



# SLOVENSKI STANDARD

## SIST EN 474-8:2000

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### Earth-moving machinery - Safety - Part 8: Requirements for graders

Earth-moving machinery - Safety - Part 8: Requirements for graders

Erdbaumaschinen - Sicherheit - Teil 8: Anforderungen für Grader

Engins de terrassement - Sécurité - Partie 8: Exigences applicables aux niveleuses

Ta slovenski standard je istoveten z: EN 474-8:1998

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#### ICS:

53.100      Stroji za zemeljska dela      Earth-moving machinery

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EUROPEAN STANDARD

EN 474-8

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 1998

ICS 53.100

Descriptors: earth moving equipment, graders, safety of machines, accident prevention, safety requirements, specifications, operating stations, human factors engineering, control devices, engine noise, sound power, hazards

English version

## Earth-moving machinery - Safety - Part 8: Requirements for graders

Engins de terrassement - Sécurité - Partie 8: Exigences applicables aux niveleuses

Erdbaumaschinen - Sicherheit - Teil 8: Anforderungen für Grader

This European Standard was approved by CEN on 2 March 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## 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 September 1998, and conflicting national standards shall be withdrawn at the latest by September 1998.

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 Directive(s), see informative Annex ZA, which is an integral part of this standard.

The annex A is normative and contains "List of additional hazards" and the annex B is informative and contains "Illustrations".

EN 474 "Earth-moving machinery - Safety" comprises the following parts:

Part 1	General requirements
Part 2	Requirements for tractor-dozers
Part 3	Requirements for loaders
Part 4	Requirements for backhoe-loaders
Part 5	Requirements for hydraulic excavators
Part 6	Requirements for dumpers
Part 7	Requirements for scrapers
Part 8	Requirements for graders
Part 9	Requirements for pipelayers
Part 10	Requirements for trenchers
Part 11	Requirements for earth and landfill compactors
Part 12	Requirements for rope excavators.

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.

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## 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 standard.

## 1 Scope

This European Standard specifies additional requirements to and/or exceptions from EN 474-1:1994 "Earth-moving machinery - Safety - Part 1: General requirements".

This European Standard applies to graders defined in 3.2, and gives additional requirements for derivated machinery.

This European Standard deals with all significant hazards pertinent to graders when they are used as intended and under the conditions foreseen by the manufacturer (see annex A of this European Standard and annex C of EN 474-1:1994). This European Standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

When graders are intended for use in winter service, see prEN .....<sup>1)</sup> „Winter service machines - Safety requirements“.

## 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.

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 specification
EN 474-1:1994	Earth-moving machinery - General Safety Requirements <small>SIST EN 474-8:2000</small>
ENV 1070:1993	Safety of machinery - Terminology <small><a href="https://standards.iteh.ai/catalog/standards/sist/b5ef1810-499a-4d67-99a9-527aa9bd8942/sist-en-474-8-2000">https://standards.iteh.ai/catalog/standards/sist/b5ef1810-499a-4d67-99a9-527aa9bd8942/sist-en-474-8-2000</a></small>
EN 60068-2-27:1993	Basic environmental testing procedures - Part 2: Tests - Test Ea and guidance: Shock
EN 60204-1:1992	Safety of machinery - Electrical equipment - Part 1: General requirements

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<sup>1)</sup> In elaboration in CEN/TC 151/WG 5/SWG 3

EN 60529:1991	Degrees of protection provided by enclosures (IP Code)
ISO 3457:1986	Earth-moving machinery - Guards and shields - Definitions
ISO 4250-2:1991	Narrow and wide base off-road tyres and rims - Part 2: Loads and inflation pressures
ISO/DIS 4250-3:1993	Earth-mover tyres and rims - Part 3: Rims
ISO 5006-1:1991	Earth-moving machinery - Operator's field of view - Part 1: Test method
ISO 5010:1992	Earth-moving machinery - Rubber-tyred machines - Steering requirements
ISO 5353:1995	Earth-moving machinery, and tractors and machinery for agriculture and forestry - Seat index point
ISO 6014:1986	Earth-moving machinery - Determination of ground speed
ISO 6165:1997	Earth-moving machinery - Basic types - Vocabulary
ISO/DIS 6393:1995	Acoustics - Measurement of exterior noise emitted by earth-moving machinery - Stationary test condition
ISO 6405-1:1991	Earth-moving machinery - Symbols for operator controls and other displays - Part 1: Common symbols
ISO 6405-2:1993	Earth-moving machinery - Symbols for operator controls and other displays - Part 2: Specific symbols for machines, equipment and accessories
ISO 6682:1986	Earth-moving machinery - Zones of comfort and reach for controls
ISO 7096:1982	Earth-moving machinery - Operator seat - Transmitted vibration
ISO 7134:1985	Earth-moving machinery - Graders - Terminology and commercial specifications
ISO 9244:1995	Earth-moving machinery - General principles for safety signs and hazard pictorials
ISO/DIS 9249:1995	Earth-moving machinery - Engine test code - Net power <small>SIST EN 474-8:2000</small>
ISO 10263-2:1994	Earth-moving machinery - Operator enclosure environment - Part 2: Air filter test <small>https://standards.iteh.ai/catalog/standards/sist/b5c21810-499a-4d67-99a9-527aa9bd8942/sist-en-474-8-2000</small>
ISO 10263-4:1994	Earth-moving machinery - Operator enclosure environment - Part 4: Operator enclosure ventilation, heating and/or air-conditioning test method
ISO 10968:1995	Earth-moving machinery - Operator's controls
ISO 12509:1995	Earth-moving machinery - Lighting, signalling and marking lights, and reflex-reflector devices



### 3 Definitions

For the purposes of this European Standard the definitions stated in ENV 1070:1993 apply.

Additional definitions specifically needed for this European Standard are added below.

#### 3.1 Common definitions

Terminology for graders is specified in ISO 7134:1985 and illustrated in annex B of this European Standard.

Definitions used in EN and ISO standards referred to in this European Standard are also valid for this European Standard.

#### 3.2 Additional definitions

**Grader:** Self-propelled wheeled machine, having an adjustable blade positioned between front and rear axles. The machine may be equipped with front-mounted blade or scarifier which also can be located between front and rear axles. The machine is primarily designed for grading, sloping, ditching, and scarifying of materials through motion of the machine (see ISO 6165:1997)

### 4 Safety requirements

#### 4.1 Operator's station

##### 4.1.1 Heating and ventilation system

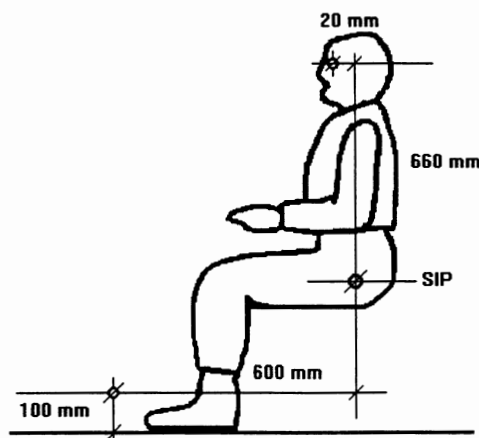
If a heating and ventilation system according to 4.2.2.6 of EN 474-1:1994 is required the following applies. The heating and ventilation system shall:

- either comply with ISO 10263-4:1994;
- or have the capacity of increasing the temperature of the air inside the cab and maintain a temperature of + 18° C at the expected ambient temperature. The minimum capacity of the heating system shall have a  $\Delta T$  of 25° C measured at - 10° C ambient temperature.

Measurement of the system capacity shall be made at three points. The three points shall be located in a vertical plane through the SIP and parallel to the longitudinal axis of the machine as follows (see figure 1):

- at filament position centre-point as defined in ISO 5006-1:1991;
- at the SIP as defined in ISO 5353:1995;
- 100 mm above floor plate and 600 mm in front of SIP.





**Figure 1: Location of measuring points**

Alternatively the heating capacity can be determined by calculation.

The ventilation system shall be capable of providing the cab with filtered fresh air at the minimum of 43 m<sup>3</sup>/h. The filter shall be tested according to ISO 10263-2:1994.

NOTE: The filter element selection depends on the intended operating environment conditions.

#### **4.2 Fenders**

Graders without a cab shall have fenders which comply with ISO 3457:1986.

Graders with a maximum designed speed (see ISO 6014:1986) > 30 km/h shall be equipped with fenders (except front wheels) that protect the operator's station from debris ejected by the tyres if the risk exists.

#### **4.3 Operator seat vibrations**

EN 474-1:1994, 4.3.1.3 applies with the following provision:

The value of vibrations transmitted by the operator's seat shall comply with ISO 7096:1982 with an input vibration of class 4. (standards.iteh.ai)

#### **4.4 Operator's controls**

Operator's controls shall comply with ISO 10968:1995.

The normal engine stopping device shall be within the zone of reach (see ISO 6682:1986).

##### **4.4.1 Remote control**

EN 474-1:1994, 4.4.2.6 applies with the following additions: