



SLOVENSKI STANDARD
SIST EN 474-5:2007+A3:2014
01-januar-2014

Stroji za zemeljska dela - Varnost - 5. del: Zahteve za hidravlične bagre

Earth-moving machinery - Safety - Part 5: Requirements for hydraulic excavators

Erdbaumaschinen - Sicherheit - Teil 5: Anforderungen für Hydraulikbagger

Engins de terrassement - Sécurité - Partie 5: Prescriptions applicables aux pelles hydrauliques

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Ta slovenski standard je istoveten z: EN 474-5:2006+A3:2013

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ICS:

53.100 Stroji za zemeljska dela Earth-moving machinery

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Earth-moving machinery - Safety - Part 5: Requirements for hydraulic excavators

Engins de terrassement - Sécurité - Partie 5: Prescriptions applicables aux pelles hydrauliques

Erdbaumaschinen - Sicherheit - Teil 5: Anforderungen für Hydraulikbagger

This European Standard was approved by CEN on 17 April 2006 and includes Amendment 1 approved by CEN on 20 December 2008, Amendment 2 approved by CEN on 22 November 2011 and Amendment 3 approved by CEN on 23 May 2013.

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.

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EN 474-5:2006+A3:2013 (E)**Foreword**

This document (EN 474-5:2006+A3:2013) 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of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2008-12-20, Amendment 2, approved by CEN on 2011-11-22 and Amendment 3 approved by CEN on 2013-05-23.

This document supersedes ^{A3} EN 474-5:2006+A2:2012 ^{A3}.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ^{A1} ^{A1}, ^{A2} ^{A2} and ^{A3} ^{A3}.

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.

^{A2} For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document. ^{A2}

SIST EN 474-5:2007+A3:2014

For bibliographic references, see ^{A3} EN 474-1:2006+A3:2013 ^{A3}.
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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 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 organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece,

Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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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 specific significant hazards, hazardous situations and events relevant to hydraulic excavators 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 object handling application, shovel application and log application.

The requirements of this part are complementary to the common requirements formulated in ^{A3} EN 474-1:2006+A3:2013 ^{A3}.

This part does not repeat the requirements from ^{A3} EN 474-1:2006+A3:2013 ^{A3}, but adds or replaces the requirements for application for hydraulic excavators.

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 hydraulic excavators.

This European Standard is not applicable to hydraulic excavators 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 document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

^{A3} EN 474-1:2006+A3:2013 ^{A3}, *Earth-moving machinery — Safety — Part 1: General requirements*

<https://standards.iteh.ai/catalog/standards/sist/fd5a715b-c069-4234-8fef-042b96f16608/sist-en-474-1-2006+A3:2013>

EN 12643:1997, *Earth-moving machinery — Rubber-tyred machines — Steering requirements (ISO 5010:1992, modified)*

^{A1} *deleted text* ^{A1}

^{A3} EN 13531:2001+A1:2008 ^{A3}, *Earth-moving machinery — Tip-over protection structure (TOPS) for compact excavators — Laboratory tests and performance requirements (ISO 12117:1997 modified)*

^{A1} EN ISO 2867:2008 ^{A1}, *Earth-moving machinery — Access systems* ^{A1} (ISO 2867:2006, including Cor 1:2008) ^{A1}

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

^{A1} EN ISO 3471:2008, *Earth-moving machinery - Roll-over protective structures - Laboratory tests and performance requirements (ISO 3471:2008)* ^{A1}

EN ISO 6165:2006, *Earth-moving machinery — Basic types —* ^{A1} *deleted text* ^{A1} *Identification and terms and definitions (ISO 6165:2006)*

^{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 6683:2008 ^{A1}, *Earth-moving machinery — Seat belts and seat belt anchorages — Performance requirements and tests (ISO 6683:2005)*

EN 474-5:2006+A3:2013 (E)

☐_{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 6014:1986, *Earth-moving machinery — Determination of ground speed*

☐_{A1} ISO 7451:2007 ☐_{A1}, *Earth-moving machinery — Volumetric ratings for hydraulic excavator buckets and backhoe loader buckets*

ISO 7546:1983, *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*

ISO 10262:1998, *Earth-moving machinery — Hydraulic excavators — Laboratory tests and performance requirements for operator protective guards*

☐_{A1} ISO 10567:2007 ☐_{A1}, *Earth-moving machinery — Hydraulic excavators — Lift capacity*

☐_{A3} ISO 12117-2:2008, *Earth-moving machinery — Laboratory tests and performance requirements for protective structures of excavators — Part 2: Roll-over protective structures (ROPS) for excavators of over 6 t* ☐_{A3}

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in ☐_{A3} EN 474-1:2006+A3:2013 ☐_{A3}, EN ISO 12100-1:2003 and the following apply.

NOTE 1 Terminology for hydraulic excavators are specified in ISO 7135:1993 and illustrated in Annex D (Figures D.1 to D.5) 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 hydraulic excavator

self-propelled machine on crawler, wheels or legs, having an upper structure normally capable of 360° swing with mounted equipment, primarily designed for excavating with bucket, without moving the undercarriage during the work cycle

NOTE 1 An excavator work cycle normally comprises excavating, elevating, swinging and discharging material (see EN ISO 6165:2006).

NOTE 2 Hydraulic excavators may also be used for material handling/transportation.

3.1.1 minimal swing radius excavator (MSRX)

excavator for operation in confined space having an upper structure with a short swing radius (equipment and attachment swing within 120 % of the width of the undercarriage)

3.1.2 compact excavator

excavator and minimal swing radius excavator with an operating mass (see ☐_{A1} ISO 6016:2008 ☐_{A1}) of less than or equal to 6 000 kg

3.2

walking excavator

excavator with three or more supporting legs which may be articulated, telescopic or both and which can be fitted with wheels

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

Hydraulic excavators shall comply with the requirements of [EN 474-1:2006+A3:2013](#), as far as not modified or replaced by the requirements of this part.

5.2 Access

[EN 474-1:2006+A3:2013](#), 5.2 applies with the exception that dimension G, in [EN ISO 2867:2008](#), Figure 2, can be greater than 600 mm when the hand rails/hand holds are in the door opening.

5.3 Operator's station

[SIST EN 474-5:2007+A3:2014](https://standards.iteh.ai/catalog/standards/sist/fd5a715b-c069-4234-8fef-043b06f6e6a8/sist-en-474-5-2007a3-2014)
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5.3.1 Minimum space envelope

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

5.3.2 Operator's protection

5.3.2.1 Operator's protective guard

[EN 474-1:2006+A3:2013](#), 5.3.4 is replaced by the following:

Excavators shall be designed so that an operator's protective guard can be fitted. The manufacturer according to the intended use of the machine shall offer a protective guard. The protective guard shall be in accordance with ISO 10262:1998.

Compact excavators with an operating mass (see [ISO 6016:2008](#)) less than or equal to 1 500 kg are excluded from the requirements for a protective guard according to ISO 10262:1998.

[EN 474-1:2006+A3:2013](#)

5.3.2.2 Tip Over Protective Structure (TOPS) and Roll Over Protective Structure (ROPS)

5.3.2.2.1 General

[EN 474-1:2006+A3:2013](#), 5.3.3 does not apply for hydraulic excavators except for walking excavators, see 5.8.3.

EN 474-5:2006+A3:2013 (E)**5.3.2.2.2 TOPS for compact excavators**

Compact excavators having an operating mass greater than 1000 kg shall be fitted with a TOPS according to EN 13531:2001+A1:2008.

5.3.2.2.3 TOPS for hydraulic excavators

Hydraulic excavators with an operating mass over 6 t and less than 50 t shall be fitted with a TOPS.

For evaluation of the performance of the TOPS, ISO 12117-2 shall be used in respect of lateral loading only and with the following lateral load energy:

$$\text{Lateral load energy } U_s \text{ (J)} = 6\,500 \times (M/10\,000)^{1,25}$$

The TOPS shall be labelled in accordance with ISO 12117-2:2008, Clause 9, except that the standard referred to shall be EN 474-5:2006+A3:2013.

In fulfilling this requirement a manufacturer may alternatively provide a ROPS which fully complies with ISO 12117-2 (see also 5.3.2.2.4). In such cases, the labelling may either be in accordance with ISO 12117-2 (ROPS) or be as modified above (TOPS). Where a structure complies with both TOPS and ROPS criteria, a manufacturer may optionally identify both standards (ROPS and TOPS) on the label.

NOTE 1 EN 13531 is intended to be applied to compact excavators having swing type boom and having an operating mass between 1000 kg and 6000 kg. This does not preclude the possibility to establish a reproducible means of evaluating the load-carrying characteristics TOPS under static loading, and prescription of performance requirements of a representative specimen under such loading for excavators with an operating mass over 6000 kg. In this case, the test is carried out in accordance with ISO 12117-2.

NOTE 2 A New Work Item (NWI) is in progress in ISO/TC 127 to define a specific standard for TOPS for hydraulic excavators with an operating mass over 6 t and less than 50 t.

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5.3.2.2.4 ROPS for hydraulic excavators

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Hydraulic excavators with an operating mass over 6 t and less than 50 t shall be designed so that a ROPS can be fitted (e.g. provision of ROPS mounting points). Where the risk of rolling over exists, based on the intended use of the machine as specified by the manufacturer in the operation manual, ROPS shall be provided and shall be in accordance with ISO 12117-2: 2008.

NOTE Tip over is the relevant hazard that is considered for normal hydraulic excavator application. Generally hydraulic excavators do not work in applications where the risk of roll over is significant (e.g. earth moving and demolition applications). Only in certain exceptional circumstances of use (e.g. steep hills and mountains) can there be a significant risk of roll over. ^(A3)

5.3.2.3 Protection for log application

The excavator shall be equipped with a front protection and, if a relevant hazard exists, with a top protection, according to ISO 10262:1998.

5.3.3 Operator's seat**5.3.3.1 Seat adjustment for compact excavators**

^(A3) EN 474-1:2006+A3:2013 ^(A3), 5.4.1.3, 2nd paragraph only applies to excavators with an operating mass (see ^(A1) ISO 6016:2008 ^(A1)) of less than 3 000 kg.