

Household and similar electrical appliances — Safety —

Part 2-7: Particular requirements for washing machines

The European Standard EN 60335-2-7:2003 has the status of a
British Standard

ICS 97.060; 13.120

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British Standards

National foreword

This British Standard is the official English language version of EN 60335-2-7:2003. It was derived by CENELEC from IEC 60335-2-7:2002. It supersedes BS EN 60335-2-7:2001 which will be withdrawn on 2006-03-01.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by common modification tags **Ⓒ** **Ⓓ**.

Those parts of the original IEC text that have been modified by CENELEC have been identified in the Nation Annex NA.

The UK participation in its preparation was entrusted by Technical Committee CPL/61, Safety of household and similar electrical appliances, to Subcommittee CPL/61/14, Home laundry appliances and dishwashers, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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**Household and similar electrical appliances –
Safety**
Part 2-7: Particular requirements for washing machines
(IEC 60335-2-7:2002, modified)

Appareils électrodomestiques
et analogues –
Sécurité
Partie 2-7: Règles particulières
pour les machines à laver le linge
(CEI 60335-2-7:2002, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2-7: Besondere Anforderungen
für Waschmaschinen
(IEC 60335-2-7:2002, modifiziert)

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CENELEC

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60335-2-7:2002 (61/2133/FDIS), prepared by the IEC Technical Committee 61, together with the common modifications prepared by CENELEC TC 61, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60335-2-7 on 2003-03-01.

This European Standard replaces EN 60335-2-7:2001.

The following dates are applicable:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2004-03-01
- date on which national standards conflicting with the EN have to be withdrawn (dow) 2006-03-01

This part 2 has to be used in conjunction with EN 60335-1, Household and similar electrical appliances – Safety – Part 1: General requirements. It was established on the basis of the 2002 edition of that standard. Amendments and revisions of Part 1 have also to be taken into account and the dates when such changes become applicable will be stated in the relevant amendment or revision of Part 1.

This part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Safety requirements for electric 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 of Part 1 is to be adapted accordingly.

NOTE 1 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.;
- subclauses, notes and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 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.

Special national conditions causing a deviation from this European Standard are listed in annex ZA and are in addition to those in EN 60335-1.

There are no national deviations from this European Standard, other than those listed in Annex ZB to EN 60335-1.

Annexes AA and BB are normative and form an integral part of this standard.

p NOTE In this document, p is used in the margin to indicate instructions for preparing the printed version.

Introduction

An investigation by CENELEC TC 61 has shown that all risks from products within the scope of this standard are fully covered by the Low Voltage Directive, 73/23/EEC. For products having mechanical moving parts, a risk assessment in accordance with the Machinery Directive, 98/37/EC, has shown that the risks are mainly of electrical origin and consequently this directive is not applicable. However, the relevant essential safety requirements of the Machinery Directive are covered by this standard together with the principal objectives of the Low Voltage Directive.

Endorsement notice

The text of the International Standard IEC 60335-2-7:2002 was approved by CENELEC as a European Standard with agreed common modifications.

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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.

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.

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.

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.

NOTE 101 Washing machines also supplied with other forms of energy are within the scope of this standard.

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 appliances that are encountered by all persons in and around the home. However, in general, it does not take into account

- the use of appliances by young children or infirm persons without supervision;
- playing with the appliance by young children.

NOTE 103 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 104 This standard does not apply to

- appliances intended exclusively 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:

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

☒ IEC 61770, *Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets* ☒

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 filled with textile material having a mass in the dry condition 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.

The temperature of the water is

- 65 °C ± 5 °C for appliances without heating elements;
- 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 70 cm × 70 cm and a specific mass between 140 g/m² and 175 g/m² in the dry condition.

NOTE 101 In washing machines of the continuously rotating impeller type, if the textile material does not move properly during operation, its quantity is reduced until the maximum power input of the motor is attained.

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.

5.7 Addition:

NOTE 101 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.

The safety release mechanism of power-driven wringers shall be marked to indicate its method of operation, unless its operating means has to be continuously actuated by the user.

NOTE 101 This marking may be near the mechanism.

7.6 Addition:



[symbol 5036 of IEC 60417-1]

dangerous voltage

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 for washing machines incorporating a power-driven wringer shall draw attention to the potential hazards involved when operating the wringer and shall state that

- the wringer must be disengaged or switched off when not in use;
- the appliance must not be operated by children.

If symbol 5036 of IEC 60417-1 is used, its meaning shall be explained.

7.12.1 Addition:

The installation instructions shall state

- that the appliance is to be connected to the water mains using new hose-sets and that old hose-sets should not be reused;

NOTE 101 This instruction is not required if the hoses are permanently attached to the appliance.

- the maximum permissible inlet water pressure, in megapascals, for appliances intended to be connected to the water mains;
- the minimum permissible inlet water pressure, in megapascals, if this is necessary for the correct operation of the appliance;
- for washing machines with ventilation openings in the base, that a carpet must not obstruct the openings.

7.14 Addition:

The height of symbol 5036 of IEC 60417-1 shall be at least 5 mm.

Compliance is checked by measurement.

7.101 The enclosure of magnetic valves, and similar components incorporated in external hoses for direct connection to the water mains, shall be marked with symbol 5036 of IEC 60417 if their **working voltage** exceeds **extra-low voltage**.

NOTE This symbol is a warning sign and the rules of ISO 3864 apply.

Compliance is checked by inspection.

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 are operated for three cycles with the programme that results in highest temperature rises, with a rest period of 4 min between cycles.

Other appliances are operated for three cycles, with a rest period of 4 min between cycles. Each cycle consists of the following operations:

- *for appliances without means for water washing; extraction,*
- *for appliances having a single drum for washing followed by water extraction; washing and water extraction,*
- *for appliances having separate drums for washing and water extraction separated by washing and water extraction that cannot be used simultaneously, an additional 4 min rest period;*
- *for appliances having separate drums for washing together with water extraction so that the operations terminate simultaneously; washing and water extraction that can be used simultaneously,*
- *for appliances incorporating a power-washing followed by wringing;*

driven wringer,

- *for appliances having a single drum for washing, water extraction and drying*
 - *that allow the same quantity of textile material to be washed and dried in the drum, washing followed by water extraction, followed by drying;*
 - *that, according to the instructions, only allow a portion of the washed textile material to be dried in the drum, washing followed by water extraction followed by two drying periods, with an additional rest period of 4 min before each drying period. In this case only two cycles of operation are carried out.*

For appliances incorporating a timer, the washing period, the water extraction period and the drying period are equal to the maximum period allowed by the timer.

For appliances without a timer,

- *the washing period has a duration of*
 - *6 min, for washing machines of the continuously rotating impeller type,*
 - *18 min, for washing machines of the agitator type,*
 - *25 min for washing machines of the drum type, unless a longer period is stated in the instructions;*
- *the water extraction period has a duration of 5 min.*

For power-driven wringers, the duration of each wringing period is 8 min. The wringer is loaded by passing a board through the rollers once a minute, the roller pressure being adjusted to the maximum value. The board is approximately 20 mm thick and 80 cm long, its width being at least equal to three-quarters of the effective length of the rollers. The board is uniformly tapered at each end down to a thickness of approximately 3 mm, over a distance of 20 cm.

The rest period, including any braking time, has a duration of 4 min.

After the specified sequence of operation, discharge pumps that are driven by a separate motor and switched on and off manually, are subjected to three operating periods separated by rest periods of 4 min. Each operating period is equal to 1,5 times the period necessary to empty the appliance when filled to the maximum normal water level. The outlet of the water discharge pipe is 90 cm above the floor.

NOTE 101 Washing machines with a hand-operated wringer are tested as appliances without means for water extraction.

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 of rated power input with a limit of 5 mA, whichever is greater.

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 **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 that 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. Twice the quantity of detergent necessary for normal washing is added, the composition of which is specified in Annex AA.

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

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operation

This clause of Part 1 is applicable except as follows.

19.1 Addition:

For appliances incorporating a programmer or a timer, the tests of 19.2 and 19.3 are replaced by the test of 19.101.

The test of 19.7 is not carried out on motors driving moving parts of an oscillating agitator.

19.2 Addition:

Restricted heat dissipation is obtained without water in the appliance or with just sufficient water to cover the heating elements, whichever is the more unfavourable.

19.7 Addition:

Appliances without a programmer or timer are operated for 5 min.

Moving parts of a wringer are locked even if a trip bar prevents rotation of the rollers.

19.9 Not applicable.

19.13 Addition:

The textile material shall not ignite and shall not show any charring or glowing.

NOTE 101 Light brown colouring of the textile material or slight emission of smoke is ignored.

During the tests of 19.101, the temperature of windings shall not exceed the values specified in Table 8.

19.101 *The appliance is supplied at rated voltage and operated under normal operation. Any fault condition or unexpected operation that may be applied in normal use is introduced.*

NOTE 1 Examples of fault conditions and unexpected operations are:

- the programmer stopping in any position;
- disconnection and reconnection of one or more phases of the supply during any part of the programme;
- open-circuiting or short-circuiting of components;
- failure of a magnetic valve;
- \square failure or blocking of the mechanical part of a water-level switch; This fault condition is not applied if the cross section of the tube supplying the air chamber with water is greater than 500 mm² with a minimum dimension of 10 mm, and if the outlet of the chamber is at least 20 mm above the highest water level. The tube connecting the air chamber to the water level switch is to be fixed so that there is no likelihood of bending or pinching. \square
- puncture of the capillary tube of a thermostat.

NOTE 2 Locking the main contacts of a contactor, used for energizing heating elements, in the 'on' position is considered to be a fault condition, unless at least two independent sets of contacts are provided. This may be achieved by two contactors operating independently of each other or by one contactor having two independent armatures operating two independent sets of contacts.

NOTE 3 In general, tests are limited to the fault conditions that may be expected to give the most unfavourable results.

The simulation of component faults is limited to those that could expose the user to a hazard.

NOTE 4 If operation without water in the appliance is a more unfavourable condition for starting any programme, the tests with that programme are carried out with the water valve closed. This valve is not closed after the programme has started to operate.

NOTE 5 If the appliance stops at any particular point in the programme, the test with that fault condition is considered to be ended.

NOTE 6 The fault condition with

- the automatic filling device held open is covered by 15.2;
- thermal controls short-circuited is covered by 19.4;
- motor capacitors short-circuited or open-circuited is covered by 19.7.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.1 Modification:

The appliance is empty or filled as specified for normal operation, whichever is more unfavourable. Doors and lids are closed and any castors turned to the most unfavourable position.

20.101 Washing machines of the drum type that are loaded from the top through an opening with a hinged lid shall incorporate an interlock that de-energizes the motor before the lid opening exceeds 50 mm.

If a removable or sliding lid is provided, the motor shall be de-energized as soon as the lid is removed or displaced and it shall not be possible to start the motor unless the lid is in the closed position.

The interlock shall be constructed so that unexpected operation of the appliance is unlikely unless the lid is in the closed position.

Compliance is checked by inspection, by measurement and by manual test.

NOTE Interlocks that can be released by means of test probe B of IEC 61032 are not considered to comply with this requirement.

20.102 Washing machines of the drum type that are loaded from the front, shall incorporate an interlock that de-energizes the motor before the door opening exceeds 50 mm.

The interlock shall be constructed so that unexpected operation of the appliance is unlikely unless the lid is in the closed position.

NOTE 1 Interlocks that can be released by means of test probe B of IEC 61032 are not considered to comply with this requirement.

When the water level in the appliance is above the lower edge of the door opening, it shall not be possible to open the door by a simple action while the appliance is operating.

NOTE 2 Interlocked doors and doors that are opened by means of a key, or by two separate actions such as pushing and turning, are considered to comply with this requirement.

Compliance is checked by inspection, by measurement and by manual test.

20.103 Power-driven wringers shall be constructed so that the pressure between the rollers has to be maintained by the user, unless a readily accessible safety release or other means of protection is incorporated.

The release mechanism shall operate easily without violent ejection of any part and shall release pressure on the rollers immediately. The rollers shall separate either by at least 45 mm at both ends or by at least 25 mm at one end and 75 mm at the other.

The safety release shall be operable by a person standing in any normal working position relative to the wringer, even if the fingers of both hands are trapped between the rollers.

Power-driven wringers shall be constructed to prevent fingers being squeezed between a roller and the frame.

Power-driven wringers shall be controlled by an easily accessible switch.

NOTE The switch controlling the washing machine may also control the wringer.

Compliance is checked by inspection, by measurement, by manual test and by the following test.

The pressure between the rollers is adjusted to its maximum value. The board described in 11.7 is passed between the rollers and the wringer is stopped when the board is approximately halfway through. A force is gradually applied to the operating means of the safety release. The release shall operate before the force exceeds 70 N.

21 Mechanical strength

This clause of Part 1 is applicable.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 Modification:

Instead of coloured water, a solution composed of 5 g of the detergent specified in Annex AA per litre of distilled water is used.

Addition:

NOTE 101 Parts that withstand the aging test specified in Annex BB are not considered to be parts where leakage could occur.

22.101 Appliances shall withstand the water pressure expected in normal use.

Compliance is checked by connecting the appliance to a water supply having a static pressure equal to twice the maximum permissible inlet water pressure or 1,2 MPa, whichever is higher, for a period of 5 min.

There shall be no leakage from any part, including the inlet water hose.

22.102 Appliances shall be constructed so that textile material cannot come into contact with heating elements.

Compliance is checked by inspection.

22.103 Appliances shall be constructed so that during normal use filter compartments cannot be opened by a simple action if this results in an outflow of water having a temperature exceeding 50 °C.

NOTE 1 Interlocked covers, and covers that are opened by means of a key or by two separate actions such as pushing and turning, are considered to comply with this requirement.

NOTE 2 Rotation by more than 180° is not considered to be a simple action.

Compliance is checked by inspection and by manual test. If the filter compartment can be opened, any flow of water shall not exceed 0,5 l/min.

23 Internal wiring

This clause of Part 1 is applicable except as follows.

23.101 The insulation and sheath of internal wiring for the supply of magnetic valves and similar components incorporated in external hoses for connection to the water mains shall be at least equivalent to light polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 52).

Compliance is checked by inspection.

NOTE The mechanical characteristics specified in IEC 60227 are not checked.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.4 Addition:

The number of cycles of operation for programmers is 3 000.

24.101 Thermal cut-outs incorporated in washing machines for compliance with 19.4 shall not be self-resetting.

Compliance is checked by inspection.

24.2101 Components necessary for the connection of the washing machine to the water mains shall comply with IEC 61770. They shall be supplied with the appliance.

Compliance is checked by inspection. 

25 Supply connection and external flexible cords

This clause of Part 1 is applicable.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable except as follows.

29.2 Addition:

The microenvironment is pollution degree 3, and the insulation shall have a CTI not less than 250, unless the insulation is enclosed or located so that it is unlikely to be exposed to pollution during normal use of the appliance due to

- condensation produced by the appliance;
- chemicals, such as detergent or fabric conditioner.

30 Resistance to heat and fire

This clause of Part 1 is applicable except as follows.

30.2 Addition:

For appliances incorporating a programmer or a timer, 30.2.3 is applicable. For other appliances, 30.2.2 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

Annexes

The annexes of Part 1 are applicable except as follows.

Annex AA (normative)

Detergent and rinsing agent

AA.1 Detergent

The composition of the detergent is as follows:

Substance	Parts by mass %
Linear sodium alkyl benzene sulphonate (mean length of alkane chain C _{11,5})	6,4
Ethoxylated tallow alcohol (14 EO)	2,3
Sodium soap (chain length C _{12 to 16} : 13 % to 26 % and C _{18 to 22} : 74 % to 87 %)	2,8
Sodium tripolyphosphate	35,0
Sodium silicate (SiO ₂ : 76,75 % and Na ₂ O: 23,25%)	6,0
Magnesium silicate	1,5
Carboxy methyl cellulose	1,0
Ethylenediamine tetra-acetic-sodium-salt	0,2
Optical whitener for cotton (dimorpholinostilbene type)	0,2
Sodium sulphate (as accompanying substance or added)	16,8
Water	7,8
Sodium perborate tetrahydrate (supplied separately)	20,0

NOTE 1 The detergent specified in the instructions may be used, but if there is any doubt with regards to the test results, this composition is to be used.

NOTE 2 The composition of the detergent is extracted from IEC 60456.

AA.2 Rinsing agent

The composition of the rinsing agent is as follows:

Substance	Parts by mass %
Plurafac LF 221 ¹⁾	15,0
Cumene sulfonate (40 % solution)	11,5
Citric acid (anhydrous)	3,0
Deionized water	70,5

The rinsing agent has the following properties:

- viscosity, 17 mPas;
- pH, 2,2 (1 % in water).

NOTE 1 Any commercially available rinsing agent may be used, but if there is any doubt with regards to the test results, this composition is to be used.

NOTE 2 The composition of the rinsing agent is extracted from IEC 60436.

¹⁾ Plurafac LF 221 is the trade name of a product supplied by BASF. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by IEC of this product.

Annex BB (normative)

Ageing test for elastomeric parts

The ageing test on elastomeric parts is carried out by measuring their hardness and mass before and after immersion in a solution of detergent at elevated temperature.

The test is carried out on at least three samples of each part. The samples and test procedure are as specified in ISO 1817, with the following modifications.

4 Test liquids

The liquid is obtained by dissolving 5 g of the detergent specified in Annex AA per litre of distilled water.

NOTE Care is to be taken to ensure that the total mass of the test pieces immersed does not exceed 100 g for each litre of solution, that the test pieces are completely immersed and that their entire surface is freely exposed to the solution. During the tests, the test pieces are not to be exposed to direct light. Test pieces of different compounds are not to be immersed at the same time in the same solution.

5 Test pieces

5.4 Conditioning of test pieces

The temperature is $23\text{ °C} \pm 2\text{ °C}$ and the relative humidity is $(50 \pm 5)\%$.

6 Immersion in the test liquid

6.1 Temperature

The solution is heated within 1 h with the test pieces immersed, to a temperature of 75^{+5}_0 °C and maintained at this value. The solution is renewed every 24 h and heated in the same way.

NOTE To avoid undue evaporation of the solution, it is recommended to use a closed-circuit system or similar method for renewing the solution.

6.2 Duration

The test pieces are immersed for a total period of 48^{+1}_0 h .

The test pieces are then immediately immersed in a fresh solution, which is maintained at ambient temperature. The pieces are immersed for $45\text{ min} \pm 15\text{ min}$.

After having been removed from the solution, the test pieces are rinsed in cold water at $15\text{ °C} \pm 5\text{ °C}$ and then dried with blotting paper.

7 Procedure

7.2 Change in mass

The increase in mass of the test pieces shall not exceed 10 % of the value determined before immersion.

7.6 Change in hardness

The micro-test for hardness applies.

The hardness of the test pieces shall not have changed by more than 8 IRHD. Their surface shall not have become sticky and shall show no crack visible to the naked eye or any other deterioration.

Annex ZA
(informative)

Special national conditions

Addition:

<u>Clause</u>	<u>Special national condition</u>
22.101	Norway

The test is carried out at twice the permissible inlet pressure or 2,0 MPa, whichever is greater.

Annex ZC
(normative)

**Normative references to international publications
with their corresponding European publications**

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61770	- ¹⁾	Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets	EN 61770	1999 ²⁾
ISO 1817	1999	Rubber, vulcanized – Determination of the effect of liquids	–	–

¹⁾ undated reference

²⁾ valid edition at date of issue

Bibliography

The bibliography of Part 1 is applicable except as follows.

Addition:

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

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

ISO 3864, *Safety of colours and safety signs*

National Annex NA
(informative)

Original IEC text Amended by CENELEC common modifications

The text of the International Standard IEC 60335-2-7:2002 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

2 Normative references

p Add:

IEC 61770, *Electric appliances connected to the water mains - Avoidance of backsiphonage and failure of hose-sets*

19 Abnormal operation

p **19.101** Add to the penultimate dashed item of note 1:

This fault condition is not applied if the cross section of the tube supplying the air chamber with water is greater than 500 mm² with a minimum dimension of 10 mm, and if the outlet of the chamber is at least 20 mm above the highest water level. The tube connecting the air chamber to the water level switch is to be fixed so that there is no likelihood of bending or pinching.

24 Components

p Add:

24.Z101 Components necessary for the connection of the washing machine to the water mains shall comply with IEC 61770. They shall be supplied with the appliance.
Compliance is checked by inspection.

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