



**SLOVENSKI STANDARD**  
**SIST ISO 11449:1996**

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**Ročno vodljivi motorni prekopalniki - Definicije, varnostne zahteve in preskusni postopki**

Walk-behind powered rotary tillers -- Definitions, safety requirements and test procedures

**iTeh STANDARD PREVIEW**

Motoculteurs à conducteur à pied -- Définitions, exigences de sécurité et méthodes d'essai

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ISO 11449:1994(E)

**ISO 11449:1994(E)****Foreword**

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11449 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 13, *Powered lawn and garden equipment*.

Annex A forms an integral part of this International Standard.

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# Walk-behind powered rotary tillers — Definitions, safety requirements and test procedures

## 1 Scope

This International Standard specifies mechanical safety requirements and tests applicable to pedestrian-controlled (walk-behind) powered rotary tillers of a rated engine motor capacity less than or equal to 7,5 kW, designed primarily for garden and horticulture use.

It does not apply to

- rotary tillers having a rated engine/motor capacity greater than 7,5 kW used in commercial agricultural or forestry operations;
- PTO-driven machines;
- electric powered handheld front-mounted tillers;
- the electric aspects of electrically powered rotary tillers having a voltage exceeding 42 V d.c. or which are mains-connected.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3411:1982, *Earth-moving machinery — Human physical dimensions of operators and minimum operator space envelope*.

ISO 3767-1:1991, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols*.

ISO 3767-2:1991, *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 3767-3:1988, *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 3789-1:1982, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Location and method of operation of operator controls — Part 1: Common controls*.

ISO 3789-2:1982, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Location and method of operation of operator controls — Part 2: Controls for agricultural tractors and machinery*.

ISO 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*.

ISO 11684:—<sup>1)</sup>, *Tractors and machinery for agriculture and forestry, powered lawn and garden equipment — General principles for safety signs and hazard pictorials.*

IEC 335-1:1976, *Safety of household and similar electrical appliances — Part 1: General requirements.*

### 3 Definitions

For the purposes of this International Standard, the following definitions apply.

**3.1 pedestrian-controlled (walk-behind) powered rotary tiller:** Tilling machine with a powered rotary member, with or without traction drive that is intended to break up soil and is normally controlled by the operator walking behind or alongside it.

**3.1.1 front tine rotary tiller:** Pedestrian-controlled (walk-behind) powered rotary tiller whose ground traction is provided by its rotating tines or whose rotating member is substantially forward of the drive wheels. [See figure 1 a).]

**3.1.2 rear tine rotary tiller:** Pedestrian-controlled (walk-behind) powered rotary tiller whose ground traction is provided by the drive wheels and whose rotating member is substantially behind the drive wheels. [See figure 1 b).]

**3.1.3 handheld rotary tiller:** Pedestrian-controlled (walk-behind) rotary tiller whose ground traction is provided by its rotating tines with or without support wheels in such a way that its rotating elements act as hoeing blades and ensure forward propulsion. [See figure 1 c).]

**3.2 power source:** Engine or motor which provides mechanical energy for linear or rotational movement.

**3.3 clutch:** Device used for engaging or disengaging the load from the power source.

**3.4 starting device:** Handle, lever, switch or similar control required to actuate starting mechanism.

**3.5 handlebars:** Device equipped with grips enabling the machine to be controlled manually.

**3.6 tines [tools]:** Those portions of the rotating member that are in contact with and penetrate the soil.

**3.7 tine barrier:** Structural members, such as transport wheels, portions of the tiller frame, ground stake, or any combination of these members, that restrict entry of the operator into the rotating tines.

**3.8 guard; shield:** Part of the rotary tiller or component incorporated to provide protection for the operator.

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

**3.10 engine [motor] start:** Change of engine state from not producing power to producing power.

**3.11 manual start:** Use of operator force on a device to rotate the engine for starting purposes.

**3.12 operator hand-control position:** Area or space within which all hand-controls to be operated from the operator position are located.

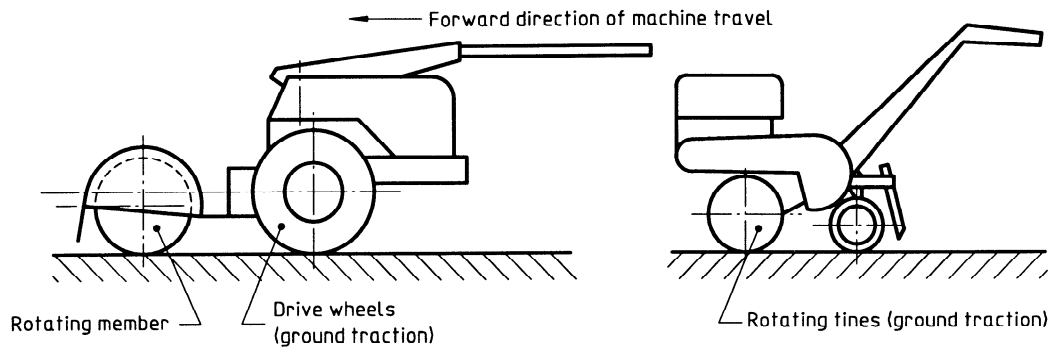
**3.13 operator position:** Area occupied by the operator during normal operation of the machine.

**3.14 operator zone:** Area into which the extremities of a 95th percentile male can reach from the normal operator position. (See figure 5.)

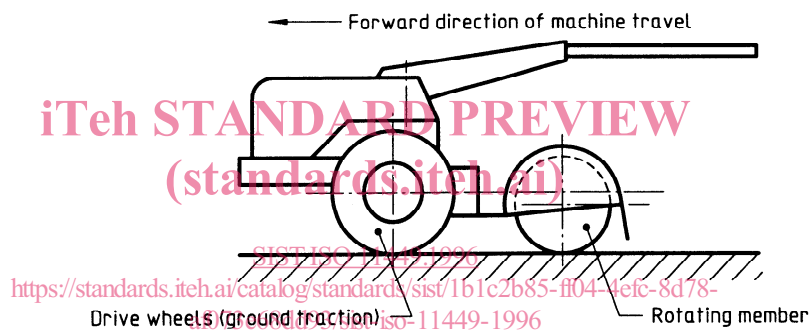
**3.15 normal operation:** Any use of the machine which is reasonably foreseeable, as perceived by the ordinary user, and which is consistent with such activities as tilling, starting, stopping, fuelling and transporting.

**3.16 durable label:** Label that is considered to be virtually permanent.

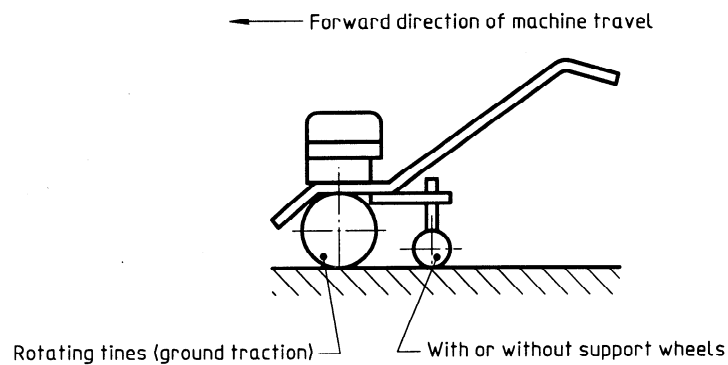
1) To be published.



a) Front tine tiller



b) Rear tine tiller



c) Handheld tiller

Figure 1 — Types of rotary tillers

## 4 General construction

### 4.1 Powered driven components (other than tilling)

**4.1.1** Powered driven gears, chains, sprockets, belts, friction drives, pulleys, fans, fan-wheel shafting and other moving parts whenever they create a pinch point or are capable of causing injury shall be so positioned or guarded by shields or similar attachments to prevent accidental contact with these components by the operator during normal starting and operation of the machine. Drive-shafts shall be fully guarded.

The principles set out in ISO 5395:1990, annex A, shall be followed when developing a guarding system.

**4.1.2** All guards shall be permanently attached to the machine and shall not be detachable without the use of tools. The opening of the guards shall require the use of a tool. Exceptions to this are opening or removing interlocked guards which disable the protected moving parts, the opening of hinged guards for soil discharge and engine compartment access.

### 4.2 Heat protection

#### 4.2.1 Temperature limits of exposed parts

A guard or shield shall be provided to prevent accidental contact with engine exhaust components greater than 10 cm<sup>2</sup> of surface and with a hot surface greater than 80 °C at (20 ± 3) °C ambient temperature during normal operation of the machine.

##### 4.2.1.1 Test method

Conduct the test in the shade. Operate the engine at its maximum no-load speed until the surface temperature stabilizes.

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 over 100 mm, cone A in figure 2 shall be used. For a distance less than 100 mm between the identified hot area and the nearest control, cone B in figure 2 shall be used.

Move cone A, with the axis of the cone anywhere between 0° and 180° to the horizontal with the nose or point of the cone downward (in relation to the horizontal direction) towards the hot surface. The cone shall not be moved upwards. 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 may be moved in any direction for exhaust surfaces.

#### 4.2.1.2 Test acceptance

The tip or conical surface of cone A or B shall not make contact with the hot surface of the exhaust system.

### 4.3 Protection from exhaust fumes

Engine exhausts shall be directed away from the operator in all operating positions.

## 5 Guarding of tilling means

### 5.1 Rear tiller

The rear tines shall be guarded as shown in figure 3.

A protective guard shall be provided at the rear of the tiller that, when the tines are placed on a level supporting surface, will extend to a maximum of 25 mm above the level supporting surface and shall have a width of at least the composite width of the tines. Any movable shield, when released, shall automatically return. The protective guard shall have side coverings.

### 5.2 Front and handheld tillers

The rotating member of the front tine and handheld tillers shall be protected by a solidly fixed guard, covering the rotating elements rearward to an angle of at least 60° to the vertical [see figure 4 a)].

The minimum length of the guard shall be as specified in table 1.

**Table 1**

Dimensions in millimetres

Working width	Length of guard min.
< 600	working width
≥ 600	600



Dimensions in millimetres

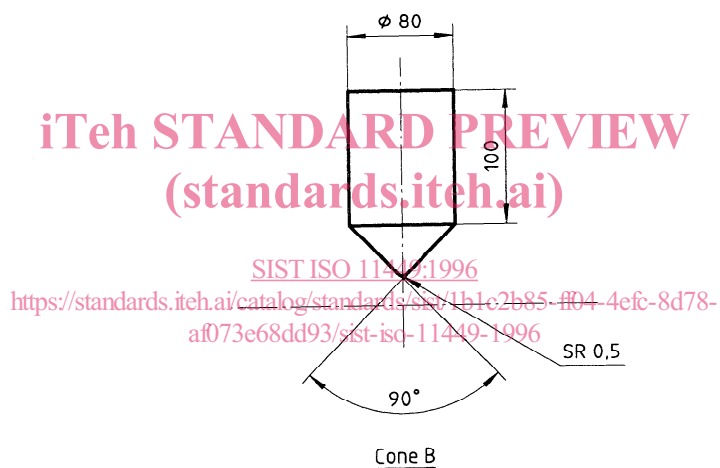
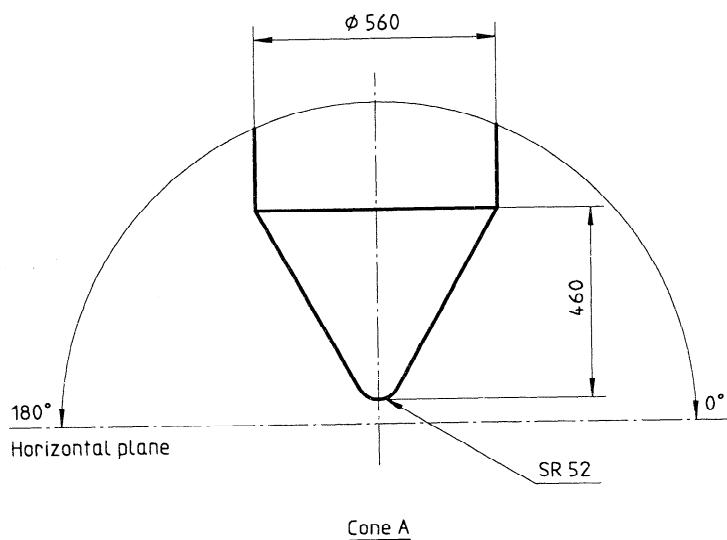


Figure 2 — Test cones

Dimensions in millimetres

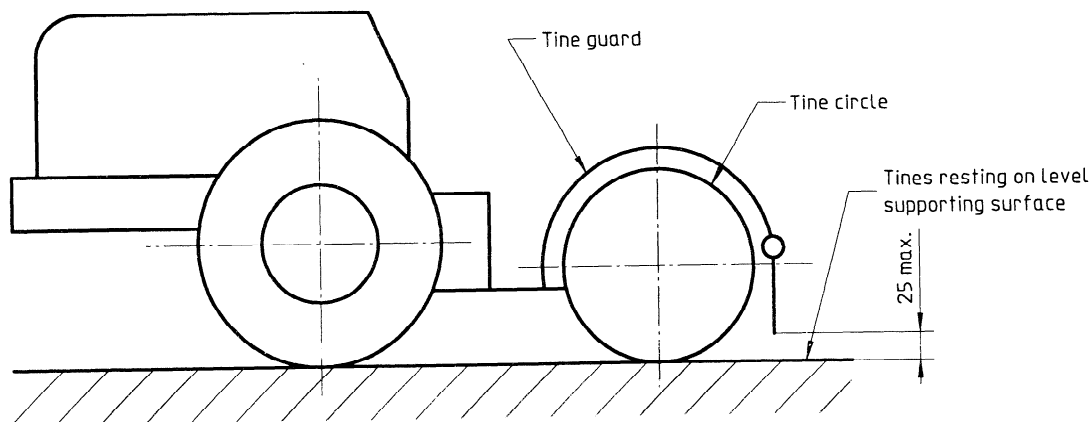


Figure 3 — Guarding of tilling means — Rear tillers