INTERNATIONAL STANDARD

IEC 60335-2-100

First edition
2002-09

Household and similar electrical appliances – Safety –

Part 2-100: Particular requirements for hand-held mains-operated garden blowers, vacuums and blower vacuums



Reference number
IEC 60335-2-100:2002(E)

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Publication numbering

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-100: Particular requirements for hand-held mains-operated garden blowers, vacuums and blower vacuums

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This part of International Standard IEC 60335 has been prepared by subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

It forms the first edition of IEC 60335-2-100.

The text of this part of IEC 60335 is based on the following documents:

FDIS	Report on voting
61F/481/FDIS	61F/497/RVD

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

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

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

This part 2 supplements or modifies the corresponding clauses in IEC 60335-1, so as to convert that publication into the IEC standard: Safety requirements for hand-held mains-operated garden blowers, vacuums and blower vacuums.

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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 of Part 1 is to be adapted accordingly.

NOTE 2 The following numbering system is used:

– subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;

– unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;

– additional annexes are lettered AA, BB, etc.

NOTE 3 The following print types are used:

– requirements: in roman type;

– *test specifications: in italic type;*

– notes: in small roman type.

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

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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

A bilingual version of this publication may be issued at a later date.

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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.

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HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – SAFETY –

Part 2-100: Particular requirements for hand-held mains-operated garden blowers, vacuums and blower vacuums

1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of **hand-held** mains-operated electrical **garden vacuums** and **garden blower/vacuums** with or without shredding means and **garden blowers** for use at and around the home or for similar purposes, their **rated voltage** being not more than 250 V single phase.

This standard does not in general take into account:

– the use of appliances by young children or infirm persons without supervision;

– playing with the appliance by young children.

NOTE 101 Attention is drawn to the fact that:

– in many countries additional requirements are specified by the national authorities responsible for the protection of labour.

NOTE 102 This standard does not apply to

– vacuum cleaners intended primarily for use indoors, for water suction cleaning or animal grooming (IEC 60335-2-2).

2 Normative references

This clause of Part 1 is applicable except as follows.

Addition:

ISO 13852:1996, *Safety of machinery – Safety distances to prevent danger zones being reached by the upper limbs*

ISO/TR 12100-1:1992, *Safety of machinery – Basic concepts, general principles for design – Basic terminology, methodology*

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9
normal operation
the appliance is operated at **rated voltage** when fully assembled in the most onerous operating conditions

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3.101
debris collector
part or combination of parts that provides a means for collecting debris

3.102
discharge opening
gap or opening through which debris may be discharged

3.103
guard
part of the appliance or component incorporated to provide protection for the operator and/or bystander

3.104
hand held garden blower
appliance supported by hand, possibly assisted by a harness, etc., which blows debris (subsequently referred to as **blower**)

3.105
hand held garden blower/vacuum
appliance supported by hand, possibly assisted by a harness, etc., which may perform as a **garden blower**, or, as a **garden vacuum** for picking up debris into a debris collector

NOTE In the **vacuum** mode there may also be a facility for shredding material.

3.106
hand held garden vacuum
appliance supported by hand, possibly assisted by a harness, etc., which collects debris into a debris collector

NOTE This may also have a facility for shredding material.

3.107
handle
any part likely to be hand-held for guiding the appliance in normal use

3.108
intended use
any use of the appliance which is reasonably foreseeable, as described in the user instructions, and which is consistent with such activities as operating, starting, stopping or connecting to (or disconnecting from) a power source

3.109
operator control
any **control** requiring operator actuation to perform specific functions

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.

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5.6 *Addition:*

Electronic speed control devices are set for the highest speed.

6 Classification

This clause of Part 1 is applicable except as follows.

6.1 *Replacement:*

Appliances shall be of one of the following classes with respect to protection against electric shock:

class II or **class III**.

Compliance is checked by inspection and by the relevant tests.

7 Marking and instructions

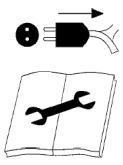
This clause of Part 1 is applicable except as follows.

7.1 *Addition:*

A warning shall be located in a position easily visible to the operator, indicating the following (in words or pictograms/symbols).

– WARNING:
– Switch off and remove plug from mains before cleaning or maintenance.
– Read the operator's manual.
– Do not use in the rain or leave outdoors while it is raining.
– Wear eye protection.
– Keep bystanders away.

7.6 *Addition:*



SWITCH OFF: Remove plug from mains before cleaning or maintenance.



Do not use in the rain or leave outdoors while it is raining.

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Wear eye protection.



Keep bystanders away.

7.9 *Modification:*

Replace the first paragraph by the following:

Operator controls other than those whose purpose is obvious, shall have the function, direction and/or method of operation clearly identified by a durable label or mark.

7.12 *Replacement:*

An instruction sheet shall be supplied with the appliance.

The instructions shall include the substance of the following where appropriate:

a) a repeat of those warnings required to be marked on the appliance together with further explanation, where appropriate. If symbols are used for marking the appliance these shall be repeated and their meanings explained;

b) instructions for the proper assembly of the appliance for use, if the appliance is not supplied in a completely assembled form;

c) instructions for proper adjustment of the appliance;

d) instructions for the safe operation of the appliance, including a recommendation that the appliance should be supplied via a residual current device (RCD) with a tripping current of not more than 30 mA;

e) instructions on the operation of all controls;

f) advice on the use and type of extension cords to be used (not lighter than required by 25.7);

g) instructions for fitting and use of attachments, if any;

h) the substance of the following, where appropriate:

   1) Training

      – Read the instructions carefully. Be familiar with the controls and the proper use of the appliance.

      – Never allow children to use the appliance.

      – Never allow people unfamiliar with these instructions to use the appliance. Local regulations may restrict the age of the operator.

      – Never operate the appliance while people, especially children, or pets are nearby.

      – The operator or user is responsible for accidents or hazards occurring to other people or their property.

   2) Preparation

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- While operating the appliance, always wear substantial footwear and long trousers.
- Do not wear loose clothing or jewellery that can be drawn into the air inlet. Keep long hair away from the air inlets.
- Wear protective goggles while operating
- To prevent dust irritation the wearing of a face mask is recommended
- Before using, check the supply and extension cord for signs of damage and aging. Do not use the appliance if the cord is damaged or worn.
- Never operate the appliance with defective guards or shields, or without safety devices, for example debris collector in place.
- Only use a weather proof extension cable fitted with a coupler according to IEC 60320-2-3.

3) Operation
   - Always direct the cable to the rear away from the appliance.
   - If a cord becomes damaged during use, disconnect the supply cord from the mains immediately. DO NOT TOUCH THE CORD BEFORE DISCONNECTING THE SUPPLY.
   - Do not carry the appliance by the cable.
   - Disconnect the appliance from the mains supply
     - whenever you leave the machine;
     - before clearing a blockage;
     - before checking, cleaning or working on the appliance;
     - if the appliance starts to vibrate abnormally.
   - Operate the appliance only in daylight or in good artificial light.
   - Do not overreach and keep your balance at all times.
   - Always be sure of your footing on slopes.
   - Walk, never run.
   - Keep all cooling air inlets clear of debris.
   - Never blow debris in the direction of bystanders.
4) Maintenance and storage
   - Keep all nuts, bolts and screws tight to be sure the appliance is in safe working condition.
   - Check the debris collector frequently for wear or deterioration.
   - Replace worn or damaged parts.
   - Use only genuine replacement parts and accessories
   - Store the appliance only in a dry place.

7.15 *Replacement:*

Marking giving cautionary information shall be located as close as practicable to the relevant hazard. Such marking shall be in one of the official languages of the country in which the appliance is to be sold or appropriate pictograms/symbols in contrasting colours shall be used. If the marking is cast, embossed or stamped, colours are not required.

8 Protection against access to live parts

This clause of Part 1 is applicable

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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.

11.7 *Replacement:*

Appliances are operated until steady state conditions are reached.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient Overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable.

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 not applicable except as follows.

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19.10 Applicable.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

20.2 *Replacement:*

All power driven components shall be guarded to prevent contact during intended use.

All apertures and safety distances shall conform to relevant clauses of ISO 13852.

All **guards** shall be permanently attached to the appliance and shall not be **detachable** without the use of **tools**. The opening of **guards** shall require the use of a **tool**. Exceptions to this are the opening or removal of interlocked **guards** which disable the protected moving parts, which shall be in accordance with ISO/TR 12100-1.

Compliance is checked by inspection and measurement.

20.101 Hand-held garden blowers, garden vacuums and garden blower vacuums shall have at least one handle.

Additionally, appliances with a mass of more than 6 kg shall also have at least a single shoulder harness and those with a mass of more than 7,5 kg shall have a double shoulder harness.

The gripping length of any handle required by this standard shall be at least 100 mm.

The gripping length of a bail or closed handle shall comprise any length that is straight or curved at a radius of greater than 100 mm together with any blend radius but not more than 10 mm at either or both ends of the gripping surface.

If a straight handle is supported centrally (i.e. 'T' type) the gripping length shall be calculated as follows:

a) for handles with a periphery (not included the support) less than 80 mm the gripping length is the sum of the two parts either side of the support;
b) for handles with a periphery (not including the support) of 80 mm or more the gripping length is the complete length from end to end.

Where appropriate the part of the handle containing the appliance control actuator shall be counted as part of the handle gripping length. Finger grip or similar superimposed profiles shall not affect the method of calculating handle gripping length.

The operator shall be able to switch off without releasing the hold on the appliance.

Compliance is checked by inspection.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

The impact energy shall be 1.0 J ± 0.05 J.

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22 Construction

This clause of Part 1 is applicable.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1 *Addition:*

Mains switches shall have a contact separation of at least 3 mm.

24.1.3 *Modification:*

Switches shall be tested for 10 000 operations.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 *Replacement:*

Appliances shall be provided with a **supply cord** or an appliance inlet.

25.5 *Replacement:*

Appliances shall be provided with one of the following:

– a **supply cord** not less than 10 m in length with **type X attachment**;
– a **supply cord** of length not exceeding 0,5 m with **type X** or **Y attachment** and terminating in a cable coupler;
– an appliance inlet.

25.7 *Modification:*

Replace the first paragraph by the following:

Supply cords shall not be lighter than:

– if rubber insulated, ordinary tough rubber sheathed flexible cord (code designation 60245 IEC 53);
– if polyvinyl chloride insulated, ordinary polyvinyl chloride sheathed flexible cord (code designation 60227 IEC 53);

In some countries these supply cords are not suitable and the supply cord shall be ordinary polychloroprene sheathed flexible cord 60245 IEC 57.

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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.

30 Resistance to heat and fire

This clause of Part 1 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.

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Annexes

The annexes of Part 1 are applicable.

Bibliography

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Q2 Please tell us in what capacity(ies) you bought the standard *(tick all that apply).* I am the/a:

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librarian ❑
researcher ❑
design engineer ❑
safety engineer ❑
testing engineer ❑
marketing specialist ❑
other.....

Q3 I work for/in/as a: *(tick all that apply)*

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consultant ❑
government ❑
test/certification facility ❑
public utility ❑
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military ❑
other.....

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general reference ❑
product research ❑
product design/development ❑
specifications ❑
tenders ❑
quality assessment ❑
certification ❑
technical documentation ❑
thesis ❑
manufacturing ❑
other.....

Q5 This standard meets my needs: *(tick one)*

not at all ❑
nearly ❑
fairly well ❑
exactly ❑

Q6 If you ticked NOT AT ALL in Question 5 the reason is: *(tick all that apply)*

standard is out of date ❑
standard is incomplete ❑
standard is too academic ❑
standard is too superficial ❑
title is misleading ❑
I made the wrong choice ❑
other .....

Q7 Please assess the standard in the following categories, using the numbers:
(1) unacceptable,
(2) below average,
(3) average,
(4) above average,
(5) exceptional,
(6) not applicable

timeliness.....
quality of writing.....
technical contents.....
logic of arrangement of contents .....
tables, charts, graphs, figures.....
other .....

Q8 I read/use the: *(tick one)*

French text only ❑
English text only ❑
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ISBN 2-8318-6590-5



ICS 13.120; 65.060.70

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GENEVA, SWITZERLAND

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