

# INTERNATIONAL STANDARD



**Household and similar electrical appliances – Safety –  
Part 2-7: Particular requirements for washing machines**

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IEC 60335-2-7

Edition 8.0 2019-05  
REDLINE VERSION

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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 97.060; 13.120

ISBN 978-2-8322-6971-8

**Warning! Make sure that you obtained this publication from an authorized distributor.**

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

### Part 2-7: Particular requirements for washing machines

#### 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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.**

International Standard IEC 60335-2-7 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances.

This eighth edition cancels and replaces the seventh edition published in 2008, Amendment 1: 2011 and Amendment 2:2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- requirements for steam generators in 3.1.9, 3.6.101, 19.101, 22.106, 22.107;
- additional definitions for washing machine types in 3.5.101, 3.5.102, 3.5.103;
- revised temperature limits for external accessible surfaces in 11.3 and 11.8;
- revised test procedure for the spillage test in 15.2;
- additional requirements for appliances that are controlled by programmable electronic circuits that limit the number of heating elements and motors from being energised at the same time, Subclause 22.108.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
61/5798/FDIS	61/5839/RVD

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

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

A list of all parts of the IEC 60335 series, under the general title: *Household and similar electrical appliances – Safety*, can be found on the IEC website.

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 fifth edition (2010) 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 washing machines.

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 the associated noun are also in bold.

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

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

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 this publication be adopted for implementation nationally not earlier than 12 months or later than 36 months from the date of publication.

The following differences exist in the countries indicated below.

- 3.1.9: Different size cloths are used. The initial water temperature for machines without heating elements and without a wringer is 71 °C (USA).
- 6.2: IPX0 appliances are allowed (USA).
- 11.7: The test durations are different (USA).
- 15.101: The test is different (USA).
- 19.7: Appliances without a programmer are operated until steady conditions are established (USA).
- 19.101: A redundant set of contacts is not required (USA).
- 22.6: The test is different (USA).
- 22.101: The test is different (USA).
- Annex AA: The detergent and rinsing agent are different (USA).
- Annex BB: Different tests are carried out (USA).

**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 publication using a colour printer.**



## 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.

**NOTE 1** — For example, if appliances within the scope of this Part 2

— have a separate spin container for water extraction, IEC 60335-2-4 is also applicable as far as is reasonable;

— have a drying function, IEC 60335-2-11 is also applicable as far as is reasonable.

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

**NOTE 2** 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 3** 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 that 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 2-7: Particular requirements for washing machines

### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric washing machines for household and similar use, that are intended for washing clothes and textiles, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances.

This standard also deals with the safety of electric washing machines for household and similar use employing an electrolyte instead of detergent. Additional requirements for these appliances are given in Annex CC.

NOTE 101 Guidance is given in Annex DD for requirements that ~~may~~ can be used to ensure an acceptable level of protection against electrical and thermal hazards for washing machines fitted with a power driven wringer.

Appliances not intended for normal household use but which nevertheless may be a source of danger to the public, such as appliances intended to be used by laymen in shops, in light industry and on farms, are within the scope of this standard.

NOTE 102 Examples of such appliances are washing machines for communal use in blocks of flats or in laundrettes.

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

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

NOTE 103 Attention is drawn to the fact that

- for washing machines 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 104 This standard does not apply to

- washing machines intended exclusively for industrial purposes (ISO 10472-2);
- 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);
- washing machines incorporating steam generating devices in which steam is produced at a pressure exceeding 50 kPa.

### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

~~IEC 60456, Clothes washing machines for household use – Methods for measuring the performance~~

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*

IEC 60730-2-12:20052015, *Automatic electrical controls for household and similar use – Part 2: Particular requirements for electrically operated door locks*

ISO 1817:20052015, *Rubber, vulcanized or thermoplastic – Determination of the effect of liquids*

### 3 Terms and definitions

This clause of Part 1 is applicable except as follows.

#### 3.1 Definitions relating to physical characteristics

*Replacement:*

##### 3.1.9

##### **normal operation**

operation of the appliance under the following conditions.

The appliance is filled with dry textile material having a mass equal to the maximum mass stated in the instructions, and with the maximum quantity of water for which it is constructed. However, if the power input or current is higher when only 50 % of the textile material is used, the appliance is operated with this load instead if this gives more unfavourable conditions than the full load during the test of Clause 11.

Note 101 to entry: For some appliances incorporating a programmer, using the 50 % reduced load may result in automatic selection of a reduced wash programme.

The temperature of the water is

- 65 °C ± 5 °C for appliances without heating elements;
- 15 °C ± 5 °C for appliances without heating elements and intended for connection to the cold water supply only;
- 15 °C ± 5 °C for other appliances.

If the appliance does not incorporate a programmer, the water is heated to 90 °C ± 5 °C or as high as the construction will allow if lower, before starting the first washing period.

The textile material consists of pre-washed double-hemmed cotton sheets having dimensions approximately 700 mm × 700 mm and a specific mass between 140 g/m<sup>2</sup> and 175 g/m<sup>2</sup> in the dry condition.

For ~~impeller-type~~ **washing machines**, if the textile material does not move properly during operation,

- the quantity of textile material may be reduced until the maximum power input of the motor is attained; or
- a textile material comprising pre-washed double-hemmed cotton sheets, having dimensions of approximately 900 mm × 900 mm and a mass between 90 g/m<sup>2</sup> and 110 g/m<sup>2</sup> in the dry condition, may be used.

However, for **impeller-type washing machines**, in case of doubt, the test is carried out using the reduced quantity of textile material.

A **steam generator** intended to be filled by hand is filled according to the instructions, water being added to maintain the steam generation.

A **steam generator** intended to be filled automatically is connected to the water mains.

### 3.5 Definitions relating to types of appliances

#### 3.5.101

##### **agitator washing machine**

washing machine in which the textiles are substantially immersed in the washing water, the mechanical action being produced by a device moving about or along its vertical axis with a reciprocating motion (an agitator)

Note 1 to entry: This device usually extends above the maximum water level.

#### 3.5.102

##### **impeller washing machine**

washing machine in which the textiles are substantially immersed in the washing water, the mechanical action being produced by a device rotating about its axis continuously or which reverses after a number of revolutions (an impeller)

Note 1 to entry: The uppermost point of this device is substantially below the minimum water level.

#### 3.5.103

##### **drum washing machine**

washing machine in which the textiles are placed in either a horizontal drum or a drum that is inclined up to and including 45° from the horizontal and the textile is partially immersed in the washing water, the mechanical action being produced by rotation of the drum about its axis, the movement being either continuous or periodically reversed

### 3.6 Definitions relating to parts of an appliance

#### 3.6.101

##### **steam generator**

device in which steam is produced at a pressure not exceeding 50 kPa and in which the pressure drops to atmospheric pressure when the steam is not supplied

## 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.

### 5.2 Addition:

*The relevant tests of 21.101, 21.102 and 22.104 shall be carried out on the same appliance as that used for the test of Clause 18.*

### 5.3 Addition:

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

*The relevant tests of 21.101 and 21.102 are carried out before the test of Clause 18. The test of 22.104 is carried out after the test of Clause 18.*

#### **5.7 Addition:**

*Doubt is considered to exist if the temperature of the water is within 6 K of the boiling point and the difference between the temperature rise of the relevant part and the limit specified does not exceed 25 K minus the room temperature.*

## **6 Classification**

This clause of Part 1 is applicable except as follows.

#### **6.1 Modification:**

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

#### **6.2 Addition:**

Appliances shall be at least IPX4.

## **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 water level.

Appliances not intended for connection to the hot water supply and not provided with heating elements shall be marked with the substance of the following:

**CAUTION:** Do not connect to the hot water supply.

#### **7.10 Addition:**

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

#### **7.12 Addition:**

The instructions shall specify the maximum mass of dry cloth in kilograms to be used in the appliance.

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;
- areas for communal use in blocks of flats or in launderettes.

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

#### 7.12.1 Addition:

For washing machines having ventilation openings in the base, the installation instructions shall state that the openings must not be obstructed by a carpet.

#### 7.15 Addition:

The caution relating to connection to the hot water supply shall be on the appliance at its point of attachment to the water supply.

### 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:

*The selected representative period is the period, such as filling with water, washing, rinsing, water extraction, spinning or braking, during which the power input is the highest.*

#### 10.2 Addition:

*The selected representative period is the period, such as filling with water, washing, rinsing, water extraction, spinning or braking, during which the current is the highest.*

### 11 Heating

This clause of Part 1 is applicable except as follows.

#### 11.3 Addition:

*Where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 101 may be used to measure the temperature rises of external **accessible surfaces** specified in Table 101. The probe is applied with a force of  $4\text{ N} \pm 1\text{ N}$  to the surface in such a way that the best possible contact between the probe and the surface is ensured. The measurement is performed after a contact period of 30 s.*

*The probe may be held in place using a laboratory stand clamp or similar device. Any measuring instrument giving the same results as the probe may be used.*

#### 11.7 Replacement: