



**SLOVENSKI STANDARD**  
**SIST EN 474-4:2007+A1:2009**  
**01-maj-2009**

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**Stroji za zemeljska dela - Varnost - 4. del: Zahteve za bagre**

Earth-moving machinery - Safety - Part 4: Requirements for backhoe loaders

Erdbaumaschinen - Sicherheit - Teil 4: Anforderungen an Baggerlader

Engins de terrassement - Sécurité - Partie 4: Prescriptions applicables aux chargeuses-pelleteuses

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**Ta slovenski standard je istoveten z: EN 474-4:2006+A1:2009**

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**ICS:**

53.100      Stroji za zemeljska dela      Earth-moving machinery

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EUROPEAN STANDARD

**EN 474-4:2006+A1**

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## Earth-moving machinery - Safety - Part 4: Requirements for backhoe loaders

Engins de terrassement - Sécurité - Partie 4: Prescriptions applicables aux chargeuses-pelleteuses

Erdbaumaschinen - Sicherheit - Teil 4: Anforderungen an Baggerlader

This European Standard was approved by CEN on 17 April 2006 and includes Amendment 1 approved by CEN on 20 December 2008.

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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 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

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**EN 474-4:2006+A1:2009 (E)****Foreword**

This document (EN 474-4:2006+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of an identical text or by endorsement, at the latest by August 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2008-12-20.

This document supersedes <sup>A1</sup> EN 474-4:2006 <sup>A1</sup>.

The start and finish of text introduced or altered by amendment is indicated in the text by tags <sup>A1</sup> <sup>A1</sup>.

This document 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.

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

For bibliographic references, see <sup>A1</sup> EN 474-1:2006+A1:2009 <sup>A1</sup>.

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

- Part 1: General requirements [SIST EN 474-4:2007+A1:2009](https://standards.iteh.ai/catalog/standards/sist/ce44afb3-3f1b-4461-bf47-847484cbea65/sist-en-474-4-2007a1-2009)
- 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

This European Standard is intended for use in combination with Part 1 of the series.

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.

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**EN 474-4:2006+A1:2009 (E)****Introduction**

This part of EN 474 is a type C standard as stated in EN ISO 12100-1:2003.

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

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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## 1 Scope

This part of EN 474 deals with all significant hazards, hazardous situations and events relevant to wheel and crawler backhoe loaders as defined in EN ISO 6165:2006, when they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This part also deals with fork application, object handling application and log handling.

The requirements of this part are complementary to the common requirements formulated in **A1** EN 474-1:2006+A1:2009 **A1**.

This does not repeat the requirements from **A1** EN 474-1:2006+A1:2009 **A1**, but adds or replaces the requirements for application for backhoe loaders.

This part specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards, hazardous situations and events during commissioning, operation and maintenance of backhoe loaders.

This European Standard is not applicable to machinery manufactured before the date of publication of this European Standard by CEN.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

**A1** EN 474-1:2006+A1:2009 **A1**, *Earth-moving machinery — Safety — Part 1: General requirements*

<https://standards.iteh.ai/catalog/standards/sist/ce44afb3-3f1b-4461-bf47->

**A1** EN ISO 3164:2008 **A1**, *Earth-moving machinery — Laboratory evaluations of protective structures — Specifications for deflection-limiting volume (ISO 3164:1995)*

**A1** EN ISO 3449:2008, *Earth-moving machinery - Falling-object protective structures - Laboratory tests and performance requirements (ISO 3449:2005)* **A1**

**A1** EN ISO 6682:2008 **A1**, *Earth-moving machinery — Zones of comfort and reach for controls (ISO 6682:1986 including Amendment 1:1989)*

**A1** EN ISO 7096:2008 **A1**, *Earth-moving machinery — Laboratory evaluation of operator seat vibration (ISO 7096:2000)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

ISO 2330:2002, *Fork-lift trucks — Fork arms — Technical characteristics and testing*

**A1** ISO 6016:2008 **A1**, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

**A1** ISO 7451:2007, *Earth-moving machinery — Volumetric ratings for hoe-type and grab-type buckets of hydraulic excavators and backhoe loaders* **A1**

**A1** ISO 7546:1983 **A1**, *Earth-moving machinery — Loader and front loading excavator buckets — Volumetric ratings*

ISO 8643:1997, *Earth-moving machinery — Hydraulic excavator and backhoe loader boom-lowering control device — Requirements and tests*

**EN 474-4:2006+A1:2009 (E)**

ISO 9248:1992, *Earth-moving machinery — Units for dimensions, performance and capacities, and their measurement accuracies*

☐<sub>A1</sub> ISO 14397-1:2007 ☐<sub>A1</sub>, *Earth-moving machinery — Loaders and backhoe loaders — Part 1: Calculation of rated operating capacity and test method for verifying calculated tipping load*

**3 Terms and definitions**

For the purposes of this European Standard, the terms and definitions given in ☐<sub>A1</sub> EN 474-1:2006+A1:2009 ☐<sub>A1</sub>, EN ISO 12100-1:2003 and the following apply.

NOTE 1 Terminology for backhoe loaders is specified in ISO 8812:1999 and most common backhoe loaders are illustrated in Annex C of this European Standard.

NOTE 2 Definitions used in EN and ISO standards referred to in this European Standard are also valid for this document.

**3.1 backhoe loader**  
self-propelled crawler or wheeled machine having a main frame designed to carry both front-mounted equipment and rear-mounted backhoe equipment, normally with stabilisers or outriggers (see EN ISO 6165:2006)

NOTE 1 When used in backhoe mode, the machine is stationary and normally digs below ground level, but when used in loader mode (bucket use), the machine loads through forward motion.

NOTE 2 A backhoe work cycle normally comprises excavating, elevating, swinging and discharging material. A loader work cycle normally comprises filling, elevating, transporting and discharging material.

**3.2 compact backhoe loader** <https://standards.iteh.ai/catalog/standards/sist/ce44afb3-3f1b-4461-bf47-8e3010101010/sist-en-474-4-2007-a1-2009>  
backhoe loader with an operating mass (see ☐<sub>A1</sub> ISO 6016:2008 ☐<sub>A1</sub>) of 4 500 kg or less, designed to work in confined spaces with the associated needs for greater manoeuvrability

**4 List of additional significant hazards**

See Annex A.

NOTE Annex A (normative) contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

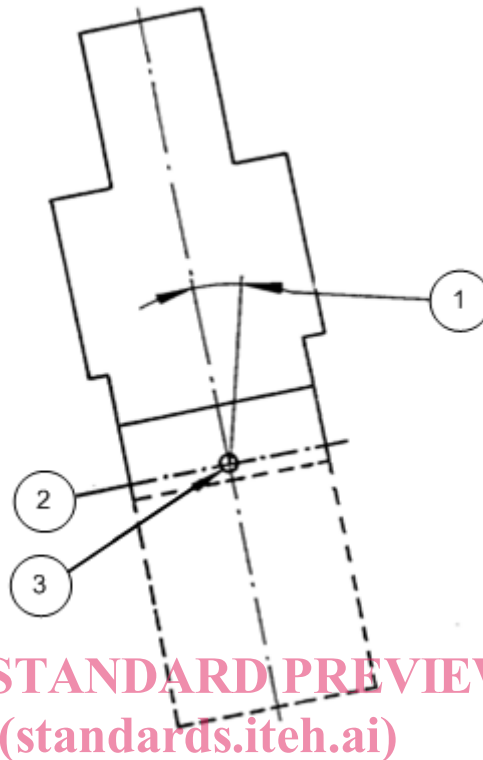
**5 Safety requirements and/or measures****5.1 General**

Backhoe loaders shall comply with the requirements of ☐<sub>A1</sub> EN 474-1:2006+A1:2009 ☐<sub>A1</sub>, as far as not modified or replaced by the requirements of this part.

**5.2 Protection****5.2.1 Roll-over protective structures (ROPS)**

☐<sub>A1</sub> EN 474-1:2006+A1:2009 ☐<sub>A1</sub>, 5.3.3 applies with the following addition for compact backhoe loaders:

The portion of deflection-limiting volume (DLV) above the LA (SIP) line according to <sup>[A1]</sup> EN ISO 3164:2008 <sup>[A1]</sup> is allowed to deviate (lean) up to 15° laterally as shown in Figure 1, when the minimum energy requirement is met. Portion below the LA (SIP) line of DLV can be disregarded.



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#### Key

- 1 up to 15°
- 2 LA
- 3 Seat index point (SIP)

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**Figure 1 — Deflection-limiting volume (DLV), front view**

### 5.2.2 Falling object protective structures (FOPS)

<sup>[A1]</sup> EN 474-1:2006+A1:2009, 5.3.4 applies with the following additions for backhoe loaders. Machines with an operating mass less than or equal to 700 kg according to ISO 6016:2008 shall be fitted with a falling-object protective structure (FOPS), when they are intended for applications where there is a risk of falling objects. If FOPS is fitted, it shall meet the performance requirements of EN ISO 3449:2008 Level 1. <sup>[A1]</sup>

## 5.3 Operator's station

### 5.3.1 Minimum space envelope

<sup>[A1]</sup> EN 474-1:2006+A1:2009 <sup>[A1]</sup>, 5.3.2.5 applies with the following additions:

On backhoe loaders with retractable rear window, the cab height above SIP shall not be less than 920 mm measured with the window retracted into the cab.

NOTE This requirement is at present under consideration. In the future this exception will disappear.

### 5.3.2 Operator's controls

<sup>[A1]</sup> EN 474-1:2006+A1:2009 <sup>[A1]</sup>, 5.5 applies with the following additions: