

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

Household and similar electrical appliances – Safety –  
Part 2-91: Particular requirements for walk-behind and hand-held lawn trimmers  
and lawn edge trimmers

Appareils électrodomestiques et analogues – Sécurité –  
Partie 2-91: Règles particulières pour les coupe-gazon et les coupe-bordures  
portatifs et à conducteur à pied



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**HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES –  
SAFETY –****Part 2-91: Particular requirements for walk-behind  
and hand-held lawn trimmers and lawn edge trimmers**

## FOREWORD

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International Standard IEC 60335-2-91 has been prepared by IEC subcommittee 61F: Safety of hand-held motor-operated electric tools, of IEC technical committee 61: Safety of household and similar electrical appliances.

This third edition cancels and replaces the second edition published in 2002. It constitutes a technical revision. Main changes in this edition include the revised endurance test in Clause 18; Annex B, which allows for battery-powered trimmers; and addition of informative Annexes BB, CC and EE on vibration, noise and safety instructions.

This bilingual version, published in 2008-09, corresponds to the English version.

The text of this standard is based on the following documents:

FDIS	Report on voting
61F/710/FDIS	61F/713/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.

The French version of this standard has not been voted upon.

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

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 walk-behind and hand-held lawn trimmers and lawn edge trimmers.

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 proper: 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.

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.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

## 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.

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 2-91: Particular requirements for walk-behind and hand-held lawn trimmers and lawn edge trimmers

#### 1 Scope

This clause of Part 1 is replaced by the following.

This International Standard deals with the safety of electric powered **walk-behind** and **hand-held lawn trimmers** and **lawn edge trimmers**, with **cutting element(s)** of non-metallic filament line or freely pivoting non-metallic cutter(s), with a kinetic energy of not more than 10 J each, used by a standing operator for cutting grass, their **rated voltage** being not more than 250 V for a.c. or 50 V d.c..

In this standard, **hand-held** and **walk-behind lawn trimmers** and **lawn edge trimmers** are referred to collectively as trimmer(s).

So far as is practicable, this standard deals with the common hazards presented by trimmers which are encountered by all persons in the normal use and reasonably foreseeable misuse of the trimmers.

NOTE 101 Attention is drawn to the fact that 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.

This standard does not apply to

- scissor type or **lawn trimmers** and **lawn edge trimmers** with **cutting means** other than those described above;
- self-propelled **lawn trimmers** or **lawn edge trimmers**;
- **lawn trimmers** or **lawn edge trimmers** which do not have a distance of at least 600 mm between the **cutting means control** and the **cutting head**;
- battery-powered trimmers fitted with batteries that have to be removed for charging.

NOTE 102 Requirements for tools with this type of battery can be found in Annexes K and L of IEC 60745-1.

EMC and environmental aspects, except noise, have not been considered in this standard.

NOTE 103 The method of calculating the kinetic energy for the purposes of this standard is given in 22.103.

#### 2 Normative references

This clause of Part 1 is applicable except as follows.

*Addition:*

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60320-2-3, *Appliance couplers for household and similar general purposes – Part 2-3: Appliance couplers with a degree of protection higher than IPX0*

ISO 354:2003, *Acoustics – Measurement of sound absorption in a reverberation room*

ISO 3744:1994, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Engineering method in an essentially free field over a reflecting plane*

ISO 3767-1:1998, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Part 1: Common symbols*

ISO 3767-3:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays – Part 3: Symbols for powered lawn and garden equipment*

ISO 8662-1:1988, *Hand-held portable power tools – Measurement of vibrations at the handle – Part 1: General*

ISO 11201:1995, *Acoustics – Noise emitted by machinery and equipment – Measurement of emission sound pressure levels at a work station and at other specified positions – Engineering method in an essentially free field over a reflecting plane*

ISO 12100-1:2003, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

ISO 11688-1:1995, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning*

ISO 11684:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Safety signs and hazard pictorials – General principles*

### 3 Definitions

This clause of Part 1 is applicable except as follows.

#### 3.1.9

*Replacement:*

##### **normal operation**

operation of the appliance at rated voltage with the load necessary to attain rated power input

NOTE The trimmer is operated at **no-load**. Automatic line extenders must be disabled.

#### 3.5.2

*Replacement:*

##### **hand-held appliance**

appliance which is supported by hand, possibly assisted by wheel(s), skids or harness etc. and constructed such that it cannot maintain its operating position without being held by an operator

#### 3.101

##### **walk-behind appliance**

appliance which is ground supported, controlled by an operator walking behind and constructed such that it maintains its operating position without being held by an operator

**3.102****lawn trimmer**

grass trimming machine where the **cutting means** operates in a plane approximately parallel to the ground

**3.103****lawn edge trimmer**

grass trimming machine where the **cutting means** operates in a plane approximately perpendicular to the ground

**3.104****cutting means**

mechanism used to provide the cutting action in which one or more **cutting elements**, cutting by impact, rotate about an axis normal to the cutting plane

**3.105****cutting element**

single non-metallic filament line or freely pivoting non-metallic cutter

**3.106****cutting head**

support system for the **cutting element**

**3.107****cutting means control**

device activated by the operator's hand or finger, for controlling the cutting mean's movement

**3.108****power switch**

switch that controls the primary operating means of the trimmer

**3.109****no-load**

operation of the appliance at rated voltage with new **cutting means**, extendable monofilament line being trimmed to the maximum cutting length less 5 mm

**4 General requirement**

This clause of Part 1 is applicable.

**5 General conditions for the tests**

This clause of Part 1 is applicable.

**6 Classification**

This clause of Part 1 is applicable except as follows.

**6.1 Replacement:**

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

*Compliance is checked by inspection and by the relevant tests.*

## 6.2 Addition:

**Walk-behind trimmers of class II** or with **class II** parts shall be classified at least as IPX4.

## 7 Marking and instructions

This clause of Part 1 is applicable except as follows.

### 7.1 Addition:

*Add the following new indents:*

- manufacturer's address or country of origin;
- year of manufacture, in 4 digits.

*Add the following new paragraphs:*

The following warnings shall be located in easily visible positions, indicating:

WARNING:

- Read instruction manual.
- Keep bystanders away.

Except for **walk-behind lawn trimmers** with 360 degree guarding, the machine shall also be marked with the following:

- Wear eye protection.

Mains-operated appliances shall also be marked with the substance of the following:

- Disconnect the mains plug if the cord is damaged or entangled.

Additionally, **hand-held lawn trimmers** and **hand-held lawn edge trimmers** shall be marked with the following:

- Do not expose to moisture.

Marking giving cautionary information shall be located as close as practicable to the relevant hazard. Such marking shall either be in one of the official languages of the country in which the appliance is to be sold or the safety signs and symbols according to Annex AA shall be used. Colours shall be in accordance with ISO 3767-1 and ISO 3767-3 and/or ISO 11684 as appropriate unless the symbols are cast, embossed or stamped when colours are not required. If symbols and/or safety signs are used, their significance shall be described in the instruction manual.

### 7.12 Addition:

An operator's manual shall be supplied with the machine. This shall include

- a) a repeat of those warnings required to be marked on the appliance together with further explanation, where appropriate. Where symbols or safety signs are used in the marking on the appliance, their function shall be 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 and maintenance of the appliance;
- d) where parts are consumable, the part number of the replacement shall be specified;
- 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 the safe operation, preparation, maintenance and storage of the appliance such as those given as an example in Annex EE.

## 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 not applicable.

## 11 Heating

This clause of Part 1 is applicable except as follows.

11.4 Not applicable.

11.5 Replacement:

*The trimmer is operated in still air under normal load operation until a steady state is reached, the torque being applied is measured. While the torque is maintained, the voltage is then adjusted to 0,94 times the rated voltage or 1,06 times the rated voltage, whichever is the most unfavourable.*

11.6 Not applicable.

11.7 Replacement:

*Appliances are operated until steady conditions are established.*

## 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 replaced as follows.

**18.101** Trimmers shall be so constructed that, in normal use, there will be no electrical or mechanical failure that might impair compliance with this standard. The insulation shall not be damaged and contacts and connections shall not work loose as a result of heating, vibrations, etc.

Moreover, overload protection devices shall not operate under normal running conditions.

*Compliance is checked by the test of 18.102.*

*Immediately after the test, the tool shall withstand an electric strength test as specified in Clause 15. Connections shall not have worked loose, and there shall be no deterioration impairing safety in normal use.* (standards.iteh.ai)

**18.102** The tool is operated at **no-load** for 15 h of operation at a voltage equal to 1,1 times rated voltage, and then for 15 h at a supply voltage equal to 0,9 times rated voltage. The trimmer may be operated for a number of periods, each period being not less than 7 h.

During this test, the trimmer is maintained according to the instruction manual and replacement of the carbon brushes is allowed.

During these tests, overload protection devices shall not operate.

## 19 Abnormal operation

This clause of Part 1 is applicable except as follows.

**19.7** Not applicable.

## 20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows.

### 20.2 Replacement:

All power driven transmission parts (other than the **cutting means**) shall be guarded to prevent the operator's contact with these parts.

The principles set out in ISO 12100-1 shall be followed when developing a guarding system.

All guards shall be either permanently attached, or secured to prevent removal without the use of tools in accordance with 3.25.1 of ISO 12100-1, or the construction of the appliance

shall be such that it cannot be used without the guard in its guarding position in accordance with 3.25.4 of ISO 12100-1.

*Compliance is checked by inspection.*

## 20.101 Guarding of cutting means

### 20.101.1 Lawn trimmers

**Lawn trimmers** shall be guarded on the operator's side, as a minimum, to the extent shown in Figure 101.

The radius X of the guard shall not be smaller than the major swept radius of the **cutting head** and the guard shall extend beyond the plane of the **cutting element** by at least 3 mm for **walk-behind lawn trimmers** and 10 mm for **hand-held lawn trimmers**. The guard shall extend at least 45° from the axis of the handle on the side where the **cutting element** is moving away from the operator and at least 90° from the axis of the handle on the side where the **cutting element** is moving towards the operator. The vertices of these angles lie on the axis of the **cutting head** spindle.

If the guarding is less than a total of 360°, the direction of rotation of the **cutting element(s)** shall be marked on the **lawn trimmer**.

*Compliance is checked by inspection and measurement.*

### 20.101.2 Lawn edge trimmers

**Lawn edge trimmers** shall be guarded, as a minimum, to the extent shown in Figure 102. The radius X of the guard shall not be smaller than the major swept radius of the **cutting head**. The guard shall extend beyond the plane of the **cutting element** by at least 10 mm. With the **lawn edge trimmer** in its normal position of use, the guard shall extend a minimum of 90° from the vertical towards the ground on the side where the **cutting element** is moving upwards and a minimum of 45° from the vertical towards the ground on the side where the **cutting element** is moving downwards. The vertices of these angles lie on the axis of the **cutting head** spindle.

If the guarding is less than a total of 360°, the direction of rotation of the **cutting elements** shall be marked on the **lawn edge trimmer**.

*Compliance is checked by inspection and measurement.*

### 20.101.3 Guarding of cutting means

All guards shall be imperforate and shall be either permanently attached or secured to prevent removal without the use of tools in accordance with 3.25.1 of ISO 12100-1, or the construction of the appliance shall be such that it cannot be used without the guard in its guarding position in accordance with 3.25.4 of ISO 12100-1.

*Compliance is checked by inspection.*

## 20.102 Controls

Controls, where the purpose is not obvious to the user, shall have the function, direction and method of operation clearly identified by a durable marking.

Detailed instructions on the operation of all controls shall be provided in the instruction handbook.