



SLOVENSKI STANDARD

SIST EN 13862:2022

01-marec-2022

Nadomešča:

SIST EN 13862:2002+A1:2009

Talni odrezovalni stroji - Varnost

Floor cutting-off machines - Safety

Bodentrennschleifmaschinen - Sicherheit

Machines à scier les sols - Sécurité

Ta slovenski standard je istoveten z: EN 13862:2021

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ICS:

93.080.10

Gradnja cest

Road construction

SIST EN 13862:2022

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13862

December 2021

ICS 93.080.10

Supersedes EN 13862:2001+A1:2009

English Version

Floor cutting-off machines - Safety

Machines à scier les sols - Sécurité

Bodentrennschleifmaschinen - Sicherheit

This European Standard was approved by CEN on 15 November 2021.

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European foreword

This document (EN 13862:2021) 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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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 13862:2001+A1:2009.

This document has been prepared under a Standardization Request 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.

The main differences between this standard and EN 13862:2001+A1:2009 are as follows:

- a) normative references (Clause 2) revised and updated;
- b) list of significant hazards revised and updated;
- c) requirements for warnings;
- d) requirements for Information for use;
- e) requirements for operator's instructions;
- f) requirements for noise test code;
- g) illustrations and pictograms updated.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 13862:2021 (E)**Introduction**

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

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 in 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 requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements 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 document applies to pedestrian-controlled floor-sawing machines having travel power feed or manual feed (see 3.1) 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 document deals with all significant hazards, hazardous situations or hazardous events relevant to floor sawing machines, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A). This document specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards during the lifetime of the machinery as described in EN ISO 12100:2010, 5.4.

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.

This document does not apply to:

- self-propelled ride-on floor-sawing machines;
- 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.

In this document, floor-sawing machines are called “machines”, and cutting-off wheels are also called “tools”.

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

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 206:2013+A2:2021, *Concrete — Specification, performance, production and conformity*

EN 12096:1997, *Mechanical vibration — Declaration and verification of vibration emission values*

EN 13236:2019, *Safety requirements for superabrasive products*

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016)*

EN 60335-2-41:2003,¹ *Household and similar electrical appliances — Safety — Part 2-41: Particular requirements for pumps (IEC 60335-2-41:2002)*

¹ As impacted by EN 60335-2-41:2003/A1:2004 and EN 60335-2-41:2003/A2:2010.

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EN 60529:1991,² *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1991)*

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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*

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

EN ISO 5349-2:2001,³ *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 8041-1:2017, *Human response to vibration — Measuring instrumentation — Part 1: General purpose vibration meters (ISO 8041-1:2017)*

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)*

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

EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

EN ISO 20643:2008,⁴ *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission (ISO 20643:2005)*

ISO 5348:2021, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

² As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

³ As impacted by EN ISO 5349-2:2001/A1:2015.

⁴ As impacted by EN ISO 20643:2008/A1:2012.

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

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

floor-sawing machine

mobile hand-guided machinery used on sites, designed for sawing, grooving and grinding ground surfaces made of concrete, asphalt and similar mineral building materials which is pedestrian-controlled

Note 1 to entry: Floor-sawing machines with different types of cutting-depth adjustment shown in Figure 1.

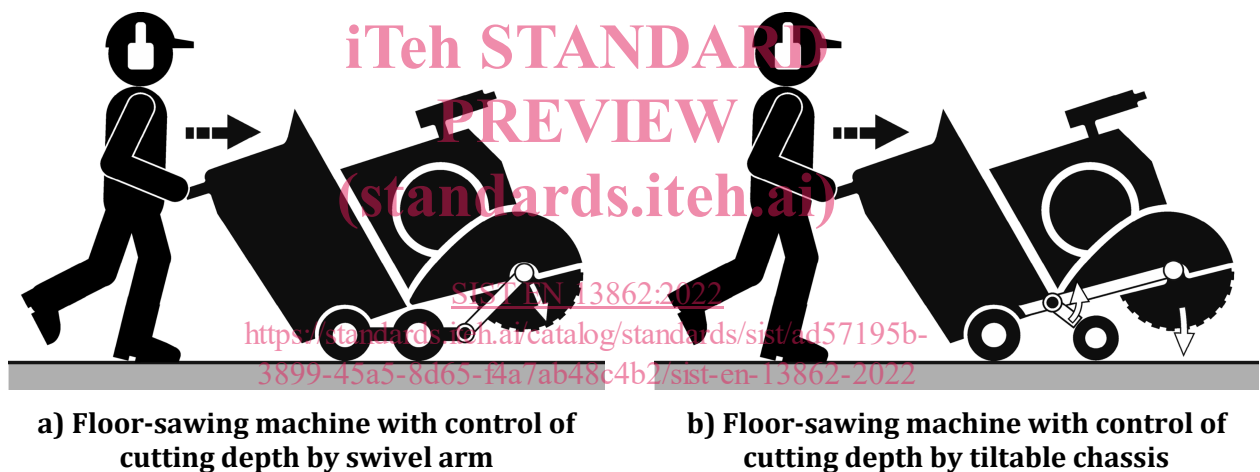
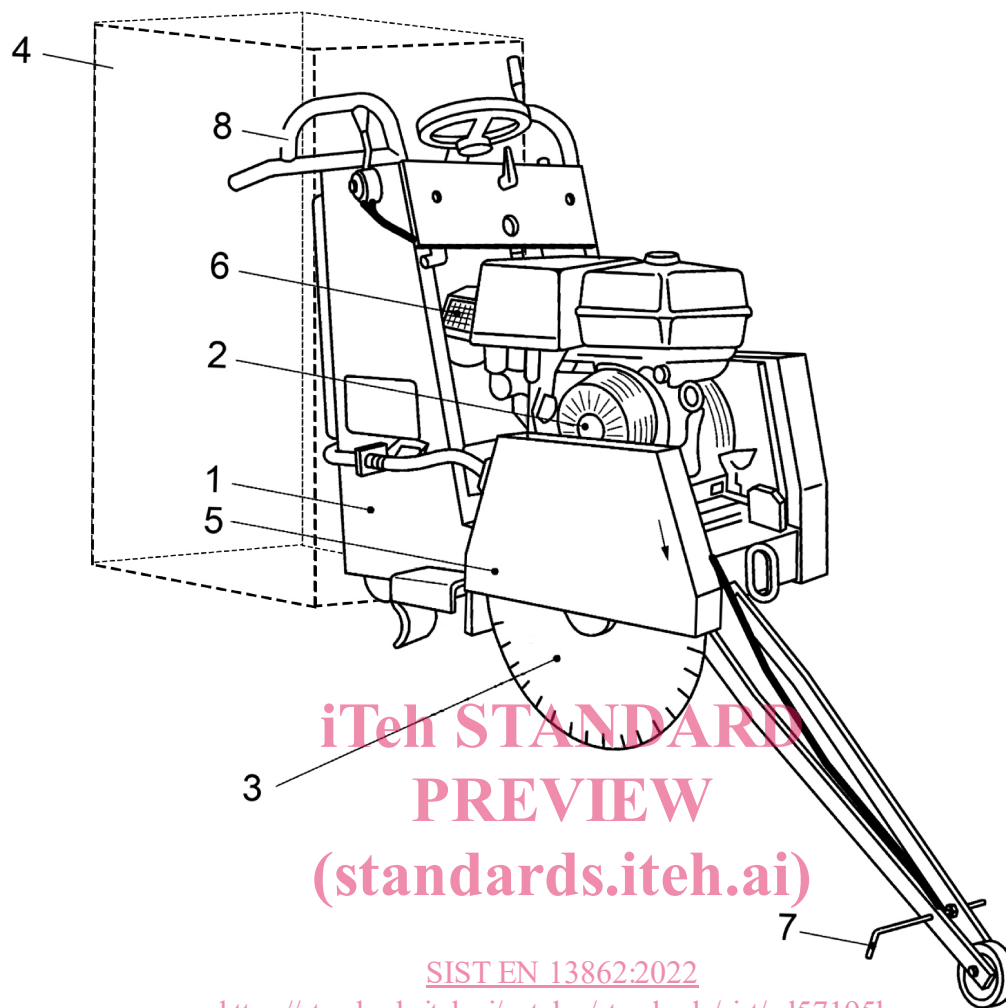


Figure 1 — Types of cutting-depth adjustment

Note 2 to entry: There are different types of floor-sawing machines:

- hand feed machine in which the feed movement is effected by the pushing action of the operator;
- machine with manual feed by mechanical means in which the feed movement is effected by manual operation of a crank or wheel;
- self-propelled machine whose feed movement is obtained by a power source via mechanical or hydraulic power transmission. Self-propelled machines are pedestrian-controlled.

Note 3 to entry: Floor-sawing machines comprising the following parts, see Figure 2.



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Key

- 1 frame
- 2 electric motor or internal combustion engine which generates the power for driving the cutting-off wheel(s) and which generates the power for the feeding movement to the machine (for self-propelled machines)
- 3 cutting-off wheel
- 4 operator's position, within reach of control devices (e.g. height adjustment, stop switch and travel, if self-propelled)
- 5 guard enclosing the not-working part of the rotating cutting-off wheel(s) (tool guard)
- 6 water supply system for cooling the diamond cutting-off wheel(s)
- 7 sawing-guiding device of the machine (when necessary)
- 8 handles (operator's position behind the machine, in-between the handles) for steering and pushing

Figure 2 — Typical example of a pedestrian-controlled floor-sawing machine

Note 4 to entry: Figure 2 is an example of one of the many machines available for floor sawing, grooving and milling. It illustrates the main components in its construction.

3.2**cutting head**

assembly comprising the power unit, the rotating tool(s) and its fixing attachment

Note 1 to entry: It can 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.

3.3**rated spindle speed**

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

3.4**cutting-off wheel**

rotating abrasive tool(s) which perform(s) the cutting operation; the cutting-off wheel(s) is(are) (a) rotating (segmented) diamond or boron nitride cutting-off wheel

Note 1 to entry: Cutting-off wheels are mounted either alone or as several units together according to the design and usage parameters of the machine.

Note 2 to entry: Cutting-off wheels are defined in EN 13236:2019.

3.5**flange**

mounting device including several parts which securely hold and position the rotating cutting-off wheel(s) on the drive spindle

3.6**tool guard**

guard which encloses the non-working part of the rotating cutting-off wheel

3.7**nominal mass**

mass of the machine equipped with all its dismountable parts, but without the cutting-off wheel(s) mounted, the attached tank(s) being empty

3.8**maximum operating mass**

mass of the machine equipped with all its dismountable parts, ready for use, with the cutting-off wheel(s) mounted and the attached tank(s) being full

3.9**working area**

restricted hazardous area where the machine is operated in cutting process:

- 5 m to the front of the machine in the direction of working;
- 5 m behind the operator's handles in the opposite direction of working;
- 1 m on each side of the cutting-off blade

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4 Safety requirements and/or protective/risk reduction measures**4.1 General**

Machinery shall comply with the safety requirements and/or protective/risk reduction measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards which are not dealt with by this document.

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

4.2 Mechanical hazards**4.2.1 General**

Components and parts which shall be manually handled and all the accessible parts, with the exception of the tool, shall be free of sharp edges and burrs 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.

4.2.2 Protection against moving parts**4.2.2.1 Transmission parts**

Rotating transmission parts, for example, couplings and belt drives for drive shafts and mechanical water pumps shall be provided with fixed enclosing guards to prevent contact. These guards shall comply with EN ISO 14120:2015 and EN ISO 13857:2019, Table 4. Fixed enclosing 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.

Fixed enclosing guards shall have their fixing system permanently attached to the guard and/or the machine when the guard is removed.

4.2.2.2 Connection between the cutting head and the frame

When the vertical movement of the cutting head with respect to the frame is power-driven, the design shall comply with the safety distances according to EN ISO 13857:2019, Table 7.

4.2.2.3 Protection of the cutting-off wheel**4.2.2.3.1 General**

In minimum, the upper part of the cutting-off wheel and its non-smooth fixing device(s) (i.e. spindle nuts or bolts, see Figure D.1) shall be covered with a fixed solid guard complying with EN ISO 14120:2015, to avoid inadvertent contact and to protect against ejection of fragments from the cutting-off wheel and the work piece, water, dust and debris.

Specifications concerning the strength of the guards are given in Annex D.

The guard(s) shall be so designed to facilitate safe and easy access for the cutting-off wheel replacement.

When the guard is removed or opened, the guard-fixing system shall be permanently attached to the guard and/or the machine.

The machine shall be so designed that the absence or the opening of the guard creates a projection of water, dust or debris during operation, which hinders the intended use of the machine.

4.2.2.3.2 Front open parts in the guard

When the guard is designed with a section which can be opened at the front in order to allow to perform a cut close to a vertical surface, then:

- the open section shall stay connected to the main guard and shall be held in position when open;
- the non-smooth fixing device of the rotating cutting-off wheel(s) shall remain covered;
- the operator shall be informed to open the front part of the guard only to perform a cut in front of a vertical surface and of the additional hazards associated to open the guard (see 6.3.4).

4.2.2.3.3 Complementary requirements to prevent contact with the rotating cutting-off wheel(s) outside the working area

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

- either the cutting-off wheel(s) shall be guarded completely except the bottom when the machine is set for displacement or
- if the cutting-off wheel(s) is(are) not completely guarded, the machine shall be designed to allow displacement without the cutting-off wheel rotating and the machine shall carry a warning sign stating the following:

“All displacement of the machine outside the working area shall be carried out with the cutting-off wheel not in rotation” (see Figure E.2).

4.2.3 Minimum strength of the guard

The guards for rotating cutting-off wheels shall be so designed to resist strains resulting from an accidental projection of a segment of the cutting-off wheel. Any brittleness damage of the guard material shall be avoided. A permanent plastic deformation of the guard resulting from stresses is acceptable as long as the guard fulfils its protective function and can be normally assembled/disassembled.

Annex D indicates characteristics of guards which correctly fulfil their function.

4.2.4 Immobilization, stability

4.2.4.1 Immobilization

Machines whose nominal mass exceeds 100 kg shall be equipped with a device which allows their immobilization (e.g. mechanical parking brake or self-sustaining system) on a slope of 10° with the machine in a position and configuration giving the maximum load on the braked wheel(s).

4.2.4.2 Stability

The machines shall be designed and constructed so that they are sufficiently stable under the intended operating conditions, e.g. movement on site, cutting and parking.

This shall be verified under the most unfavourable conditions with the machine located on a plane inclined at 10° to the horizontal and with the machine-power source switched off. The immobilization means (if any) shall be in use during the test. For machines without immobilization means, the wheels shall be blocked for the test. Under these test conditions, the machine shall not overturn.