



SLOVENSKI STANDARD
SIST EN 60335-2-77:2001

01-julij-2001

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Safety of household and similar electrical appliances -- Part 2-77: Particular requirements for pedestrian controlled mains-operated lawnmowers

Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke -- Teil 2-77: Besondere Anforderungen für handgeführte netzbetriebene Rasenmäher

Sécurité des appareils électrodomestiques et analogues -- Partie 2-77: Règles particulières pour les tondeuses à gazon fonctionnant sur le réseau et à conducteur à pied

Ta slovenski standard je istoveten z: EN 60335-2-77:2000

ICS:

65.060.70 Vrtnarska oprema Horticultural equipment

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EUROPEAN STANDARD

EN 60335-2-77

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2000

ICS 65.060.70

English version

Safety of household and similar electrical appliances
Part 2-77: Particular requirements for pedestrian controlled
mains-operated lawnmowers
(IEC 60335-2-77:1996, modified)

Sécurité des appareils
électrodomestiques et analogues
Partie 2-77: Règles particulières pour
les tondeuses à gazon fonctionnant
sur le réseau et à conducteur à pied
(CEI 60335-2-77:1996, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2-77: Besondere Anforderungen
an handgeführte netzbetriebene
Rasenmäher
(IEC 60335-2-77:1996, modifiziert)

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This European Standard was approved by CENELEC on 2000-01-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 60335-2-77:1996, prepared by SC 61F, Safety of hand-held motor-operated electric tools, of IEC TC 61, Safety of household and similar electrical appliances, together with common modifications prepared by the Technical Committee CENELEC TC 61F, Hand-held and transportable electric motor-operated tools, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60335-2-77 on 2001-01-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-05-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2003-01-01

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances, Part 1: General requirements. It was established on the basis of the 1994 edition of that standard.

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 pedestrian controlled mains-operated lawnmowers.

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.

This European Standard has been prepared under a mandate given to CEN and CENELEC by the European Commission and the European Free Trade Association and supports the essential health and safety requirements of the Machinery Directive.

Compliance with the clauses of EN 60335-1 together with this part 2 provides one means of conforming with the essential health and safety requirements of the Directive.

Specific requirements for the reduction for the risk arising from noise and vibration through the design of the tool are not given as this reflects the current state of the art. As with any standard technical progress will be kept under review so that any developments can be taken into account.

Warning: Other requirements and other EC Directives can be applicable to the products falling within the scope of this standard.

NOTE 1 In this standard the following print types are used:

- Requirements proper;
- *Test specifications*
- Explanatory matter.

Words in **bold** in the text are defined in clause 2. When a definition of part 1 concerns an adjective, in this part the adjective and the associated noun are also in bold.

NOTE 2 Subclauses and figures which are additional to those in part 1 are numbered starting from 101. Annexes which are additional to those in part 1 are lettered AA, BB, etc.

NOTE 3 The references of subclauses, notes, figures and annexes which are additional to those of IEC 60335-2-77 are prefixed with the letter Z.



Corrigendum to EN 60335-2-77:2000

English version

Foreword

At the end of the first paragraph, **replace** "2001-01-01" by "2000-01-01".

December 2000

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Endorsement notice

The text of the International Standard IEC 60335-2-77:1996 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

1 Scope

1.1 Replace the third paragraph by:

This standard is not applicable to **rotary lawnmowers** for which the **cutting means** is a generally circular central drive unit on which is mounted, either one or more non-metallic filaments or one or more non-metallic, pivotally mounted cutting elements. These cutting elements rely on centrifugal force to achieve cutting, with the kinetic energy of a single cutting element not exceeding 10 joules.

Delete the note at the end of the clause.

2 Definitions

Add:

2.Z101 **grass catcher adaptor**: A device to modify a **lawnmower** from a non-collecting type to a collecting type.

3

General requirement

[SIST EN 60335-2-77:2001](https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001)

[https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-](https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001)

Replace by:

[e34abe2709bf/sist-en-60335-2-77-2001](https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001)

This clause of part 1 is applicable.

7 Marking and instructions

7.1 Replace by:

7.1 *Replacement:*

Appliances shall be marked with the

- **rated voltage** or **rated voltage range** in volts;
- symbol for nature of supply, unless the **rated frequency** is marked;
- **rated power input** in watts or kilowatts or **rated current** in amperes;
- name, trade mark or identification mark of the manufacturer or responsible vendor;
- model or type reference;
- symbol for **class II construction**, for **class II appliances** only;
- IP number according to degree of protection against ingress of water, other than IPX0;
- manufacturer's address or country of origin;
- any mandatory mark showing compliance with legislation by reference to this standard.

Compliance is checked by inspection.

NOTE 1 The first numeral of the IP number need not be marked on the appliance.

NOTE 2 Additional markings are allowed provided they do not give rise to misunderstanding.

NOTE 3 If components are marked separately, the marking of the appliance and that of the components are to be such that there can be no doubt with regard to the marking of the appliance itself.

Marking giving cautionary information shall be located as close as practical to the relevant hazard. Such marking shall be in one of the official languages of the country in which the machine 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.

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

WARNING:

KEEP BYSTANDERS AWAY

SWITCH OFF AND REMOVE PLUG FROM MAINS BEFORE ADJUSTING, CLEANING OR IF THE CORD IS ENTANGLED OR DAMAGED.

READ THE INSTRUCTIONS SHEET.

KEEP THE SUPPLY FLEXIBLE CORD AWAY FROM THE CUTTING BLADES.

If pictograms are used they shall be as shown in annex ZAA for the text indicated.

For rotary mowers:

- the **cutting means** shall be marked for identification;
- if a **grass catcher adaptor** is used, instructions shall be affixed to the **lawnmower** near the **discharge opening** and to the **grass catcher adaptor** stating that the **lawnmower** shall not be operated without either the entire **grass catcher** or the **guard** in place.

7.6 Delete the addition.

20 **Stability and mechanical hazards**

20.2 **Replace by:**

20.2 *Replacement:*

To prevent unexpected operation which may result in a hazard, only manually reset cut-outs and those requiring the operating **control** to be released are allowed.

All power driven components except the **cutting means** and the ground-contacting parts of power propelled mowers shall be guarded to prevent contact with these parts during normal operation.

All apertures and safety distances shall conform to 4.5.2 and 4.5.3 of EN 294:1992 unless otherwise specified in this standard.

Rotating covers or discs shall have a continuous unbroken or smooth surface.

Guards shall be provided to prevent accidental contact with hazardous servicing points when the machine is serviced as recommended by the manufacturer.

Where a **guard** is designed to be opened or removed and which exposes a hazard, a safety sign warning of the hazard shall be located on the **guard** or adjacent to the hazard.

All **guards** shall be permanently attached to the machine and shall not be detachable without the use of **tools**. The opening of **guards**, except for the following, shall require the use of a **tool**:

- a) the opening or removal of interlocked **guards** which disable the protected moving parts;
- b) the opening of hinged, self-closing **guards** for grass **discharge chutes**.

Compliance is checked by inspection and measurement.

20.101.1 **Replace** the first paragraph by:

The **controls** shall accommodate the 5th to 95th percentile adult operator as specified in ISO 3411.

20.103.1.1 In the second paragraph **replace** "(see 20.104.4)" by "(see 20.103.4)".

Add a third paragraph:

On the operator side of the **mower** a rear wall of the **blade** enclosure or a barrier shall extend at least 120 mm from the nearest point of the **blade** tip circle and rise by an angle of not more than 5° from the horizontal. See figure Z101.

20.103.1.2 **Replace** by:

20.103.1.2 *Front opening*

Mowers may be provided with a front opening in the front wall of maximum width as shown in figures Z102 and Z103 in which case the following two conditions shall be fulfilled:

- a) they shall satisfy the foot probe test given in 20.103.4,
- b) all tangential lines from the **cutting means** circle, in or above the plane of the **cutting means** circle and in the direction of rotation of the **blade** shall intersect the **blade** enclosure structure.

NOTE Figure Z104 shows an example of a structure meeting this requirement.

20.103.1.3 **Replace** by:

20.103.1.3 *Discharge openings (chutes)*

When open **discharge chutes** are provided, no tangential line which passes through the **discharge chute** from the **cutting means tip circle** in or above the plane of the **cutting means tip circle** and in the direction of rotation of the **cutting means** shall intersect the operator target zone (figure 101) without first contacting the **cutting means enclosure** or **guard**.

Grass catchers are not subject to the tangential line test but if the chute is not completely covered by the **grass catcher** the gaps are probed.

Add:

20.103.1.Z101 *Tangential lines*

The tangential lines referred to in 20.103.1.2 and 20.103.1.3 shall be probed by means of a 3 mm diameter rod applied with minimal force from the outside of the machine.

20.103.2.2 **Replace by:**20.103.2.2 *Measurement of **cutting means stopping time***

The **stopping time** of the **cutting means** shall be measured as detailed below during the test of 5 000 start/stop cycles, see annex ZBB for further information. The 5 000 cycles do not have to be continuous. The cycle time shall be decided by the manufacturer but shall not exceed 100 s 'on' and 20 s 'off'. Before the test is started ten operations of the test cycle shall be carried out.

The **blade stopping time** shall be measured for the following:

- each of the first five cycles of the 5 000 cycle test sequence (i.e. not including the ten preparatory operations; and
- each of the last five cycles of the 5 000 test cycles.

No other **stopping times** shall be recorded.

The **stopping time** is measured from the moment of release of the blade **operator presence control** until the last time a cutting **blade** passes the sensing device, the time recording measurement system shall have a total accuracy of 25 ms.

The measured **stopping time** shall not be more than that specified in 20.103.2.1.

20.103.3 **Replace the third and second from last paragraphs by:**

For **cutting widths** equal to and less than 1 200 mm, for each test (500 projectiles), not more than 30 projectiles shall **hit** the target panels between the base and the 450 mm line (lower and middle elevation area) of which not more than six may **hit** the target panels above the 300 mm line (middle elevation area). There shall be no **hits** above the 450 mm line (top elevation area) and there shall be not more than two **hits** in the operator target area between the base and the 450 mm line.

For **cutting widths** greater than 1 200 mm, for each test (500 projectiles), not more than 40 projectiles shall **hit** the target panels between the base and the 450 mm line (lower and middle elevation area) of which not more than six may **hit** the target panels above the 300 mm line (middle elevation area). There shall be no **hits** above the 450 mm line (top elevation area) and there shall be not more than two **hits** in the operator target area between the base and the 450 mm line.

20.104.1.3 **Replace by:**

20.104.1.3 Cutting cylinders of free discharge and of rear discharge appliances shall be covered from above with a **guard** that extends so that its projection on the horizontal plane covers at least the projection of the cylinder on the same horizontal plane, when any **grass catcher** has been removed. See figure 108.

Free discharge denotes throwing out grass clippings without guiding or collecting.

Rear discharge denotes throwing out grass clippings so that they will be collected in a **grass catcher** which is located behind the cylinder.

20.104.1.4 **Replace by:**

20.104.1.4 Cutting cylinders of front discharge appliances shall be covered from the rear with a **guard** that extends so that its projection on the vertical plane covers at least the projection of the cylinder on the same vertical plane, less up to 25 mm. See figure 109.

Front discharge denotes throwing out grass clippings so that they will be collected in a **grass catcher** which is located in front of the cylinder.

Compliance with the requirements of 20.104.1 is checked by measurement and inspection.

21 Mechanical strength

21.101.2 Add after the note below the table:

The mower shall be constrained in a suitable manner such that its specified position relative to the injection point is maintained throughout the test. The constraint(s) shall not obstruct the free passage of the projectiles from under the machine.

Replace the text under item a) by :

- a) a hole in the **cutting means enclosure, guard(s) or grass catcher** which has allowed the ball to pass through. A hole in a secondary enclosure, such as an internal baffle, shall not be considered a failure;

25 Supply connection and external flexible cables and cords

25.1 Replace the second paragraph by:

Appliance inlets shall not allow the introduction of a connector complying with the standard sheets of EN 60320 except EN 60320-2-3.

25.5 Replace the third indent by:

- an appliance inlet. <https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-c344bc270201/sist-en-60335-2-77-2001> If not complying with EN 60320-2-3, it shall be supplied with the appropriate mating connector.

25.7 Replace by:

25.7 *Replacement:*

Supply cords shall not be lighter than:

- if rubber insulated, ordinary polychloroprene sheathed flexible cord (code designation H05 RN-F) ;
- if polyvinyl chloride insulated, ordinary polyvinyl sheathed flexible cord (code designation H05 VV-F).

Figure 102 Replace by Figure Z102.

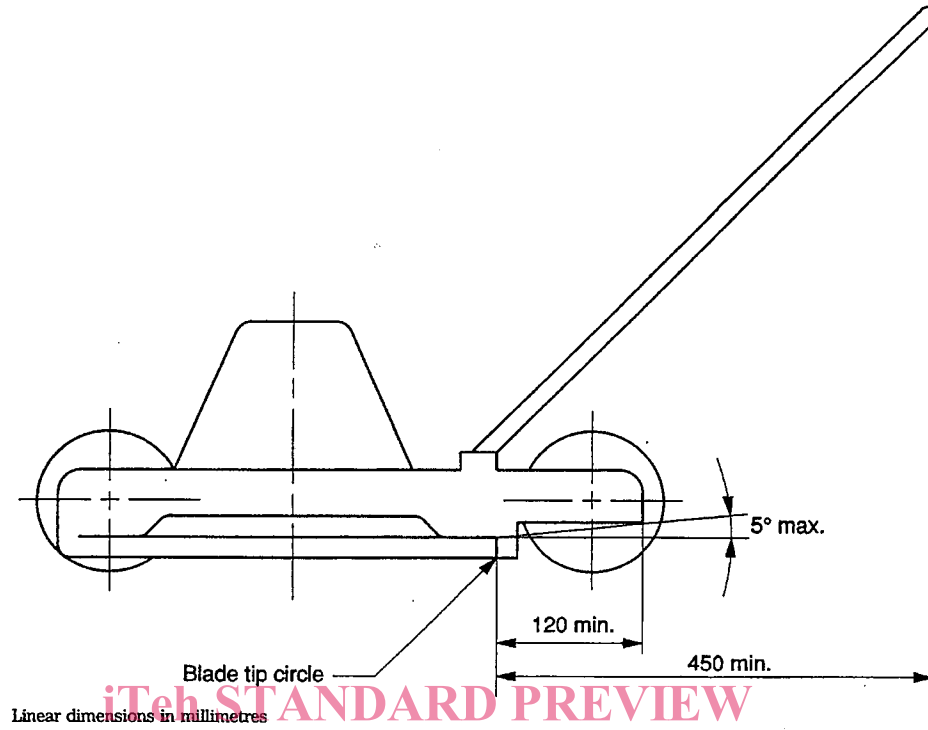
Figure 103 Replace by Figure Z103.

Annex A Replace by:

Annex A
(normative)**Normative references**
International publications with their corresponding European publications*Addition:*

<u>IEC standard</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
60320-2-3	1998	Appliance couplers for household and similar general purposes -- Part 2-3: Appliance coupler with a degree of protection higher than IPX0	EN 60320-2-3	1998
<u>ISO standard</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
-	-	Safety of machinery - Safety distance to prevent danger zones being reached by the upper limbs	EN 294	1992
2758	1983	Paper - Determination of bursting strength	-	-
3411	1982	Earth-moving machinery - Human physical dimensions of operators and minimum operator space envelope	EN 23411	1988
5395	1990	Power lawn-mowers, lawn tractors, lawn and garden tractors, professional mowers and lawn and garden tractors with mowing attachments – Definitions, safety requirements and test procedures	-	-

Annex AA Delete the whole annex.



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Figure Z101 – Handle distance and rear blade enclosure
<https://standards.iteh.ai/catalog/standards/sist/19547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001>

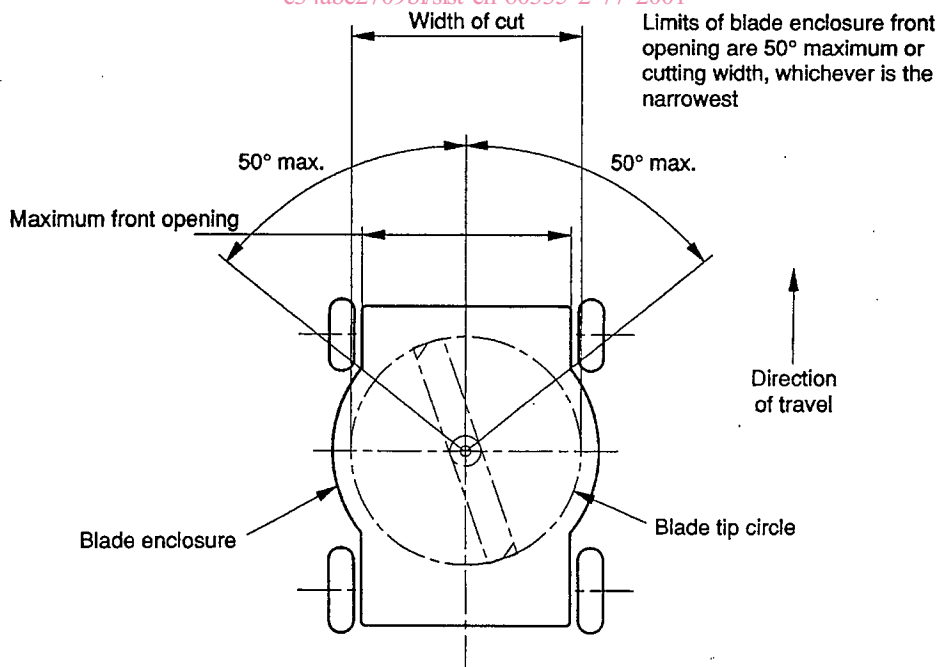


Figure Z102 – Front opening restrictions for single spindle lawnmowers

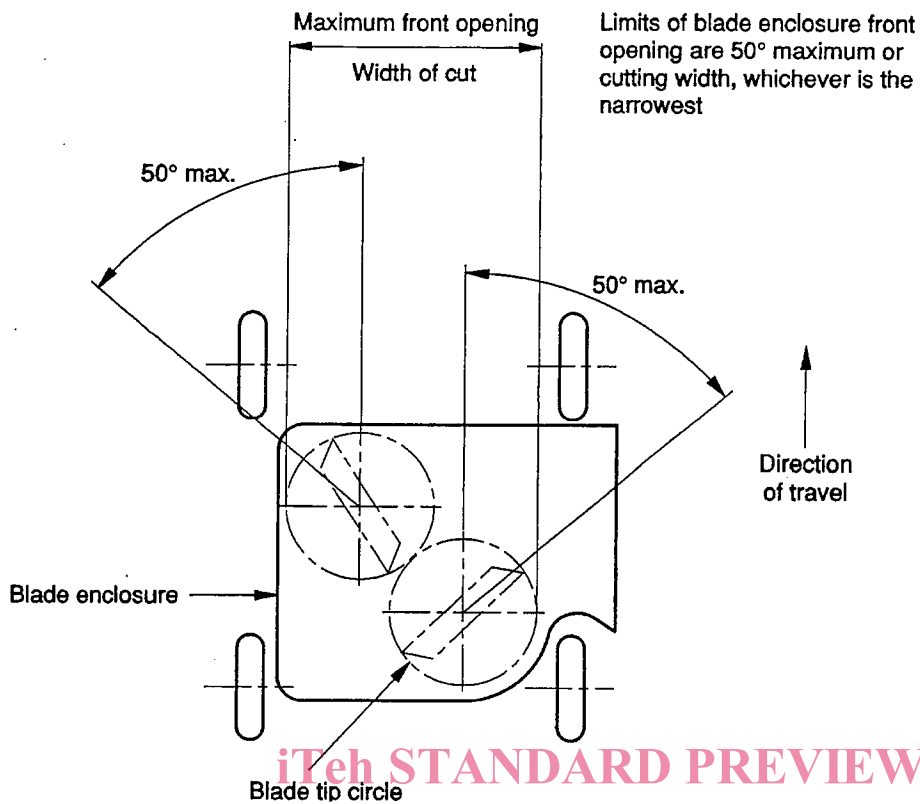


Figure Z103 – Front opening restrictions for multi spindle-lawnmowers

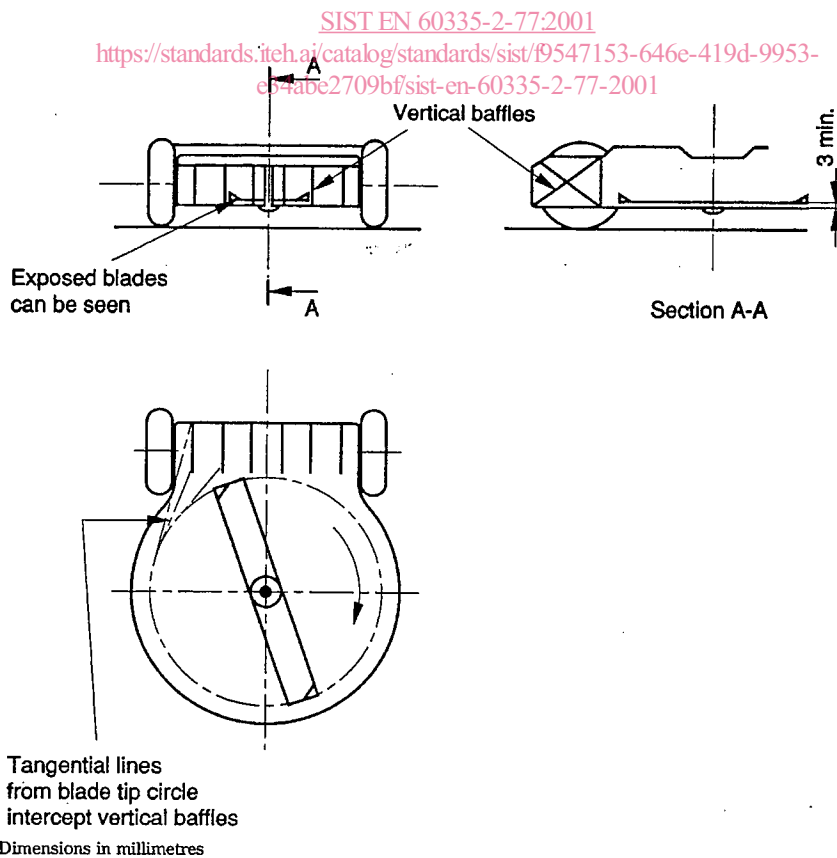
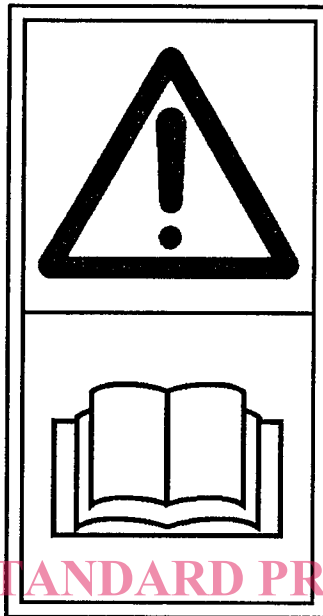


Figure Z104 – Construction for front opening

Annex ZAA
(normative)

Pictograms for lawnmower marking



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Figure ZAA.1 – Pictogram illustrating “Read instruction sheet”

[SIST EN 60335-2-77:2001](https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001)

<https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001>



It is recommended that the rectangular box is replaced by a sketch more closely representing the machine.

Figure ZAA.2 – Pictogram illustrating “Keep bystanders away”

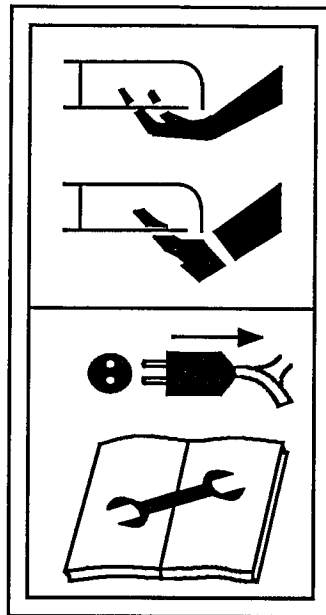


Figure ZAA.3 - Pictogram illustrating
“Beware of sharp blades – remove plug from mains before maintenance or if cord is damaged.
Keep supply flexible cord away from cutting blades.”

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[SIST EN 60335-2-77:2001](https://standards.iteh.ai/catalog/standards/sist/9547153-646e-419d-9953-e34abe2709bf/sist-en-60335-2-77-2001)

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