



SLOVENSKI STANDARD

SIST EN 13862:2002

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Nadomešča:
SIST EN 500-5:2000

Floor cutting-off machines - Safety

Floor cutting-off machines - Safety

Bodentrennschleifmaschinen - Sicherheit

Machines à scier les sols - Sécurité

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Road construction

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EUROPEAN STANDARD
NORME EUROPÉENNE
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Floor cutting-off machines - Safety

Machines à scier les sols - Sécurité

Bodentrennschleifmaschinen - Sicherheit

This European Standard was approved by CEN on 25 July 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents**Page**

Foreword	3
0 Introduction	4
1 Scope.....	4
2 Normative references	5
3 Terms and definitions.....	6
3.1 Floor sawing machine	6
3.2 Types of machines.....	6
3.3 Parts of a floor sawing machine	6
3.4 Cutting head	8
3.5 Rated spindle speed	8
3.6 Tool(s).....	8
3.7 Tool flange	8
3.8 Tool guard.....	8
3.9 Nominal mass	8
3.10 Maximum operating mass	8
4 List of significant hazards.....	9
5 Safety requirements and/or measures	10
5.1 Mechanical hazards	10
5.2 Electrical hazards	14
5.3 Thermal hazards	15
5.4 Exhaust fumes (and gas)	15
5.5 Machines having a hydraulic power transmission	15
5.6 Fluid containers.....	16
5.7 Water supply and dust emission	16
5.8 Rotational speed	16
5.9 Noise.....	16
5.10 Maintenance	17
6 Verification of safety requirements and/or measures	17
7 Information for use	17
7.1 Marking	17
7.2 Accompanying documents	18
Annex A (normative) Noise test code - Grade 2 of accuracy.....	22
Annex B (normative) Dimensions of the flanges for cutting-off diamond wheels.....	25
Annex C (normative) Strength of the guards - State of the art concerning the characteristics of guards used with cutting-off wheels.....	27
Annex D (normative) Pictograms	31
Annex E (normative) Verification of surface temperature.....	33
Annex ZA (informative) Relationship of this document with EC Directives	34
Bibliography	35

Foreword

This European Standard 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 March 2002, and conflicting national standards shall be withdrawn at the latest by March 2002.

This European Standard replaces EN 500-5:1995.

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 Directives, see informative annex ZA, which is an integral part of this standard.

The annex A is normative and contains "Noise test code - Grade 2 of accuracy", annex B is normative and contains "Dimensions of the flanges for cutting-off diamond wheels", annex C is normative and contains "Strength of guards - State of the art concerning the characteristics of guards used with cutting-off wheels", annex D is normative and contains „Pictograms“, the annex E is normative and contains „Verification of surface temperature“ and the annex ZA is informative and contains „Relationship of this document with EC Directives“.

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

EN 13862:2001 (E)

0 Introduction

This European standard is a Type C-standard as stated in EN 292.

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 self-propelled ride-on¹⁾ and 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:

- 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.

¹⁾ Specific requirements related to the operator's station and the mobility of ride-on machines will be added later on by an amendment.

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

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 (including amendments).

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
EN 294:1992	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
EN 563:1994	Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces
EN 953:1997	Safety of machinery – Guards - General requirements for the design and construction of fixed and movable guards
EN 954-1:1996	Safety of machinery - Safety related parts of control systems - Part 1: General principles of design
EN 982:1996	Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics
EN 1070:1998	Safety of machinery – Terminology
prEN 13218:1998	Machine tools – Safety – Stationary grinding machines
EN 60204-1:1997	Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:1997)
EN 60335-1:1994	Safety of household and similar electrical appliances - Part 1: General requirements (IEC 60335-1:1991, modified)
EN 60335-2-41:1996	Safety of household and similar electrical appliances – Part 2: Particular requirements for pumps for liquids having a temperature not exceeding 35 °C (IEC 60335-2-41:1996)
EN 60529:1991	Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)
EN 61029-1:1995	Safety of transportable motor operated electric tools - Part 1: General requirements (IEC 61029-1:1990, modified)

EN 13862:2001 (E)

EN ISO 3744:1995	Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)
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)
ISO 525:1999	Bonded abrasive products - General requirements
ISO 6104:1979	Abrasive products - Diamond or cubic boron nitride grinding wheels and saws - General survey, designation and multilingual nomenclature
ISO 6395:1988	Acoustics - Measurement of exterior noise emitted by earth-moving machinery - Dynamic test conditions
ISO 7000:1989	Graphical symbols for use on equipment - Index and synopsis

3 Terms and definitions

For the purposes of this European Standard the terms and definitions stated in EN 1070:1998 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 ride-on operated or 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

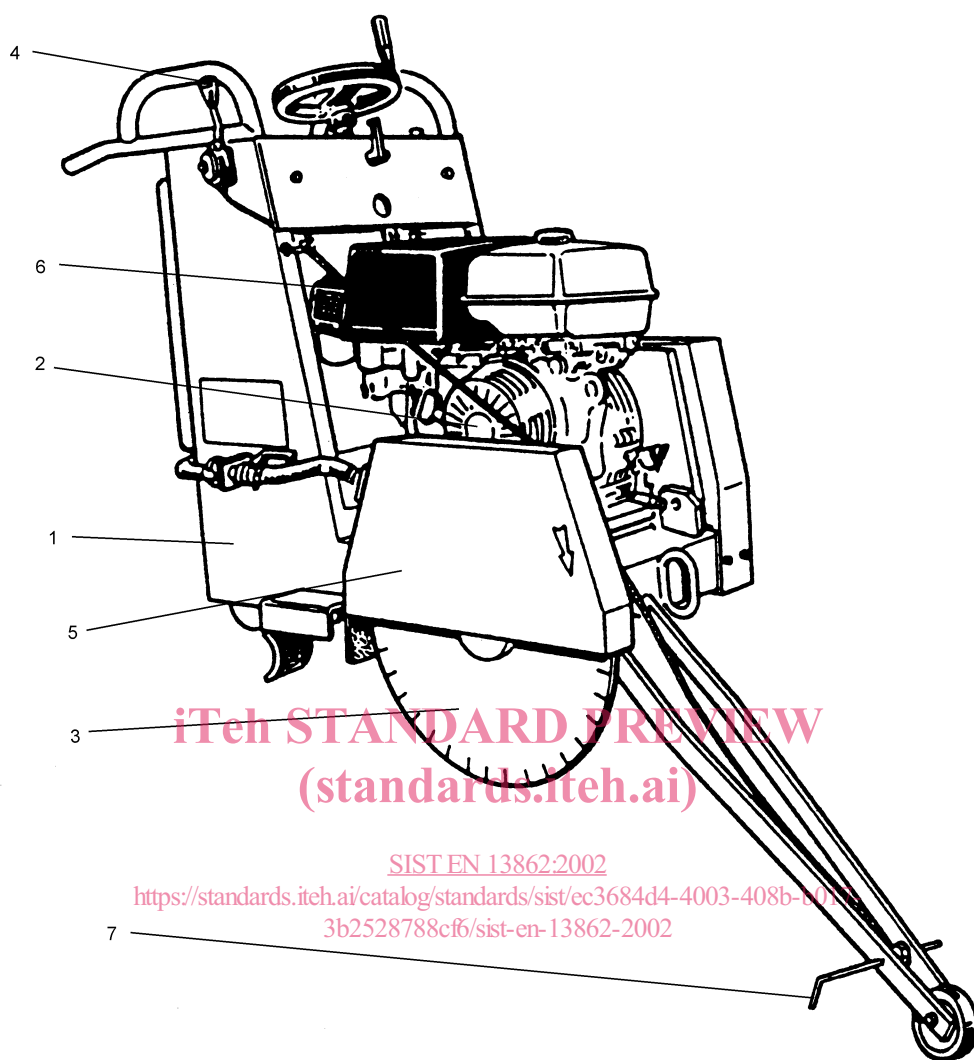
Machine in which the feed movement is effected by manual operation of a crank or wheel

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 ride-on operated or 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

EN 13862:2001 (E)

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 ISO 6104:1979

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

5 Safety requirements and/or measures

Machinery shall comply with the safety requirements and/or measures of this clause and in addition with EN 292-1:1991 and EN 292-2:1991 for hazards relevant but not significant which are not dealt with in this standard.

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For the application of EN 294:1992, EN 953:1997, EN 982:1996 and EN 60204-1:1997 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. These guards shall comply with EN 953:1997 in particular