SLOVENSKI STANDARD
SIST EN 13862:2002+A1:2009

01-maj-2009

Talni odrezovalni stroji - Varnost

Floor cutting-off machines - Safety

Bodentrennschleifmaschinen - Sicherheit

Machines à scier les sols - Sécurité

Ta slovenski standard je istoveten z: **EN 13862:2001+A1:2009**

ICS:

93.080.10 Gradnja cest Road construction

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EUROPEAN STANDARD

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English Version

Floor cutting-off machines - Safety

Machines à scier les sols - Sécurité

Bodentrennschleifmaschinen - Sicherheit

This European Standard was approved by CEN on 25 July 2001 and includes Amendment 1 approved by CEN on 15 February 2009.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13862:2001+A1:2009) has been prepared by Technical Committee CEN/TC 151 "Construction equipment and building material machines - Safety", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-02-15.

This document supersedes ⟨A1⟩ EN 13862:2001 ⟨A1⟩.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

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).

⟨A1⟩ For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

⟨A1⟩ *deleted text* ⟨A1⟩

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, 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.

Introduction

This European Standard is a Type C-standard as stated in ⟨A1⟩ EN ISO 12100-1:2003 ⟨A1⟩.

The machinery concerned and the extent to which hazards are covered are indicated in the scope of this European Standard.

1 Scope

This European Standard applies to ⟨A1⟩ *deleted text* ⟨A1⟩ pedestrian controlled floor sawing machines having power feed, manual feed or hand feed (see 3.2) for sawing, grooving and milling floor surfaces made of concrete, asphalt and similar mineral building materials where the main power is supplied by electric or internal combustion prime engine. The power transmission of floor sawing machines is mechanical or hydraulic.

This European Standard deals with all significant hazards pertinent to floor sawing machines, when they are used as intended and under the conditions foreseen by the manufacturer (see clause 4). This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

These machines are designed for use with rotating cutting-off wheels for wet and dry cutting. These cutting-off wheels can be either a diamond cutting-off wheel or a boron nitride cutting-off wheel.

NOTE Other types of cutting tools may also be used provided that they fall within the design and usage parameters of the machine. This standard does not cover this.

This European Standard does not apply to:

⟨A1⟩

— self-propelled ride-on floor sawing machines; ⟨A1⟩

— machines moving along a rail;

— hand-held portable cutting off machines for construction materials mounted on a mobile support, to be used as floor saws;

— remote controlled machines.

This European Standard covers electrical hazards by making reference to relevant European Standards (see 5.2).

Those hazards that are relevant for all mechanical, electrical, hydraulic and other equipment or machinery and that are dealt with in standards for common use are not covered by this European Standard. Reference to pertinent standards is made where such standards are applicable and so far necessary.

In this European Standard, floor sawing machines are called "machines", and cutting-off wheels are called “tools”.

This European Standard applies primarily to machines which are manufactured after the date of approval of the standard by CEN.

2 Normative references

A1⟩ 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. ⟨A1

A1⟩ *deleted text* ⟨A1

A1⟩ EN 206-1:2000, *Concrete — Part 1: Specification, performance, production and conformity* ⟨A1

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

A1⟩ *deleted text* ⟨A1

A1⟩ EN 953 ⟨A1, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

A1⟩ *deleted text* ⟨A1

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components - Hydraulics*

A1⟩ *deleted text* ⟨A1

A1⟩ EN 13218:2002 ⟨A1, *Machine tools — Safety — Stationary grinding machines*

A1⟩ EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)* ⟨A1

A1⟩ EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60033-1:2001, modified)* ⟨A1

A1⟩ EN 60335-2-41:2003, *Household and similar electrical appliances — Safety — Part 2-41: Particular requirements for pumps (IEC 60335-2-41:2002)* ⟨A1

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

A1⟩ EN 61029-1:2000 ⟨A1, *Safety of transportable motor operated electric tools — Part 1: General requirements (IEC 61029-1:1990, modified)*

A1⟩ prEN ISO 3744:2006, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering method for an essentially free field over a reflecting plane (ISO/DIS 3744:2006)* ⟨A1

A1⟩ EN ISO 5349-2:2001, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 2: Practical guidance for measurement at the workplace (ISO 5349-2:2001)*

EN ISO 8041:2005, *Human response to vibration — Measuring instrumentation (ISO 8041:2005)* ⟨A1

EN ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at the work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)*

A1⟩ 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 13732-1:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 20643:2008, *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission (ISO 20643:2005)* ⟨A1⟩

ISO 525:1999, *Bonded abrasive products — General requirements*

⟨A1⟩ ISO 6104:2005, *Superabrasive products — Rotating grinding tools with diamond or cubic boron nitride — General survey, designation and multilingual nomenclature* ⟨A1⟩

⟨A1⟩ ISO 5348:1998, *Mechanical vibration and shock — Mechanical mounting of accelerometers* ⟨A1⟩

⟨A1⟩ ISO 6395:2008 ⟨A1⟩, *Acoustics — Measurement of exterior noise emitted by earth-moving machinery — Dynamic test conditions*

⟨A1⟩ ISO 7000:2004 ⟨A1⟩, *Graphical symbols for use on equipment — Index and synopsis*

⟨A1⟩ ISO 16063-1:1998, *Methods for the calibration of vibration and shock transducers — Part 1: Basic concepts* ⟨A1⟩

3 Terms and definitions

For the purposes of this European Standard the terms and definitions stated in ⟨A1⟩ EN ISO 12100-1:2003 ⟨A1⟩ apply. Additional terms and definitions specifically needed for this European Standard are added below.

3.1
floor sawing machine
mobile machine used on sites, designed for sawing, grooving and grinding ground surfaces made of concrete, asphalt and similar mineral building materials which is ⟨A1⟩ *deleted text* ⟨A1⟩ pedestrian controlled

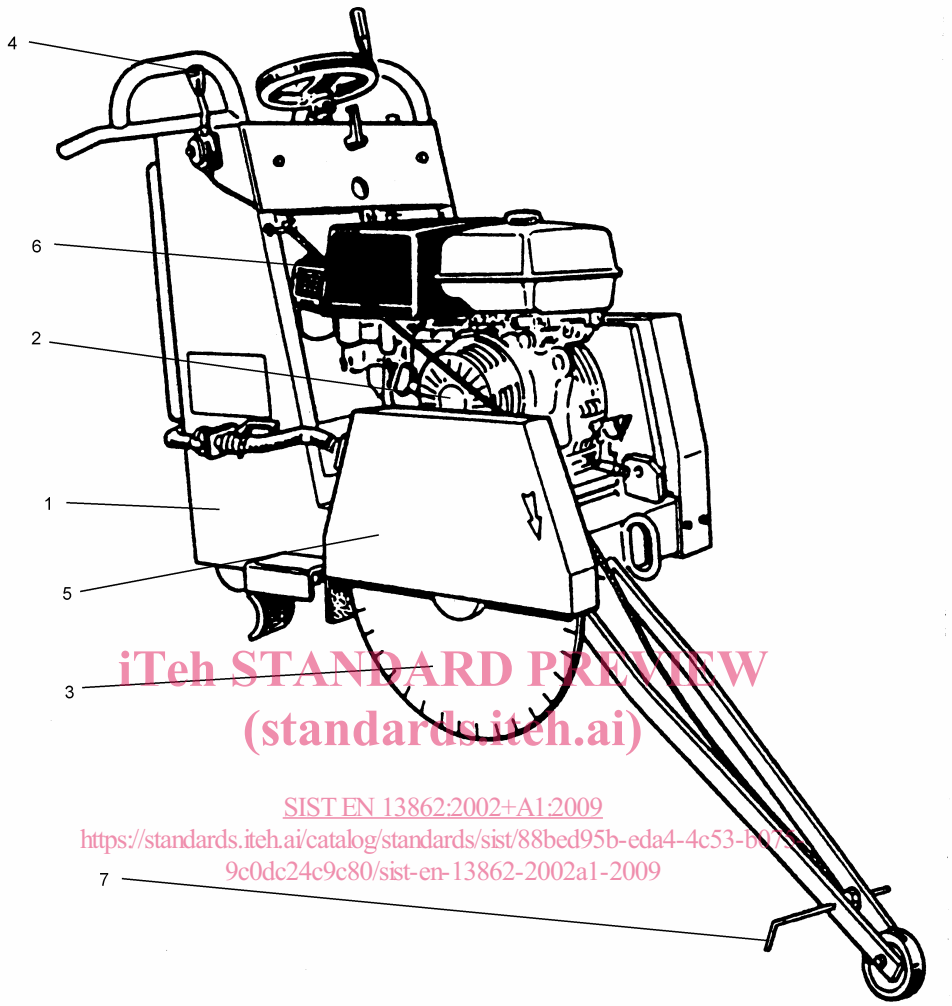
3.2
types of machines
floor sawing machines may be of the following types:

3.2.1
hand feed machine
machine in which the feed movement is effected by the pushing action of the operator

3.2.2
machine with manual feed by mechanical means
machine in which the feed movement is effected by manual operation of a crank or wheel

3.2.3
self-propelled machine
machine whose feed movement is obtained by a power source via mechanical or hydraulic power transmission. Self-propelled machines are ⟨A1⟩ *deleted text* ⟨A1⟩ pedestrian controlled

3.3
parts of a floor sawing machine
a floor sawing machine generally comprises the parts shown in figure 1



Key

1 Frame
2 Electric motor, or internal combustion engine which generates the power for driving the tool(s) and which generates the power for the feeding movement to the machine (for self propelled machines)
3 Tool(s) (illustrated as a cutting-off wheel)
4 Control devices for the functions and feed of the machine
5 Guards limiting the hazard of contact in dangerous areas
6 Water supply system for cooling the diamond cutting-off wheel(s)
7 Sawing guiding device of the machine (when necessary)

NOTE Figure 1 is an example of one of the many machines available for floor sawing, grooving and milling. It illustrates the main components in its construction.

Figure 1 — Typical example of a pedestrian controlled floor sawing machine

3.4
cutting head
assembly comprising the power unit, the rotating tool(s) and its fixing attachment. It may be integral to the frame of the machine or the drive unit which causes forward movement of the machine along the ground, in order to perform sawing, grooving or milling operation

3.5
rated spindle speed
speed of the drive spindle, in revolutions per minute (min^{-1}) at the rated conditions specified by the machine manufacturer without cutting-off wheel(s) and under no load

3.6
tool(s)
rotating abrasive tool(s) which perform(s) the cutting operation. The tool(s) is(are) (a) rotating (segmented) diamond cutting-off wheel or (an) abrasive cutting-off reinforced bonded wheel(s) type 41 according to ISO 525:1999 and ⒶA1 ISO 6104:2005 A1Ⓐ

NOTE Other types of abrasive wheels may also be mounted either alone or as several units together according to the design and usage parameters of the machine.

3.7
tool flange
mounting device including several parts which securely hold and position the rotating tool/tools on the drive spindle

3.8
tool guard
guard which encloses the non-working part of the rotating tool

3.9
nominal mass
the mass of the machine equipped with all its dismountable parts, but without the tool(s) mounted, the attached tank(s) being empty

3.10
maximum operating mass
the mass of the machine equipped with all its dismountable parts, ready for use, with the tool(s) mounted and the attached tank(s) being full

4 List of significant hazards

This clause contains all significant hazards and hazardous situations, as far as they are dealt with in this European Standard, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce risk.

Table 1 — List of significant hazards

	Hazards	Concerned subclauses
4.1	Hazards due to mass and velocity (kinetic energy of elements in controlled and uncontrolled motion) of the tool	5.1.3
4.2	Hazards due to inadequacy of mechanical strength of the tool	5.1.3
4.3	Crushing hazard	5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6, 5.1.7, 5.1.8, 5.1.9, 7.2
4.4	Shearing hazard	5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.1.8, 5.1.9
4.5	Cutting and severing hazard	5.1.1, 5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.1.8, 5.1.9
4.6	Entanglement hazard	5.1.2, 5.1.3, 5.1.6, 5.1.8, 5.1.9
4.7	Drawing-in or trapping hazard	5.1.2, 5.1.3, 5.1.6, 5.1.8, 5.1.9
4.8	Impact hazard	5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.1.7, 5.1.8, 5.1.9, 7.2
4.9	Friction or abrasion hazard	5.1.2.3, 7.2
4.10	Fluid ejection hazard	5.5
4.11	Hazards caused by ejection of parts (material/work pieces)	5.1.2, 5.1.3, 5.1.6, 5.1.7, 5.8
4.12	Excessive speed of pedestrian controlled machinery	5.1.8.3
4.13	Hazards caused by loss of stability (machinery and machine parts)	5.1.4, 7.2
4.14	Slip, trip and fall hazard in relationship with machinery	5.6, 7.2
4.15	Hazards caused by electrical contact direct or indirect	5.2, 7.2
4.16	Hazards resulting in burns and/or scalds, by possible contact of persons, by flames or explosions and also by radiation of heat sources	5.3, 7.2
4.17	Hazards generated by noise	5.9, 7.2
4.18	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	5.4, 5.6, 5.7, 7.2
4.19	Hazards caused by fire and/or explosion	7.2
4.20	Hazards from the engine and batteries	5.4, 5.6, 7.2
4.21	Unauthorized start-up	5.1.8.3
4.22	Unhealthy postures or excessive efforts	5.1.5, 5.1.8, 7.2
4.23	Hazards caused by inadequate local lighting	7.2
4.24	Hazards caused by human errors	7.1, 7.2
4.25	Hazard combinations	5, 7.1, 7.2

(continued)

Table 1 - List of significant hazards (concluded)

	Hazards	Concerned subclauses
4.26	Hazard caused by failure of energy supply (of energy and/or control circuits)	5.1.9, 5.2, 7.2
4.27	Hazards caused by failure/disorder of control system	5.1.8.1, 5.1.9, 5.2, 7.2
4.28	Inadequate design of manual controls and their mode of operation	5.1.7
4.29	Hazards caused by errors of fitting	5.1.6, 7.1, 7.2
4.30	Hazards caused by temporarily missing and/or incorrectly positioned safety related measures/means such as:	
4.30.1	Guards of all kinds	7.2
4.30.2	Safety related protection devices of all kinds	7.2
4.30.3	Starting and stopping devices	5.1.8.2, 7.2
4.30.4	Safety signs and tags	7.1, 7.2
4.30.5	Information and warning devices of all kinds	7.1, 7.2
4.30.6	Insufficient instructions for the driver/operator	7.2
4.30.7	Essential equipment and accessories for safe adjustment and/or maintenance	7.2
[A1] 4.31	Hazards generated by vibration	Annex F [A1]

5 Safety requirements and/or measures

Machinery shall comply with the safety requirements and/or measures of this clause and in addition with [A1] EN ISO 12100-1:2003 and EN ISO 12100-2:2003 [A1] for hazards relevant but not significant which are not dealt with in this standard.

For the application of EN 294:1992, [A1] EN 953 [A1], EN 982:1996 and [A1] EN 60204-1:2006 [A1] the manufacturer shall carry out an adequate risk assessment of their requirements, where it is necessary to make choices.

NOTE This specific risk assessment should be part of the general risk assessment relating to the hazards not covered by this standard.

Covering each significant individual hazard is sufficient for covering combinations of hazards.

5.1 Mechanical hazards

5.1.1 General

As components and parts have to be manually handled, all the accessible parts, the tool excepted, shall not present sharp edges or angles/corners which could generate hazards when setting, using, handling, and maintaining the machine. Burrs resulting from, for example, manufacturing, casting or welding shall be eliminated and sharp edges shall be smoothed.

5.1.2 Protection against moving parts

5.1.2.1 Transmission parts

Rotating transmission parts, for example drive shafts, couplings, belt drives shall be provided with fixed guards to prevent contact. [A1] These guards shall comply with EN 953 and 5.3.2.2 of EN ISO 12100-2:2003. [A1] Fixed guards shall be held in position either by welding or by mounting them in such a way that they can be opened or removed only with the aid of tools or keys.

Guards shall comply with the provisions of EN 294:1992 on safety distances.

[A1] *deleted text* [A1]

5.1.2.2 Connection between the cutting head and the frame

When the vertical movement of the cutting head with respect to the frame is power driven, safety distances according to EN 294:1992 shall be provided.

5.1.2.3 Protection of the tool

5.1.2.3.1 General

Machines shall be equipped with a guard covering at least the upper half of the tool(s) and its fixing device(s) (see figure C.1).

Specifications concerning the strength of the guards are given in annex C.

The guard(s) shall be so designed to facilitate safe and easy access for tool replacement.

When the tool guard is removable to allow access to the tool fixing device, the machine shall be so designed that the rotation of the tool(s) may not be possible without the guard. The following exception is possible.

The presence of a device for stopping the tool(s) is not necessary when the absence or the opening of the guard creates a projection of water, which prevents the intended use of the machine. The guard shall remain fixed to the machine also in the open position and a warning sign (see figure D.3) shall be provided at the guard.

5.1.2.3.2 Open parts in the guard

When the guard is designed with a section which can be opened at the front in order to visually position the rotating tool in relation with the cutting line, or to allow it to perform a cut close to a vertical surface, then:

— the open section shall stay connected to the main guard;

— the retaining device of the rotating tool(s) shall remain covered.

5.1.2.3.3 Complementary requirements to prevent contact with the tool(s) out of the cutting area

Contact with the tool(s) in rotation during the displacement of the machine outside the cutting area shall be prevented as follows:

— either all parts of the tool(s) (in particular the lower part) shall be guarded when the machine is set for displacement or;

— if the tool(s) is(are) not completely guarded, the machine shall be designed to allow displacement without the tool rotating, for example by means of a clutch and the guard shall carry a warning sign stating the following: