



**SLOVENSKI STANDARD**  
**SIST EN 836:1998+A4:2011**  
**01-oktober-2011**

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**Oprema za nego vrta - Gnane vrtno kosilnice - Varnost**

Garden equipment - Powered lawnmowers - Safety

Gartengeräte - Motorgetriebene Rasenmäher - Sicherheit

Matériel de jardinage - Tondeuses à gazon à moteur - Sécurité

**Ta slovenski standard je istoveten z: EN 836:1997+A4:2011**

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**ICS:**

65.060.70      Vrtnarska oprema      Horticultural equipment

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EUROPEAN STANDARD

**EN 836:1997+A4**

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**Garden equipment - Powered lawnmowers - Safety**Matériel de jardinage - Tondeuses à gazon à moteur -  
Sécurité

Gartengeräte - Motorgetriebene Rasenmäher - Sicherheit

This European Standard was approved by CEN on 12 March 1997 and includes includes Corrigendum 1 issued by CEN on 13 December 2006, Amendment 1 approved by CEN on 18 September 1997, Amendment 2 approved by CEN on 4 February 2001, Amendment 3 approved by CEN on 17 December 2003 and Amendment 4 approved by CEN on 23 April 2010.

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









EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Contents

Page

|  |    |
|--|----|
| Foreword.....  | 4  |
| Introduction .....   | 5  |
| 1 Scope .....  | 5  |
| 2 Normative references .....   | 5  |
| 3 Definitions .....  | 7  |
| 4 Safety requirements and/or measures .....  | 10 |
| 4.1 General.....   | 10 |
| 4.2 Specific requirements for rotary lawnmowers .....  | 20 |
| 4.3 Specific requirements for cylinder lawnmowers.....   | 48 |
| 5 Information for use .....  | 53 |
| 5.1 Instruction for use .....  | 53 |
| 5.2 Minimum marking .....  | 54 |
| Annex A (normative) List of hazards.....   | 56 |
| Annex B (informative) Examples of pictograms that may be used for lawnmower marking .....  | 61 |
| B.1 Read operator's manual .....   | 61 |
| B.2 Keep bystanders away .....   | 61 |
| Annex C (normative)  Test enclosure target panels – Corrugated fibreboard penetration test  .....  | 63 |
| C.1 Purpose.....   | 63 |
| C.2 Test fixture.....  | 63 |
| C.3 Fibreboard samples.....  | 63 |
| C.4 Procedure .....  | 63 |
| C.5 Acceptance criteria.....   | 63 |
| Annex D (normative) Target panel elevation areas and suggested data sheet for thrown object test (see 4.2.2.3) .....   | 65 |
| D.1 Target elevation areas (see  Figure 10  ).....   | 65 |
| D.2 Suggested data sheet.....  | 65 |
| Annex E (normative) Test enclosure (see 4.2.2.4) .....   | 67 |
| E.1 Base .....   | 67 |
| E.2 Target composition.....  | 67 |
| Annex F  (informative)  Safety instructions - Rotary lawnmowers, (pedestrian and ride-on) - Cylinder lawnmowers (pedestrian and ride-on) (see 5.1.2) ..... | 70 |
| F.1 General.....   | 70 |
| F.2 Safe operation practices for pedestrian-controlled rotary lawnmowers .....   | 70 |
| F.3 Safe operation practices for ride-on (riding) rotary machines .....  | 72 |
| F.4 Safe operation practices for pedestrian-controlled cylinder lawnmowers .....   | 74 |
| F.5 Safe operation practices for ride-on (riding) cylinder lawnmowers.....   | 75 |
| Annex G (normative)  Vibration  .....  | 77 |
| G.1 Quantities to be measured.....   | 77 |
| G.2 Instrumentation.....   | 77 |
| G.3 Measurement direction and measurement location.....  | 77 |
| G.4 Test procedure .....   | 77 |
| G.5 Measurement procedure .....  | 78 |
| G.6 Determination of the measurement result .....  | 79 |
| Annex H (normative)  Noise test code – Engineering method (grade 2)  .....   | 82 |
| H.0 Scope .....  | 82 |

|           |   |    |
|-----------|---|----|
| H.1       | Sound power level determination.....  | 82 |
| H.2       | A-weighted emission sound pressure level determination .....  | 84 |
| H.3       | Requirements for test floor .....   | 84 |
| H.4       | Installation, mounting and operating conditions .....   | 85 |
| H.5       | Measurement uncertainties and declaration of noise emission values .....  | 86 |
| H.6       | Information to be recorded and reported.....  | 86 |
| Annex I   | (informative) <b>A2</b> Example of a material and construction fulfilling the requirements for an artificial surface <b>A2</b> .....          | 87 |
| I.1       | Material .....  | 87 |
| I.2       | Construction .....  | 87 |
| Annex ZA  | (informative) <b>A4</b> Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC <b>A4</b> ..... | 89 |
| <b>A2</b> | Bibliography <b>A2</b> .....  | 90 |

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## Foreword

This document (EN 836:1997+A4:2011) has been prepared by Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry", the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard was approved by CEN on 12 March 1997 and includes Corrigendum 1<sup>1</sup> issued by CEN on 13 December 2006, Amendment 1 approved by CEN on 18 September 1997, Amendment 2 approved by CEN on 4 February 2001, Amendment 3 approved by CEN on 17 December 2003 and Amendment 4 approved by CEN on 2010-04-23.

This document supersedes EN 836:1997.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1**, **A2**, **A3**, **A4**, **A5**, **A6**, **A7** and **A8**.

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags **AC**.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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<sup>1</sup> Applicable to the French and German versions only.

## Introduction

<sup>A4</sup> This document is a type C standard as stated in EN ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard. <sup>A4</sup>

## 1 Scope

This European Standard specifies safety requirements and their verification for the design and construction of powered rotary and cylinder lawnmowers, including pedestrian-controlled and ride-on (riding) types, and lawn and garden tractors, professional lawnmowers, and lawn and garden tractors with mowing attachments.

This European Standard is <sup>A3</sup> not applicable to machines covered by EN 786, lawn edgers, flail mowers, scrub cutters, automatic (robot) mowers, sickle-bar mowers, <sup>A3</sup> or agricultural mowers.

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 <sup>A3</sup> kinetic energy of a single cutting element not exceeding 10 J <sup>A3</sup>.

It describes methods for the elimination or reduction of hazards arising from their use - in addition, it specifies the type of information to be provided by the manufacturer on safe working practices.

<sup>A3</sup> This standard is not applicable to lawnmowers as covered by EN 60335-2-77 and EN 50338. <sup>A3</sup>

The list of significant hazards dealt with in this standard is given in annex A. Annex A also indicates the hazards which have not been dealt with.

<sup>A4</sup> The risk of contact with power driven components of ride-on machines (definition 3.28) other than the cutting means and ground contacting parts, has not been dealt with for persons other than the operator when in the driving position. <sup>A4</sup>

<sup>A3</sup> Environmental aspects and EMC have not been dealt with in this standard. <sup>A3</sup>

<sup>A4</sup> This document is not applicable to powered lawnmowers which are manufactured before the date of its publication as EN. <sup>A4</sup>

NOTE The reduction of risks from noise and vibration will be the subject of amendments to this standard now being developed.

## 2 Normative references

<sup>A4</sup> The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. <sup>A4</sup>

## EN 836:1997+A4:2011 (E)

**A4** deleted text **A4**

**A2** EN 1032:1996, *Mechanical vibration — Testing of mobile machinery in order to determine the whole-body vibration emission value — General*

EN 1033:1995, *Hand-arm vibration — Laboratory measurement of vibration at the grip surface of hand-guided machinery — General* **A2**

**A4** deleted text **A4**

**A3** EN 50338, *Safety of household and similar electrical appliances — Particular requirements for pedestrian controlled battery powered electrical lawnmowers* **A3**

**A3** EN 60335-2-77, *Safety of household and similar electrical appliances — Part 2-77: Particular requirements for pedestrian controlled mains-operated lawnmowers (IEC 60335-2-77:1996, modified)* **A3**

**A2** EN ISO 354:1993, *Acoustics — Measurement of sound absorption in a reverberation room (ISO 354:1985)*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)* **A2**

**A4** EN ISO 4871, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)* **A4**

**A3** EN ISO 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point (ISO 5353:1995)* **A3**

**A4** EN ISO 5674, *Tractors and machinery for agriculture and forestry — Guards for power take-off (PTO) drive-shafts — Strength and wear tests and acceptance criteria (ISO 5674:2004, corrected version 2005-07-01)* **A4**

EN ISO 6682:1995, *Earth moving machinery — Zones of comfort and reach for controls*

**A2** EN 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 11201:1995)* **A2**

**A4** deleted text **A4**

**A4** EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)* **A4**

ISO 500:1991, *Agricultural tractors — Rear-mounted power take-off — Types 1, 2 and 3*

**A4** deleted text **A4**

ISO 3304:1985, *Plain end seamless precision steel tubes — Technical conditions for delivery*

ISO 3305:1985, *Plain end welded precision steel tubes — Technical conditions for delivery*

ISO 3306:1985, *Plain end as-welded and sized precision steel tubes — Technical conditions for delivery*



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

ISO 3767-2:2008, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 2: Symbols for agricultural tractors and machinery*

ISO 3767-3, *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 4046:1978, *Paper, board, pulp and related terms — Vocabulary*

ISO 4200:1991, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

ISO 4253:1993, *Agricultural tractors — Operator's seating accommodation — Dimensions*

ISO 5673:1993, *Agricultural tractors and machinery — Power take-off drive shafts and position of power-input connection*

ISO 9190:1990, *Lawn and garden ride-on (riding) tractors — Drawbar*

ISO 9191:1991, *Lawn and garden ride-on (riding) tractors — Three-point hitch*

ISO 9192:1991, *Lawn and garden ride-on (riding) tractors — One-point tubular sleeve hitch*

ISO 9193:1990, *Lawn and garden ride-on (riding) tractors — Power take-off*

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### 3 Definitions

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For the purposes of this European Standard, the following definitions apply:

#### 3.1

##### **blade tip circle**

the path described by the outermost point of the cutting means cutting edge as it rotates about its shaft axis

#### 3.2

##### **braking distance**

the distance travelled between the point of the first application of the brake control and the point at which the machine comes to rest

#### 3.3

##### **braking system**

a combination of one or more brakes and related means of operation and control

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#### 3.4

##### **cutting means; blade**

the mechanism used to provide the cutting action

#### 3.5

##### **cutting means enclosure**

the part or assembly which provides the protective means around the cutting means

**EN 836:1997+A4:2011 (E)****3.6****cutting positions**

any height setting of the cutting means designated by the manufacturer for cutting grass

**3.7****cutting width**

the total width of cut measured across the cutting means at right angles to the direction of travel

**3.8****cylinder lawnmower**

a powered lawnmower with one or more cutting means rotating about a horizontal axis to provide a shearing action with a fixed cutter bar or blade

**3.9****discharge chute**

an extension of the cutting means enclosure from the discharge opening, generally used to control the discharge of material from the cutting means.

**3.10****discharge opening**

a gap or opening in the cutting means enclosure through which grass can be discharged

**3.11****flail mower**

a grass cutting machine with a multiplicity of free-swinging cutting elements that rotate about an axis parallel to the cutting plane and cut by impact

**3.12****grass catcher**

a part or combination of parts which provides a means for collecting grass clippings or debris

**3.13****hover lawnmower**

a powered lawnmower which uses a cushion of air as its ground support

**3.14****jack knifing**

movement of an articulated unit which results in:

- prevention of further operation in the reverse direction; or
- entrapment of the operator; or
- displacement of the operator sufficient to cause loss of control

**3.15****lawn edger**

a powered machine suitable for cutting lawn and soil, usually in a vertical plane

**3.16****lawn edge trimmer**

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

**3.17****lawn trimmer**

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

**3.18****maximum operating engine/motor speed**

the highest engine/motor speed obtainable when adjusted in accordance with the machine manufacturer's specifications and/or instructions with the cutting means engaged

**3.19****mowing attachment**

a cutting means designed to be easily detached from the machine, generally to allow the machine to be used for other purposes

**3.20****mulching lawnmower**

a rotary lawnmower without discharge openings in the cutting means enclosure

**3.21****normal operation**

any use of the machine which is reasonably foreseeable, as seen by the ordinary user, and which is consistent with such activities as cutting grass, starting, stopping, fuelling, connecting to (or disconnecting from) a power source, or the mounting of and dismantling from ride-on machines

**3.22****normal use**

normal operation, plus routine maintenance, servicing, cleaning, transporting, attaching or removing accessories, and making ordinary adjustments as determined by the manufacturer's instructions

**3.23****open discharge chute**

a discharge chute without a self closing guard or with a self closing guard which does not completely close the chute

**3.24****operator control**

any control requiring operator actuation to perform specific functions

**3.25****operator presence control**

a control designed so that it will automatically interrupt power to a drive when the operator's actuating force is removed

**3.26****pedestrian-controlled powered lawnmower**

a grass-cutting machine, either pushed or self-propelled, normally controlled by the operator walking behind the unit

**3.27****powered lawnmower**

a grass-cutting machine or a machine with grass-cutting attachment(s) where the cutting means operates in a plane approximately parallel to the ground and which uses the ground to determine the height of cut by means of wheels, air cushion or skids, etc., and which utilises an engine or an electric motor for a power source

**3.28****ride-on (riding) machine; lawn and garden tractor**

a self-propelled machine on which an operator rides and which is designed primarily for cutting grass and auxiliary garden work

NOTE The cutting means can be an integral part of the machine or suspended from or attached to the machine

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## EN 836:1997+A4:2011 (E)

## 3.29

**rotary lawnmower**

a powered lawnmower in which one or more cutting means, cutting by impact, rotate about an axis normal to the cutting plane

## 3.30

**service brake system**

the designated primary means for decelerating and stopping a machine from its ground travel speed

## 3.31

**sickle bar mower**

a mower which uses a power source to reciprocate a knife or knives to provide a shearing action with a stationary cutter bar or movable knife

## 3.32

**trailing seat**

a removable, trailing device designed to carry a seated operator to ride behind while controlling a self-propelled, pedestrian-controlled lawnmower or tractor

NOTE Also known as a 'sulky'

## 3.33

**trailing seat unit**

a pedestrian-controlled powered lawnmower or tractor with an optional trailing seat attached

NOTE Also known as a 'sulky unit'

## 3.34

**automatic (robot) mower**

automatic lawnmower that operates without human control. It operates only within a delimited perimeter or within a pre-programmed area

## 3.35

**cutter unit**

combination of cutting means and cutting means enclosure  $\text{A}_3$

## 4 Safety requirements and/or measures

### 4.1 General

#### 4.1.1 Power driven components

All power driven components except the cutting means and the ground-contacting parts of  $\text{A}_3$  pedestrian-controlled self-propelled lawnmowers  $\text{A}_3$  shall be guarded to prevent contact with these parts during normal operation.

All openings and safety distances shall conform to  $\text{A}_4$  4.2.4.2 and 4.2.4.3 of EN ISO 13857:2008  $\text{A}_4$  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  $\text{A}_3$  recommended by the instruction manual.  $\text{A}_3$

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.

Where a guard is so positioned that it can be used as a step, it shall withstand a force of 1200 N.

Compliance shall be checked by inspection and measurement.

**A4** Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards, which are not dealt with by this document. **A4**

#### 4.1.2 Guard attachment

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 of or removable interlocked guards which disable the protected moving parts;
- b) the opening of hinged, automatically closing guards for grass discharge chutes;
- c) engine compartment access of machines where the operator presence control stops the engine.

**A4** Fixed guards that are to be removed as a part of maintenance procedures, as described in the operator's manual, shall be fixed by systems that can be opened or removed only with tools. These guard fixing systems shall remain attached to the guards or to the machinery when the guards are removed.

Where possible, fixed guards shall be incapable of remaining in place without their fixings. **A4**

#### 4.1.3 Hot surfaces

##### 4.1.3.1 General <https://standards.iteh.ai/catalog/standards/sist/f734d564-6f99-44c2-bdff-405e0c61a4c9/sist-en-836-1998a4-2011>

A guard shall be provided to prevent accidental contact with any exposed engine exhaust components larger than 10 cm<sup>2</sup> which have a surface temperature greater than 80 °C at (20 ± 3) °C ambient temperature during normal starting, mounting and operation of the machine.

NOTE The temperature of 80 °C is to be reviewed at the next revision of this standard taking into account any relevant values given in **A4** EN ISO 13732-1 **A4**.

##### 4.1.3.2 Temperature measuring equipment

The temperature measuring equipment shall have an accuracy of ± 4 °C.

##### 4.1.3.3 Test method

The engine shall be operated at its maximum operating speed until the surface temperatures stabilise. The test shall be conducted in the shade. Temperatures shall be determined by correcting the observed temperature by the difference between the specified ambient and the test ambient temperature.

Identify the hot surface area(s) on the engine exhaust system.

When the distance between the identified hot area and the nearest control is in excess of 100 mm, cone A as shown in Figure 1 shall be used. For distances less than 100 mm between the identified hot area and the nearest control, cone B as shown in Figure 1 shall be used.

For Cone A, with the axis of the cone anywhere between 0° and 180° to the horizontal and with **A3** the cone tip **A3** in a downward to horizontal direction, move the cone towards the hot surface. The cone shall not be

**EN 836:1997+A4:2011 (E)**

moved in an upwards direction. When moving the cone, determine if contact is made with the hot surface area(s) with the cone tip or conical surface of the cone.

Cone B shall be moved in any direction.

**4.1.3.4 Test acceptance**

When tested in accordance with 4.1.3.3, using the test equipment given in 4.1.3.2 the tip or conical surface of cone A or B shall not make contact with the hot surface of the exhaust system as described in 4.1.3.1.

**4.1.4 Protection from exhaust fumes**

Engine exhaust, where provided, shall not be directed towards the operator.

On machines equipped with an enclosure for the operator, the engine exhaust shall not be directed towards the enclosure or the air inlet to the enclosure.

**4.1.5 Pressurised components**

Pressurised hoses, lines and components shall be located or shielded so that in the event of rupture the fluid can not be discharged directly on to the operator when in the operating position.

**4.1.6 Liquid spillage**

When filled to the maximum  $\text{A}_3$  according to the instruction manual  $\text{A}_3$ , liquid containers, batteries, fuel systems, oil reservoirs, and coolant systems shall be constructed to prevent spillage for 1 min whilst the machine is tilted at 20° lateral and 30° longitudinal or at its limit of stability as specified in the stability test for ride-on machines (see 4.2.4.2.3.2) if greater. Weeping at vent systems shall not be considered spillage.

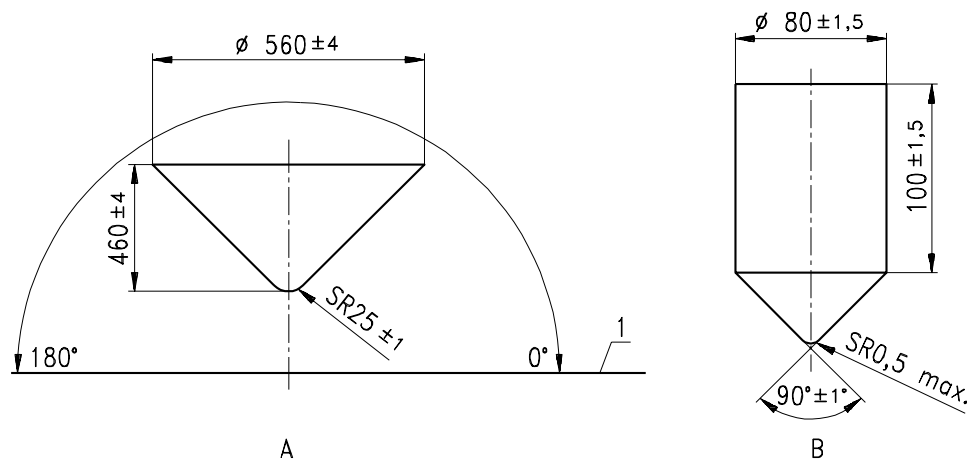
**4.1.7 Seats and foot rests**

**4.1.7.1** Ride-on machines shall be provided with an operator seat and foot rests. Where there is no floor beneath the driver's feet, foot rests shall be provided. These shall be covered with slip resistant material.

Where the operator sits astride the frame of the machine and holds handlebars the requirements of 4.1.7.2 shall not apply.

$\text{A}_3$  For ride-on machines the seat index point (as defined in EN ISO 5353) shall be at least 500 mm from the blade tip circle, measured as a chain dimension around any fixed components (see Figure 2).  $\text{A}_3$

Dimensions in millimetres

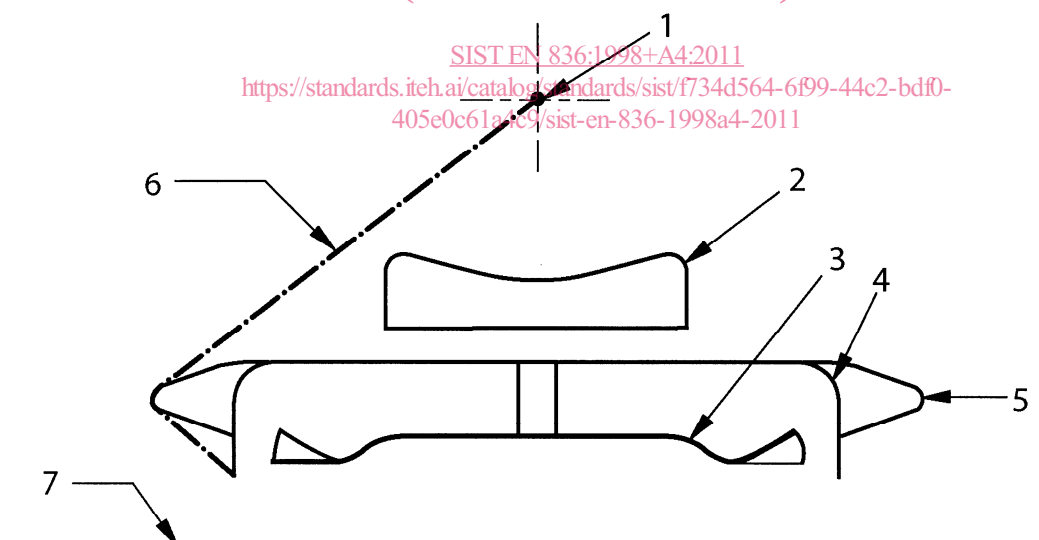
**Key**

- 1 horizontal plane

**Figure 1 — Test cones (see 4.1.3.3)**

A3

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**Key**

- |   |                         |   |  |
|---|-------------------------|---|--|
| 1 | seat index point        | 5 | fixed component  |
| 2 | seat                    | 6 | chain dimension – seat index point to blade tip circle |
| 3 | cutting means           | 7 | ground surface   |
| 4 | cutting means enclosure |   |  |

**Figure 2 — Example of chain distance measurement from Seat index point to blade tip circle** A3