SLOVENSKI STANDARD
SIST EN 836:1998

01-februar-1998

Oprema za nego vrta - Gnane vrtne kosilnice - Varnost

Garden equipment - Powered lawnmowers - Safety

Gartengeräte - Motorgetriebene Rasenmäher - Sicherheit

Matériel de jardinage - Tondeuses a gazon a moteur - Sécurité

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English version

Garden equipment - Powered lawnmowers - Safety

Matériel de jardinage - Tondeuses à gazon à moteur - Sécurité

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CEN

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

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Contents **Page**

Contents **Page**

Annexes

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by September 1997, and conflicting national standards shall be withdrawn at the latest by September 1997.

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 standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The extent to which hazards are covered is indicated in the scope of this standard. In addition, machinery shall comply as appropriate with EN 292 for hazards which are not covered by this standard.

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 not applicable to lawn trimmers, lawn edge trimmers, lawn edgers, flail mowers, scrub cutters, sickle-bar mowers 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 kinetic energy of a single cutting means not exceeding 10 Joules.

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.

For the electrical aspects of electrically driven machines refer to EN 60 335.

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.

Environmental aspects have not been dealt with in this standard.

This European Standard applies primarily to machines which are manufactured after the date of issue of this standard.

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

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1: 1991	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN 292-2:1991	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications (and amendment A1:1995)
EN 294: 1992	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
EN 563	Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces.
EN 1152	Tractors and machinery for agriculture and forestry - Guards for PTO drive shafts - Wear and strength tests
EN 60 335	Safety of household and similar electrical appliances (IEC 335)
EN ISO 3767-1: 1995	Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator control and other displays - Part 1: Common symbols
EN ISO 3767-2: 1995	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 500: 1991	Agricultural tractors -Rear-mounted power take-off - Types 1, 2 and 3
ISO 2758: 1983	Paper - Determination of bursting strength
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
EN 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 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
EN ISO 6682: 1995	Earth-moving machinery - Zones of comfort and reach for controls

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

3 Definitions

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.

3.4 manual control: A means or device which will control the operation of the lawnmower or any specific operating function thereof.

3.5 cutting means; blade: The mechanism used to provide the cutting action.

3.6 cutting means enclosure: The part or assembly which provides the protective means around the cutting means.

3.7 cutting positions: Any height setting of the cutting means designated by the manufacturer for cutting grass.

3.8 cutting width: The total width of cut measured across the cutting means at right angles to the direction of travel.

3.9 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.

3.10 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.

3.11 discharge opening: A gap or opening in the cutting means enclosure through which grass can be discharged.

3.12 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.

3.13 grass catcher: A part or combination of parts which provides a means for collecting grass clippings or debris.

3.14 hover lawnmower: A powered lawnmower which uses a cushion of air as its ground support.

3.15 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.

3.16 lawn edger: A powered machine suitable for cutting lawn and soil, usually in a vertical plane.

3.17 lawn edge trimmer: A grass trimming machine where the cutting means operates in a plane approximately perpendicular to the ground.

3.18 lawn trimmer: A grass trimming machine where the cutting means operates in a plane approximately parallel to the ground.

3.19 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.

3.20 mowing attachment: A cutting means designed to be easily detached from the machine, generally to allow the machine to be used for other purposes.

3.21 mulching lawnmower: A rotary lawnmower without discharge openings in the cutting means enclosure.

3.22 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 dismounting from ride-on machines.

3.23 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.

3.24 open discharge chute: A discharge chute without a self closing guard or with a self closing guard which does not completely close the chute.

3.25 operator control: Any control requiring operator actuation to perform specific functions.

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

3.27 pedestrian-controlled powered lawnmower: A grass-cutting machine, either pushed or self-propelled, normally controlled by the operator walking behind the unit.

3.28 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.

3.29 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.

3.30 rotary lawnmower: A powered lawnmower in which one or more cutting means, cutting by impact, rotate about an axis normal to the cutting plane.

3.31 service brake system: The designated primary means for decelerating and stopping a machine from its ground travel speed.

3.32 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.

3.33 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'.

3.34 trailing seat unit: A pedestrian-controlled powered lawnmower or tractor with an optional trailing seat attached.

NOTE: Also known as a 'sulky unit'.

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 pedestrian-controlled power propelled lawnmowers shall be guarded to prevent contact with these parts during normal operation.

All openings 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.

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.

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.

4.1.3 *Hot surfaces*

4.1.3.1 *General*

A guard shall be provided to prevent accidental contact with any exposed engine exhaust components larger than 10 cm^2 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 EN 563.

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 the nose or point of the cone in a downward to horizontal direction, move the cone towards the hot surface. The cone shall not be 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*

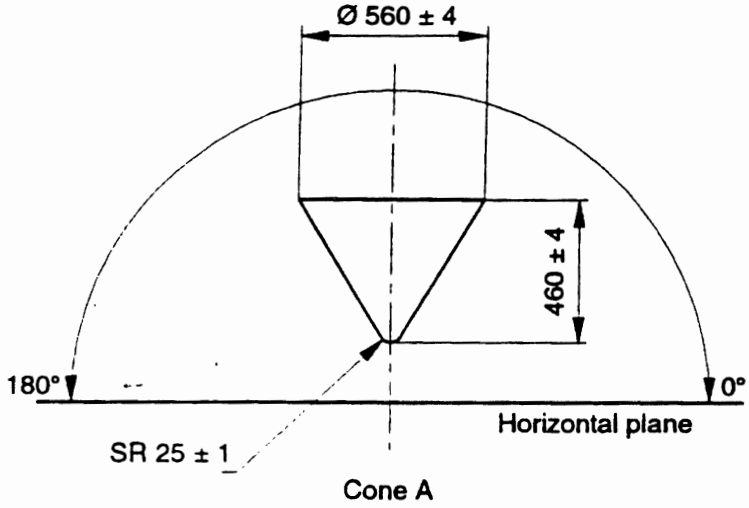
When filled to the maximum according to the manufacturer's instructions liquid containers, batteries, fuel systems, oil reservoirs, and coolant systems shall be constructed to prevent spillage for 1 min whilst the machine is tilted at 20° lateral and 30° longitudinal or at its limit of stability as specified 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.

Dimensions in millimetres



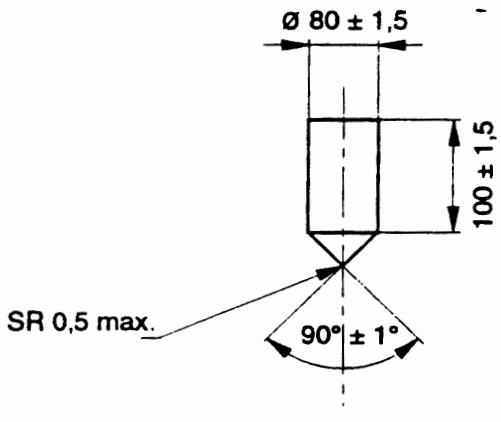


Figure 1: Test cones (see 4.1.3.3)

4.1.7.2 For machines with a width of cut less than or equal to 1200 mm:

a) the operator's seat shall have a buttock support at least 115 mm high at the rear, above the seating surface, to retain the operator;

b) the seat shall be at least 400 mm wide.

For machines with a width of cut greater than 1200 mm the dimensions and longitudinal adjustment of the driver's seat shall conform to the requirements of ISO 4253: 1993.

4.1.8 *Controls*

4.1.8.1 *General*

4.1.8.1.1 *All machines*

The following shall not be considered operator controls:

- height of cut setting;

- fixed blade (on-cut) setting or adjustment on cylinder lawnmowers;

- engine starting;

- grass catcher discharge arrangements.

It shall not be possible to sustain an engine/motor speed greater than the maximum operating speed (see 3.19) by use of any control or by simple adjustments made by using standard tools.

For machines with traction drive the drive shall automatically stop or disengage when the operator leaves the normal operating position.

NOTE: An audible warning device (e.g. horn) is not required. However machines travelling on public roads may be required to be fitted with a horn in order to meet highway regulations.

4.1.8.1.2 *Pedestrian-controlled lawnmowers*

The location and range of movement of operator controls shall remain within anthropometric dimensions given in figure 2 for pedestrian-controlled units. The operating range of less frequently used operator controls may be extended by allowing the operator's trunk, when standing with both feet on the ground, to articulate within the confines of the operator zone (e.g. lean forward until contacting the handle in any of the operating positions).

Engine starting controls shall only be outside this range if either:

a) starting can only be accomplished with the blade drive disengaged; or