

# INTERNATIONAL STANDARD



**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

#### FOREWORD

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

This second edition cancels and replaces the first edition published in 2004 including its Amendment 1 (2008) and its Amendment 2 (2012). This edition constitutes a technical revision.

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

- a spillage test is introduced for appliances that have a flat surface on which a cup may be placed (15.101);
- terms and definitions were renumbered;
- some notes have been converted to normative text or deleted (19.11.2, 22.103).

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

CDV	Report on voting
61/5295/CDV	61/5381A/RVC

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 gas, oil and solid-fuel burning appliances having electrical connections.

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.

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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 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.

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

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard 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.

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, ~~it also has to comply~~ safety aspects concerning these electric sources are covered when the appliance also complies with the relevant part 2 of IEC 60335.

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;

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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.

~~As far as is practicable,~~ This standard deals with the ~~common~~ reasonably foreseeable 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;~~

- 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 ~~by young children.~~

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 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.

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 61558-2-3, *Safety of ~~power~~ transformers, reactors, power supply units and ~~similar devices 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

This clause of Part 1 is applicable except as follows.

### 3.5.101

#### **spark-ignition circuit**

electrical circuit for producing sparks which ignite gaseous or liquid fuel

### ~~3.102~~

#### ~~pulse spark ignition~~

~~ignition by sparks having a pulse with a duration of greater than 0,1 ms but less than 100 ms, the interval between pulses being at least 250 ms~~

### ~~3.103~~

#### ~~continuous spark ignition~~

~~ignition by sparks having a pulse with a duration at least 100 ms, or a duration less than 100 ms with the interval between pulses being less than 250 ms~~

### 3.104

#### **pulse repetition ignition**

ignition by sparks having a pulse with a duration not more than 0,1 ms, the interval between pulses being at least 40 ms

### 3.8.106101

#### **lock-out**

**shut-down** requiring a manual operation to restart the appliance

### 3.8.105102

#### **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

## 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.*

### 5.3 Addition:

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

### 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.

## 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.*

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

<del>— pulse spark ignition discharge</del>	<del>100 µC per pulse</del>
<del>— continuous spark ignition</del>	
• <del>current</del>	<del>0,7 mA (peak)</del>
• <del>no load voltage</del>	<del>10 kV (peak)</del>
or	
• <del>discharge</del>	<del>45 µC per pulse</del>
<del>— pulse repetition ignition</del>	
• <del>discharge</del>	<del>45 µC per pulse</del>

~~• pulse repetition frequency 25 Hz~~

**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 <sub>o</sub> ≤ 10 kV and I ≤ 0,7 mA	V <sub>o</sub> ≤ 10 kV and I ≤ 0,7 mA	<sup>a</sup>
40 ms ≤ t < 250 ms	45 μC/pulse	V <sub>o</sub> ≤ 10 kV and I ≤ 0,7 mA	V <sub>o</sub> ≤ 10 kV and I ≤ 0,7 mA (only applicable if d < t) <sup>a</sup>
t ≥ 250 ms	100 μC/pulse	100 μC/pulse	V <sub>o</sub> ≤ 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<sub>o</sub> is the no-load voltage of the ignition circuit. V<sub>o</sub> and I are peak values.

<sup>a</sup> 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. ~~For pulse repetition ignition, the interval between pulses is also measured. For continuous spark ignition, the no-load peak voltage is measured with the spark electrode removed.~~

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.

The quantity of electricity in the discharge is calculated from the current and duration of the pulse.

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.

### 11.8 Addition:

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.

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.

## 12 Void

## 13 Leakage current and ~~dielectric~~ 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.*

## 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 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 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 solution is poured over the burner so that it flows over the device.*

*For ovens or grills, 0,5 l of the saline 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 solution. A further quantity of the solution, equal to 0,01 l per 100 cm<sup>2</sup> 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 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, shall not have their electrical insulation affected by spillage of liquid.

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 a 0,25 l spillage solution of 15.2.*

*The solution is poured as quickly as possible over the identified surface.*

*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** or **creepage distances** below the values specified in Clause 29.*

*The test is repeated for each identified surface, the appliance being dried between each test.*

## 16 Leakage current and electric strength

This clause of Part 1 is applicable except as follows.

### 16.2 Modification:

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

### 16.3 Addition:

The no-load **peak** voltage of **spark-ignition circuits** is measured with the spark electrode removed. The **peak** voltage applied between the **spark-ignition circuit** and metal foil covering the insulation is 1,5 times this value.

NOTE 101 It ~~may~~ could be necessary to insulate the spark gap to prevent it flashing over during the test.

## 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.

### 19.4 Addition:

*The test is repeated with the supply neutral conductor connected to the protective conductor, however any controls are not short-circuited.*

*This test is repeated with the polarity of the supply to the appliance reversed and with the neutral conductor connected to the protective conductor.*

*The additional tests are not carried out on appliances where an all-pole disconnection is used to disconnect all fuel valves.*