IEC 60335-2-102

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INTERNATIONAL STANDARD

COMMENTED VERSION

Household and similar electrical appliances - Safety -
Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Household and similar electrical appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections

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This commented version (CMV) of the official standard IEC 60335-2-102:2026 edition 3.0 allows the user to identify the changes made to the previous IEC 60335-2-102:2017 edition 2.0. Furthermore, comments from IEC TC 61 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are shown in green text, and deletions in red text with strikethrough. Hover over the comment icons to display pop-up notes containing the comments, which are also available in the margin of the publication.

This publication contains the CMV and the official standard.

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IEC 60335-2-102 has been prepared by IEC technical committee 61: Safety of household and similar electrical appliances. It is an International Standard.

This third edition cancels and replaces the second edition published in 2017. This edition constitutes a technical revision.

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

– alignment with IEC 60335-1:2020;
– conversion of some Notes to normative text (Clause 1, 8.101, 11.8, 15.101, 16.3);
– clarification of the requirement for moisture resistance (15.101);
– addition of external accessible surface temperature limits for appliances with electric heat sources where there is no relevant IEC 60335 part 2 standard (3.6.102, 3.6.103, 7.12.1, 11.3, 11.8, Table 102, Figure 102);
– application of test probe 19 for parts no more than 850 mm from the floor (7.12.1, 8.1.1, 8.1.3, 20.2);
– addition of requirements for appliances intended for installation in areas with restricted access (3.8.103, 7.12.1, 8.1.1, 11.8, Table 102, 20.2, 22.106);
– limitation of the application of test probes and external accessible surface temperatures for parts of appliances above 850 mm, 1,8 m or 2,3 m after installation (7.12.1, Table 102, 20.2);
– addition of requirements for parts made of particle foam material (3.8.104, 21.2, 22.104, 22.105, 22.106, 30.1, 30.1.101, Figures 103 and 104);
– clarification of requirements for controls and software to align with requirements for fuel control standards and fuel burning appliance standards (19.11.2, 19.11.3, 19.13, 22.46, 24.1, Annex AA, Annex BB).

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

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Draft	Report on voting
61/7655/FDIS	61/7694/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This part 2 is to be used in conjunction with the latest edition of IEC 60335-1 and its amendments unless that edition precludes it; in that case, the latest edition that does not preclude it is used. It was established on the basis of the sixth edition (2020) 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: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections.

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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.

NOTE 4 The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations can 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.

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.

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

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– revised.

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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.

Guidance documents concerning the application of the safety requirements for appliances can be accessed via TC 61 supporting documents on the IEC website

https://www.iec.ch/tc61/supportingdocuments

This information is given for the convenience of users of this International Standard and does not constitute a replacement for the normative text in this standard.

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~~ can 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.

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

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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~~ Horizontal publications, basic safety publications and group safety publications 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.

NOTE 3 Standards dealing with non-safety aspects of household appliances are:

- IEC standards published by TC 59 concerning methods of measuring performance;
- CISPR 11, CISPR 14-1 and relevant IEC 61000-3 series standards concerning electromagnetic emissions;
- CISPR 14-2 concerning electromagnetic immunity;
- IEC standards published by TC 111 concerning environmental matters.

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1 Scope

This clause of Part 1 is replaced by the following.

This part of IEC 60335 deals with the safety of gas, oil and solid-fuel burning appliances having electrical connections, for household and similar purposes, their **rated voltage** being not more than 250 V for single-phase appliances and 480 V for other appliances including direct current (DC) supplied appliances and **battery-operated appliances**.

This standard covers the electrical safety and some other safety aspects of these appliances. All safety aspects are covered when the appliance also complies with the relevant standard for the fuel-burning appliance. If the appliance incorporates electric heating sources, safety aspects concerning these electric sources are covered when the appliance also complies with a relevant part 2 of IEC 60335.

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

~~NOTE 101~~ Examples of appliances within the scope of this standard are:

– central heating boilers;
– commercial catering equipment;
– cooking appliances;
– laundry and cleaning appliances;
– room heaters;
– warm air heaters;
– water heaters.

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~~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.~~

~~This standard deals with the reasonably foreseeable hazards presented by appliances that are encountered by all persons.~~

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:

– 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 102~~ Attention is drawn to the fact that:

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

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~~NOTE 103~~ 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:

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

IEC 60695-10-2:2014, *Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test method*

IEC 61558-2-3, *Safety of transformers, reactors, power supply units and combinations thereof - Part 2-3: Particular requirements and tests for ignition transformers for gas and oil burners*

ISO 3808, *Road vehicles - Unscreened high-voltage ignition cables - General specifications, test methods and requirements*

3 Terms and definitions

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This clause of Part 1 is applicable except as follows.

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3.6 Definitions relating to parts of an appliance

3.~~5~~6.101
spark-ignition circuit
electrical circuit for producing sparks which ignite gaseous or liquid fuel

3.6.102
functional surface
surface that is intentionally heated by an internal heat source and has to be hot to carry out the function for which the appliance is intended

Note 1 to entry: An example is the heated sheath of a tubular heating element.

3.8 Definitions relating to miscellaneous matters

3.8.101
lock-out
shut-down requiring a manual operation to restart the appliance

3.8.102
shut-down
de-energization of a control resulting from the action of a limiting device or detection of a fault in the control system, thus stopping the flow of gaseous or liquid fuel

3.8.103
area with restricted access
location with restricted access by trained persons

Note 1 to entry: Examples are rooms for central heating devices with a locked door, or construction areas.

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Note 2 to entry: Laypersons and children are not considered to be trained persons.

3.8.104
particle foam material
closed cell material with a density not more than 250 kg/m^3 moulded from thermoplastic particles (e.g. beads) with expanding agent

Note 1 to entry: Measurement of density can be made according to ISO 845.

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:*

A separate appliance may be used for the tests carried out on the fuel-burning appliance, in accordance with its relevant standard.

The tests of this standard may be carried out in conjunction with the tests of another part 2, if applicable.

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5.3 *Addition:*

If a test has been carried out in accordance with the fuel-burning appliance standard, it is not repeated.

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5.4 *Addition:*

When the appliance incorporates electric heating sources, the tests are carried out with all parts of the appliance in operation, as allowed by the construction.

5.101 *Appliances are supplied as specified for* ***motor-operated appliances****.*

6 Classification

This clause of Part 1 is applicable.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.12.1 *Addition:*

The installation instructions shall indicate the minimum height of installation of parts intended to be installed above 850 mm, 1,8 m or 2,3 m above the floor in accordance with 8.1.1, Table 102 or 20.2.

For appliances intended for installation in **areas with restricted access**, the instruction shall include the substance of the following:

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WARNING: This appliance shall be installed in an area with access for trained persons only. Access for laypersons and children is forbidden.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows.

8.1 *Addition:*

The requirement does not apply to **accessible parts** of **spark-ignition circuits**.

8.1.1 *Addition:*

For parts of appliances situated not more than 850 mm above the floor after installation or in normal use, in addition to the use of test probe 18, test probe 19 of IEC 61032 is also applied wherever test probe 18 is used and with the same test conditions used for test probe 18.

*For appliances intended for installation in **areas with restricted access**, test probe 18 and test probe 19 are not applied.*

8.1.3 *Addition:*

Test probe 19 of IEC 61032 is not applied.

8.101 Parts of the **spark-ignition circuits** shall not be **accessible parts** if the limits in Table 101 are exceeded, unless they are piezoelectric igniters.

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Table 101 – Accessible spark-ignition circuit limits

Interval between pulses *t*	**Pulse duration *d***		
	***d* ≤ 0,1 ms**	**0,1 ms < *d* ≤ 100 ms**	***d* > 100 ms**
t < 40 ms	V_o ≤ 10 kV and *I* ≤ 0,7 mA	V_o ≤ 10 kV and *I* ≤ 0,7 mA	[a]
40 ms ≤ *t* < 250 ms	45 µC/pulse	V_o ≤ 10 kV and *I* ≤ 0,7 mA	V_o ≤ 10 kV and *I* ≤ 0,7 mA (only applicable if *d* < *t*)[a]
t ≥ 250 ms	100 µC/pulse	100 µC/pulse	V_o ≤ 10 kV and *I* ≤ 0,7 mA
NOTE 1 For the pulse duration (*d*) and the interval between pulses (*t*), see also Figure 101. NOTE 2 V_o is the no-load voltage of the ignition circuit. V_o and *I* are peak values.			
[a] If *t* < 40 ms and *d* > 100 ms or if 40 ms ≤ *t* < 250 ms and *d* > 100 ms when *d* < *t*, then parts of the **spark-ignition circuits** shall not be accessible.			

Compliance is checked by inspection, by applying test probe B of IEC 61032 as described in 8.1.1 and by the following test.

*The **spark-ignition circuit** is operated and the pulse duration measured across the spark gap until it has reduced to 10 % of its peak value, as shown in Figure 101.*

A resistor having a nominal non-inductive resistance of 2 000 Ω is connected across the spark gap and the voltage measured. The current flowing through the resistor is calculated from the voltage measured across it.

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The quantity of electricity in the discharge is calculated from the current and duration of the pulse by calculating the sum of all areas recorded on the voltage/time graph without taking voltage polarity into account.

~~NOTE The quantity of electricity is calculated from the sum of all areas recorded on the voltage/time graph without taking voltage polarity into account.~~

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.

11 Heating

This clause of Part 1 is applicable except as follows.

11.3 *Addition:*

*For appliances having electric heating sources where no part 2 of IEC 60335 exists, where the external **accessible surfaces** are suitably flat and access permits, then the test probe of Figure 102 is used to measure the temperature rises of external **accessible surfaces** specified in Table 102. The probe is applied with a force of 4 N ± 1 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.

11.8 *Addition:*

For appliances having no electric heating sources, the temperature rises of the walls of the test corner, and the temperature rises of the surfaces of handles, knobs, grips and similar parts, are not measured and Table 102 is not applicable.

~~*The temperature rise limits for common parts of appliances having electric and fuel-burning heating sources are specified in the relevant part 2.*~~

~~NOTE 101 Examples of common parts are components in the control panel of a combined gas and electric cooking range.~~

For appliances having electric and fuel-burning heating sources, the temperature rise limits for common parts of the appliance, such as parts in the control panel of a combined gas and electric cooking range, are specified in the relevant part 2 of IEC 60335 and the relevant product standard for the fuel-burning appliance.

*For appliances having electric heating sources where no part 2 of IEC 60335 exists, the temperature rises shall not exceed the values shown in Table 102. If the **accessible surface** is protected by a guard, the temperature rise limits in Table 102 apply to the guard. However, if the guard is a **detachable guard** the temperature rise limits in Table 102, also apply to parts of the surface protected by the guard.*

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Table 102 – Maximum temperature rises for specified external accessible surfaces under normal operating conditions

Surface [a]	*Temperature rise of accessible external surface* *K*		
	Parts situated not more than 850 mm above the floor after installation	***Parts situated more than 850 mm above the floor and not more than 2,3 m above the floor after installation***	***Appliances intended for installation in areas with restricted access***
Bare metal	*38*	*42*	*48*
Coated metal [b]	*42*	*49*	*59*
Glass and ceramic	*51*	*56*	*65*
Plastic and plastic coating > 0,4 mm [c, d]	*58*	*62*	*74*

NOTE The temperature rise limits of handles, knobs, grips, keyboards, keypads and similar parts are specified in Table 3.

[a] *Temperature rises are not measured on:*

- *surfaces that are inaccessible to a 75 mm diameter probe having a hemispherical end after installation or placing according to the instructions, unless they are protected by a **detachable guard**;*
- ***functional surfaces** and surfaces within 25 mm of them;*
- *the water supply fittings, pipes, hoses and pressure relief valves;*
- *flue gas systems and surfaces within 25 mm of them;*
- *burner flange, flame sighting hole and surfaces within 25 mm of them;*
- *surfaces of gas hob that are within 25 mm below the level of the hob surface or are above the hob surface;*
- *small parts such as gas oven vents, hinges and trim where the width of the **accessible surface** is less than 10 mm;*
- *surfaces within 10 mm of the edge of a gas oven door or vents.*

[b] *Metal is considered coated when a coating having a minimum thickness of 90 µm made of enamel, powder or non-substantially plastic coating is used.*

[c] *The temperature rise limit of plastic also applies for plastic material having a metal finish of thickness less than 0,1 mm.*

[d] *When the thickness of the plastic coating does not exceed 0,4 mm, the temperature rise limits of coated metal for underlying metal apply or the temperature rise limits for glass or ceramic material for underlying glass or ceramic material apply.*

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12 ~~Void~~ Charging of metal-ion batteries

This clause of Part 1 is applicable.

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable except as follows.

13.2 *Modification:*

~~*The limit for **stationary class I motor-operated appliances** is applicable.*~~

Replace the eighth paragraph with the following:

After the appliance has been operated for a duration as specified in 11.7, the leakage current shall not exceed 3,5 mA.

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14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 *Addition*:

For cooking ranges, hobs and similar appliances, compliance is checked by the following tests.

Cooking ranges and hobs are positioned so that the hob surface is horizontal, ***detachable burner heads*** *being in position. A vessel having a diameter approximately 220 mm is completely filled with ~~water containing approximately 1 % NaCl~~ the spillage solution and positioned centrally over the burner. A further quantity of 0,5 l of the solution is poured steadily into the vessel over a period of 15 s.*

This test is made for each burner separately, after removing any residual solution from the appliance.

If controls are mounted below the hob surface, 0,5 l of the ~~saline~~ spillage solution is poured steadily over the top of the hob near the controls over a period of 15 s. If they are mounted in the hob surface, the solution is poured over the controls.

For burners incorporating a temperature sensor, switch or ignition device, 0,02 l of the ~~saline~~ spillage solution is poured over the burner so that it flows over the device.

For ovens or grills, 0,5 l of the ~~saline~~ spillage solution is poured over the floor of the oven or grilling compartment.

For appliances having a drip tray or similar receptacle, the receptacle is filled with the ~~saline~~ spillage solution. A further quantity of the solution, equal to 0,01 l per 100 cm² of the area of the top surface of the receptacle, is poured onto the receptacle through openings in the hob surface. However, the total quantity of solution shall not exceed 3 l.

For hobs provided with a lid, 0,5 l of the ~~saline~~ spillage solution is poured uniformly over the closed lid. When the solution has run off, the surface is dried and a further 0,125 l of the solution is poured steadily from a height of approximately 50 mm onto the centre of the lid over a period of 15 s. The lid is then opened as in normal use.

15.101 Appliances, other than those classified at least IPX4, having ~~flat, horizontal external~~ surfaces ~~measuring 75 mm × 75 mm or greater at a height not exceeding 2 m above the floor after the appliance is installed according to the instructions,~~ on which a vessel, such as a cup or jug, can be placed, shall not have their electrical insulation affected by spillage of liquid. Surfaces that are subjected to the test of 15.2 are not tested in 15.101.

~~NOTE The intent is to identify surfaces on which a vessel, such as a cup or jug, can be placed and are subject to spillage.~~

Compliance is checked by the following test using 0,25 l of the spillage solution specified in 15.2.

The solution is rapidly poured ~~as quickly as possible over the identified surface~~ over flat, horizontal external surfaces measuring 75 mm × 75 mm or greater that are at a height not exceeding 2 m above the floor after the appliance is installed according to the instructions.

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