



# SLOVENSKI STANDARD

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Nadomešča:

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**Oprema za nego vrta - Ročno upravljani prezračevalniki travne ruše in rahljalniki zemlje - Varnost**

Garden equipment - Pedestrian controlled lawn aerators and scarifiers - Safety

Gartengeräte - Handgeführte Rasen-Bodenbelüfter und Vertikutierer - Sicherheit

Matériel de jardinage - Aérateurs et scarificateurs à conducteur à pied - Sécurité

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EUROPEAN STANDARD

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## Garden equipment - Pedestrian controlled lawn aerators and scarifiers - Safety

Matériel de jardinage - Aérateurs et scarificateurs à  
conducteur à pied - Sécurité

Gartengeräte - Handgeführte Rasen-Bodenbelüfter und  
Vertikutierer - Sicherheit

This European Standard was approved by CEN on 15 January 2018.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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## European foreword

This document (EN 13684:2018) 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of an identical text or by endorsement, at the latest by December 2018 and conflicting national standards shall be withdrawn at the latest by December 2018.

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

This document supersedes EN 13684:2004+A3:2019.

In comparison with the previous edition, the following modifications have been made:

- Addition of requirements for:
  - electromagnetic immunity;
  - engine starting;
  - guarding of power driven components;
  - machine stability, with a test method.
- Modification of the:
  - contents of the instructions;  
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  - machine markings and warnings with new safety signs;
  - noise test method;
  - vibration test method.

This document 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, 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**EN 13684:2018 (E)****Introduction**

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document. The machinery concerned and the extent to which hazards, hazardous situations or 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 type -B standards, the provisions of this type-C standard take precedence over the requirements of the other standards, for machines that have been designed and built according to the requirements of this type-C standard.

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## 1 Scope

This European Standard specifies safety requirements and their verification for the design and construction. It is applicable to pedestrian controlled internal combustion engine powered lawn aerators and scarifiers which are designed for re-generating lawns by, for instance, combing out grass, thatch and moss or cutting vertically into the lawn face using tines which rotate about a horizontal axis.

This document deals with all significant hazards, hazardous situations or hazardous events relevant to pedestrian controlled internal combustion engine powered lawn aerators and scarifiers, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer. It describes methods of 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.

Throughout this document, the term “machine” applies to those machines known as aerators, scarifiers, corers, lawn rakes or grass rakes.

It does not apply to:

- aerators/scarifiers made from a machine falling within the scope of EN 709:1997+A4:2009 when fitted with an aerating/scarifying implement;
- non-powered aerators;
- vertical axis aerators; or
- those aerators which cut into the soil by means of a reciprocating motion or by water pressure.

Environmental hazards have not been considered in this document.

This document is not applicable to aerators/scarifiers which are manufactured before the date of its publication.

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## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN ISO 354:2003, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 4413, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 7010, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010)*

EN ISO 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

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EN ISO 11688-1:2009, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

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

EN ISO 14982:2009, *Agricultural and forestry machinery - Electromagnetic compatibility - Test methods and acceptance criteria (ISO 14982:1998)*

EN ISO 20643:2008, *Mechanical vibration - Hand-held and hand-guided machinery - Principles for evaluation of vibration emission (ISO 20643:2005)*

ISO 3767-1, *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, *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 3767-4, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment - Symbols for operator controls and other displays - Part 4: Symbols for forestry machinery*

ISO 3864-1, *Graphical symbols - Safety colours and safety signs - Part 1: Design principles for safety signs and safety markings*

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ISO 7000, *Graphical symbols for use on equipment - Registered symbols*

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

### **3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

- 3.1  
braking system**  
combination of one or more brakes and the related means of operation and control
- 3.2  
catcher**  
part or combination of parts which provides a means for collecting grass, thatch, moss or other debris
- 3.3  
control**  
means or device which will control the operation of the machine or any specific operating function thereof

**3.4****working position**

depth setting of the **tines** designated by the manufacturer

**3.5****discharge chute**

extension of the tine enclosure from the discharge opening, generally used to control the discharge of material from the tines

**3.6****discharge opening**

gap or opening in the tine enclosure through which grass, thatch, moss and other debris may be discharged

**3.7****front discharge**

action of throwing out grass, thatch and moss so that they will be collected in a catcher which is located in front of the **tines**

**3.8****handle**

part likely to be hand-held for guiding the machine in normal use

**3.9****lawn aerator**

corer

machine which uses the ground to determine the depth of cut, designed for penetrating the lawn surface

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**3.10****scarifier**

lawn rake

machine designed to scratch the surface, or earth face thereby also combing the lawn

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**3.11****maximum operating engine speed**

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

**3.12****normal operation**

use of the machine which is specified by the manufacturer and which is consistent with such activities as combing thatch, starting, stopping, fuelling, connecting to (or disconnecting from) a power source

**3.13****normal use**

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

**3.14****operator control**

control requiring operator actuation to perform specific functions

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**3.15**

**operator presence control**

OPC

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

**3.16**

**operator zone**

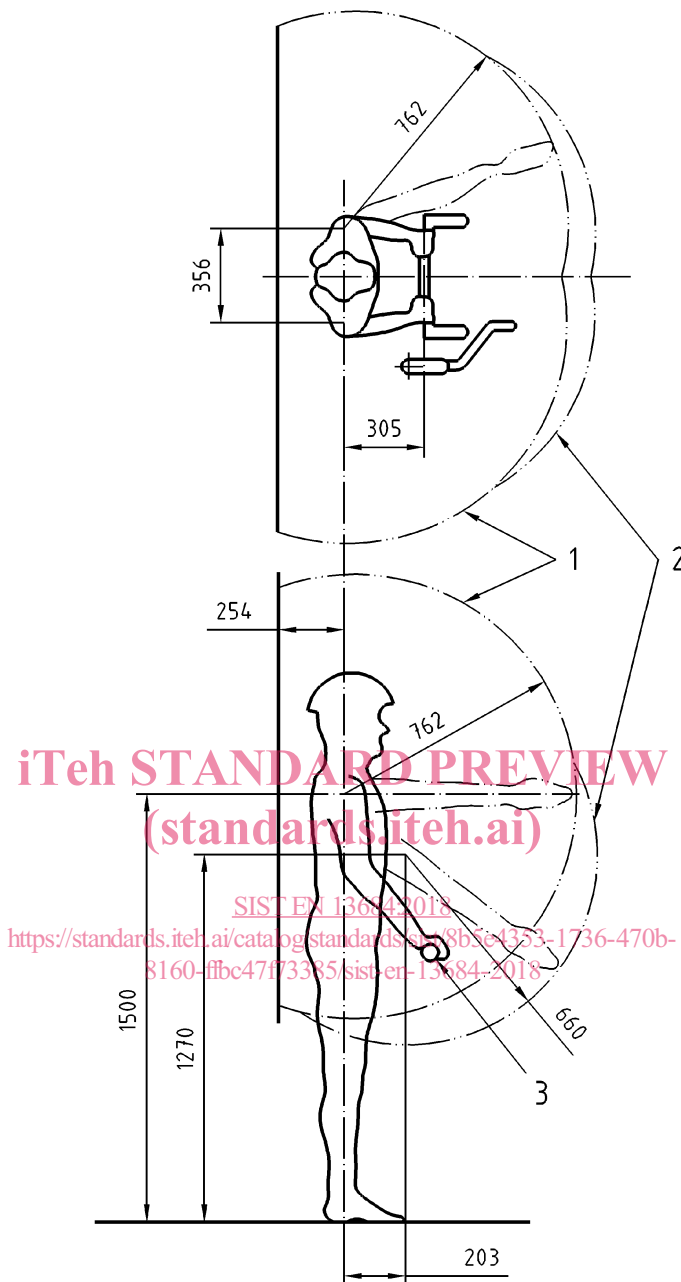
zone for persons operating a machine as presented in Figure 1

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Dimensions in millimetres

**Key**

- 1 operator zone
- 2 lower forward zone
- 3 handle

NOTE 1 The operator zone is the area into which the extremities of a 95th percentile male can reach from the normal operator position.

NOTE 2 The lower forward zone is the area into which a 5th percentile male or a 50th percentile female can reach when against the handle. This zone can also be reached by a 95th percentile leaning forward against the handle.

NOTE 3 All barriers (handles) within the operator zone will reduce the zone by the space occupies and protected by the barrier.

NOTE 4 The operator zone includes the maximum range of movement of all frequently used operator controls but is not intended to represent preferred operator control positions.

**Figure 1 — Operator zone (see 3.16 and 5.8.1)**

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## 3.17

**parking brake**

device incorporated in the machine which, when operated, prevents the machine from moving from a stationary position and which will remain applied without the operator being present

## 3.18

**power source**

engine which provides mechanical energy for movement of the tines and traction drive

## 3.19

**rear discharge**

action of throwing out grass, thatch and moss so that they will be collected in a catcher which is located behind the tines

## 3.20

**service brake**

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

## 3.21

**tine**

mechanism used to provide the penetrating or scratching action of a machine

## 3.22

**tine enclosure**

part or assembly which provides the protective means around the tines

## 3.23

**tine tip circle**

path described by the outermost point of the tine as it rotates about its shaft axis

## 3.24

**traction drive**

means (system) used to transmit power from the power source to the ground drive means

## 3.25

**width of cut**

total width of scarification/aeration measured across the tines at right angles to the direction of travel

## 3.26

**tine assembly**

tines together with any supporting part(s), which together perform the aerating or scarifying action

## 4 List of significant hazards

This clause contains for defined danger zones all the significant hazards, hazardous situations and events covered by this document, identified by risk assessment as significant for this type of machines and which require specific action by the designer or manufacturer to eliminate or to reduce the risk (see Table 1).

It is the responsibility of the manufacturer to check whether or not the safety requirements specified in this document apply to each significant hazards presented by its specific machine and to validate that the risk assessment is complete with particular attention to:

- the intended use of the machine including maintenance, setting and cleaning and its reasonably foreseeable misuse;
- the identification of all significant hazards associated with the machine.

Table 1 — List of significant hazards associated with scarifiers and aerators

Ref. No.	Hazard	Location or event	Clause/subclause of this standard
<b>Hazards, hazardous situations and hazardous events</b>			
<b>1</b>	<b>Mechanical hazards due to:</b>		
	— machine parts or work pieces, e.g.:		
	e) inadequacy of mechanical strength;	Tine failure/strength	5.14
	— accumulation of energy inside the machinery e.g.:		
	g) liquids and gases under pressure;	Hydraulic fluid leakage/burst	5.6, 6.1
1.1	Shearing hazard	Contact with moving parts	5.2, 5.3, 5.10.2, 5.15, 6.1, 6.2 and Annex A
1.2	Cutting or severing hazard	Contact with moving parts	5.2, 5.3, 5.10.2, 5.15, 6.1, 6.2 and Annex A
1.3	Entanglement hazard	Contact with moving parts	5.2, 5.3, 5.10.2, 5.15, 6.1, 6.2 and Annex A
1.4	Drawing-in or trapping hazard	Contact with moving parts	5.2, 5.3, 5.10.2, 5.15, 6.1, 6.2 and Annex A
1.5	Impact hazard	Hit by thrown objects	5.3, 5.13
1.6	High pressure fluid injection or ejection hazard	Penetration by high pressure fluid	5.6, 6.1
<b>2</b>	<b>Electrical hazards due to:</b>		
2.1	Contact of persons with live parts (direct contact)	Contact with live parts	5.9.3
2.2	Approach to live parts under high voltage	Contact with HT ignition parts	5.9.3
2.3	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads, etc.	Protection against circuit overload	5.9.2.3