



**SLOVENSKI STANDARD**  
**SIST EN 474-8:2022**

**01-maj-2022**

**Nadomešča:**

**SIST EN 474-8:2007+A1:2009**

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**Stroji za zemeljska dela - Varnost - 8. del: Zahteve za grederje**

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

Erdbaumaschinen - Sicherheit - Teil 8: Anforderungen für Grader

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

**Ta slovenski standard je istoveten z: EN 474-8:2022**

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**ICS:**

53.100

Stroji za zemeljska dela

Earth-moving machinery

**SIST EN 474-8:2022**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 474-8**

March 2022

ICS 53.100

Supersedes EN 474-8:2006+A1:2009

English Version

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

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

Erdbaumaschinen - Sicherheit - Teil 8: Anforderungen  
für Grader

This European Standard was approved by CEN on 14 February 2022.

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 CEN-CENELEC 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 CEN-CENELEC 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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 474-8:2022) 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 2022, and conflicting national standards shall be withdrawn at the latest by March 2024.

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 474-8:2006+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.

- 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 cable excavators
- Part 13: Requirements for rollers

This document is intended for use in combination with part 1 of the series.

**EN 474-8:2022 (E)**

The main differences between this document and EN 474-8:2006+A1:2009 are as follows:

- a) the normative references (Clause 2) (updated);
- b) verification methods table (Clause 5) (added);
- c) safety related function of control systems (excluded);
- d) list of significant hazards (Annex A) (updated);
- e) Annex ZA (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.

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## Introduction

This document is a type-C standard as stated in EN ISO 12100:2010.

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 at 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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**EN 474-8:2022 (E)****1 Scope**

This document, together with EN 474-1:2022 deals with all significant hazards, hazardous situations and events relevant to graders as defined in 3.1, when used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A), associated with the whole life time of the machine as described in EN ISO 12100:2010, 5.4.

The requirements of this document are complementary to the common requirements formulated in EN 474-1:2022. This document does not repeat the requirements of EN 474-1:2022 but supplements or modifies the requirements for graders.

This document does not provide performance requirements for safety related functions of control system(s).

The following significant and relevant hazards are not covered in this document:

- Transmission of power between self-propelled machinery (or tractor) and recipient machinery;
- Laser;
- Lightning.

This document is not applicable to graders manufactured before the date of publication of this document by CEN.

**2 Normative references**

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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 474-1:2022, *Earth-moving machinery — Safety — Part 1: General requirements*

EN ISO 7096:2020, *Earth-moving machinery — Laboratory evaluation of operator seat vibration (ISO 7096:2020)*

SIST EN 474-8:2022  
<https://standards.iteh.ai/catalog/standards/sist/3122e37c-0351-412c-8592-b7a6e6210a7e/sist-en-474-8-2022>

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 474-1:2022, EN ISO 12100:2010 and the following apply.

NOTE Terminology for graders is specified in ISO 7134:2013 and illustrated in Annex B of this document.

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

#### grader

self-propelled wheeled machine with an adjustable blade positioned between the front and rear axles, which can be equipped with a front-mounted blade or scarifier that can also be located between the front and rear axles

Note 1 to entry: The machine is primarily designed for grading, sloping, ditching and the scarifying of materials through its forward motion.

[SOURCE: ISO 6165:2012]

Note 2 to entry: The grader can be equipped with a rear-mounted ripper.

## 4 Safety requirements and/or protective/risk reduction measures

### 4.1 General

#### 4.1.1 Context

Graders shall comply with the safety requirements and/or protective/risk reduction measures of this clause. In addition, the machines 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.

#### 4.1.2 Specific relation to EN 474-1

Graders shall comply with the requirements of EN 474-1:2022, as far as not modified or replaced by the requirements of this part.

There are general requirements specified in EN 474-1:2022 that are not applicable because the risk assessment has shown that for graders the corresponding hazard does not exist. For graders 4.4.2, 4.5.10, 4.7.3, 4.12, 4.22.5, 4.23, 4.24, Annex B, Annex C and Annex D in EN 474-1:2022, are not applicable.

#### 4.2 Seat

EN 474-1:2022, 4.4.1 shall apply with the addition that the seat shall meet the requirements of EN ISO 7096:2020, tested with the input spectral class of EM4.

### 4.3 Transportation

#### 4.3.1 General

EN 474-1:2022, 4.15.6 shall apply with the modification given in 4.3.2 below.

#### 4.3.2 Requirements for travelling mode

The leaning front wheel system shall be designed to be mechanically locked in the vertical position.

The frame articulation system shall be designed to be mechanically locked in the straight-frame position.

The implement control system shall be designed so that it can be deactivated (EN 474-1:2022, 4.5.3).

All blades and equipment shall be designed to allow them to be positioned within the defined transport-width of the machine for travel.

### 4.4 Steering system

#### 4.4.1 General

EN 474-1:2022, 4.6 shall apply with the additions given in 4.4.2 below.

**EN 474-8:2022 (E)****4.4.2 Steering performance test**

For wheeled machines:

- the steering performance test shall be conducted with the front steering system (Ackermann steering system) only;
- during testing, leaning front wheels and articulated or bogie steering systems shall be kept in the vertical and straight ahead positions respectively.

**4.5 Protective measures and devices**

EN 474-1:2022, 4.14.4 shall apply with the exception that front wheels do not require fenders.

**5 Verification of the safety requirements and/or protective/risk reduction measures**

EN 474-1:2022, Clause 5 shall apply with the following additions:

Safety requirements and/or protective/risk reduction measures of Clauses 4 of this document shall be verified according to Table 1.

Table 1 sets out verification methods which shall be applied for each safety requirement in this document.

Where X(s) is indicated in the table, the corresponding verification method(s) shall be applied.

Table 1 shall be read in conjunction with the corresponding clauses.

Table 1 includes the following verification methods:

- a) calculation: to establish that the requirements of this document have been met;
- b) visual verification: to establish that something is present (e.g. a guard, a marking, a document);
- c) measurement: to show that the required numerical values have been met (e.g. geometric dimensions, safety distances, resistance of insulation of the electric circuits, results of physical tests);
- d) functional tests: to show that the adequate signals intended to be forwarded to the main control system of the complete machine are available and comply with the requirements and with the technical documentation;
- e) special verification: by reference to a standard which is mentioned in the corresponding clause.

Table 1 — Verification of safety requirements and/or protective/risk reduction measures

Clause number	Title	a) Calculation	b) Visual verification	c) Measurement	d) Functional test	e) Special verification
4.1	Safety requirements and/or protective risk reduction measures, General					X
4.2	Seat					X
4.3.1	Transportation, General	X		X		
4.3.2	Requirements for travelling mode	X	X	X	X	
4.4.1	Steering system, General				X	
4.4.2	Steering performance test			X	X	
4.5	Protective measures and devices			X		

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## 6 Information for use (standards.iteh.ai)

### 6.1 General

Information for use shall be provided in accordance with EN ISO 12100:2010, 6.4.

### 6.2 Operator's manual

EN 474-1:2022, 6.3 shall apply with the following additions:

- use the grader steering on public roads;
- for travelling on public roads or long distance travelling off road the operator needs to put the leaning front wheel system in the vertical position, to lock the system, and to put the blades and equipment within the defined transport width of the machine.