those detailed in the requirements of this standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be considered to comply with the standard.



# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

## Part 2-5: Particular requirements for dishwashers

### 1 Scope

This clause of Part 1 is replaced by the following.

- 2 | This International Standard deals with the safety of electric dishwashers for household and similar purposes that are intended for washing and rinsing dishes, cutlery and other utensils, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

Appliances intended for normal household and similar use and that may also be used by laymen in shops, in light industry and on farms, are within the scope of this standard. However, if the appliance is intended to be used professionally for washing and rinsing dishes and cutlery and other utensils that are used for commercial purposes, the appliance is not considered to be for household and similar use only.

As far as is practicable, this standard deals with the common hazards presented by appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- 2 | – persons (including children) whose
- physical, sensory or mental capabilities; or
  - lack of experience and knowledge
- prevents them from using the appliance safely without supervision or instruction;
- children playing with the appliance.

NOTE 101 Attention is drawn to the fact that

- for appliances intended to be used in vehicles or on board ships or aircraft, additional requirements may be necessary;
- in many countries additional requirements are specified by the national health authorities, the national authorities responsible for the protection of labour, the national water supply authorities and similar authorities.

NOTE 102 This standard does not apply to

- commercial electric dishwashing machines (IEC 60335-2-58);
- appliances intended for industrial purposes;
- appliances intended to be used in locations where special conditions prevail, such as the presence of a corrosive or explosive atmosphere (dust, vapour or gas).

### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60436, *Methods for measuring the performance of electric dishwashers*

ISO 1817:1999, *Rubber, vulcanized – Determination of the effect of liquids*



### 3 Definitions

This clause of Part 1 is applicable except as follows.

#### 3.1.9 Replacement:

##### normal operation

operation of the appliance under the following conditions.

The appliance is operated with the maximum quantity of water for which it is constructed, without detergents or rinsing agents and without place settings or serving pieces. However if it is apparent that the test results will be affected by the load, the appliance is loaded with the maximum number of place settings and serving pieces specified in the instructions.

NOTE 101 The place settings and serving pieces to be used are specified in IEC 60436.

The water is supplied at any convenient pressure within the range specified in the instructions, the temperature of the water at the inlet being

- 60 °C ± 5 °C or that specified in the instructions if it is higher, for inlets intended for hot water only;
- 15 °C ± 5 °C for inlets intended for cold water only.

If the appliance has an inlet intended for hot or cold water, the most unfavourable water temperature is used

### 4 General requirement

This clause of Part 1 is applicable.

### 5 General conditions for the tests

This clause of Part 1 is applicable except as follows.

#### 5.3 Addition:

*The test of 15.101 is carried out before the test of 15.3.*

### 6 Classification

This clause of Part 1 is applicable except as follows.

#### 6.1 Modification:

Appliances shall be **class I**, **class II** or **class III**.

#### 6.2 Addition:

Appliances intended to stand on a draining board shall be at least IPX1.

### 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

**7.1 Addition:**

Appliances without automatic water-level control shall be marked with the maximum permissible water level.

2 |

**7.10 Addition:**

If the **off position** is only indicated by letters, the word "off" shall be used.

**7.12 Addition:**

The instructions shall state

- the maximum number of place settings to be washed;
- that the door should not be left in the open position since this could present a tripping hazard;
- how to load the dishwasher, and the substance of the following:

WARNING: Knives and other utensils with sharp points must be loaded in the basket with their points down or placed in a horizontal position.

2 | The instructions shall include the substance of the following:

This appliance is intended to be used in household and similar applications such as:

- staff kitchen areas in shops, offices and other working environments;
- farm houses;
- by clients in hotels, motels and other residential type environments;
- bed and breakfast type environments.

NOTE 101 If the manufacturer wants to limit the use of the appliance to less than the above, this must be clearly stated in the instructions.

**7.12.1 Addition:**

2 | For dishwashers having ventilation openings in the base, the instructions shall state that the openings must not be obstructed by a carpet.

**8 Protection against access to live parts**

This clause of Part 1 is applicable.

**9 Starting of motor-operated appliances**

This clause of Part 1 is not applicable.

**10 Power input and current**

This clause of Part 1 is applicable except as follows.

#### 10.1 Addition:

NOTE 101 The selected representative period is the period during which the power input is the highest.

#### 10.2 Addition:

NOTE 101 The selected representative period is the period during which the current is the highest.

### 11 Heating

This clause of Part 1 is applicable except as follows.

#### 11.7 Replacement:

*Appliances incorporating a programmer or timer are operated for two cycles with the programme that results in the highest temperature rises. The cycles are separated by a rest period of 15 min with the door or lid open.*

*Other appliances are subjected to two cycles of the sequence stated in the instructions that results in the highest temperature rises or for two periods of 15 min each, whichever is longer. The cycles or periods are separated by a rest period of 15 min with the door or lid open. Discharge pumps driven by a separate motor are then subjected to three periods of operation, each separated by a rest period of 15 min. The duration of each period of operation is 1,5 times the period necessary to empty the appliance when it is filled with the maximum quantity of water for which it is constructed. The level of the water discharge is*

- 90 cm above the floor, for appliances standing on the floor;
- the maximum height above the supporting surface, as stated in the instructions, for other appliances.

### 12 Void

### 13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

#### 13.2 Modification:

*For stationary class I appliances, the leakage current shall not exceed 3,5 mA, or 1 mA/kW rated power input with a limit of 5 mA, whichever is higher.*

### 14 Transient overvoltages

This clause of Part 1 is applicable.

### 15 Moisture resistance

This clause of Part 1 is applicable except as follows.

#### 15.1 Addition:

*Magnetic valves and similar components incorporated in external hoses for connection to the water mains are subjected to the test specified for IPX7 appliances.*

## 15.2 Replacement:

Appliances shall be constructed so that spillage of liquid in normal use does not affect their electrical insulation, even if an inlet valve fails to close.

*Compliance is checked by the following test.*

*Appliances with a **type X attachment**, except those having a specially prepared cord, are fitted with the lightest permissible type of flexible cord of the smallest cross-sectional area specified in Table 13.*

*Appliances intended to be filled with water by the user are completely filled with water containing approximately 1 % NaCl. A further quantity of this solution equal to 15 % of the capacity of the appliance or 0,25 l, whichever is greater, is poured in steadily over a period of 1 min.*

*Other appliances are operated until the maximum water level is reached, and 5 g of the detergent specified in Annex AA is added for each litre of water in the appliance. The inlet valve is held open and the filling continued for 15 min after first evidence of overflow or until the inflow is automatically stopped by other means.*

*For appliances that are loaded from the front, the door is then opened if this can be achieved manually and without damage to the door interlock system.*

*For appliances having a working surface, 0,5 l of water containing approximately 1 % NaCl and 0,6 % of rinsing agent, as specified in Annex AA, is poured over the top of the appliance, the controls being placed in the on position. The controls are then operated through their working range, this operation being repeated after a period of 5 min.*

*The appliance shall then withstand the electric strength test of 16.3 and inspection shall show that there is no trace of water on insulation that could result in a reduction of **clearances** and **creepage distances** below the values specified in Clause 29.*

**15.101** Appliances shall be constructed so that foaming does not affect electrical insulation.

*Compliance is checked by the following test which is carried out immediately after that of 15.2.*

*The appliance is operated under the conditions specified in Clause 11 but for one complete cycle with the programme that results in the longest period of operation. A solution consisting of 20 g of NaCl and 1 ml of a solution of 28 % by mass of dodecyl sodium sulphate ( $C_{12}H_{25}Na_2SO_4$ ), is added for each 8 l of water in the appliance.*

*For appliances incorporating a detergent dispenser, the solution is added manually at the point in the cycle when it would normally be dispensed automatically. For other appliances, the solution is added before starting the cycle.*

*The appliance shall then withstand the electric strength test of 16.3.*

*The appliance is then operated for two cycles under the same conditions, except that the solution is not added. It shall then withstand the electric strength test of 16.3.*

*The appliance is kept in a test room having a normal atmosphere for 24 h before being subjected to the test of 15.3.*

NOTE The solution used for this test has to be stored in a cool atmosphere and used within seven days of its preparation.