



SLOVENSKI STANDARD
SIST EN 474-3:2007

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Stroji za zemeljska dela - Varnost - 3. del: Zahteve za nakladalnike

Earth-moving machinery - Safety - Part 3: Requirements for loaders

Erdbaumaschinen - Sicherheit - Teil 3: Anforderungen für Lader

Engins de terrassement - Sécurité - Partie 3: Prescriptions applicables aux chargeuses

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53.100 Stroji za zemeljska dela Earth-moving machinery

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English Version

Earth-moving machinery - Safety - Part 3: Requirements for loaders

Engins de terrassement - Sécurité - Partie 3: Prescriptions applicables aux chargeuses

Erdbaumaschinen - Sicherheit - Teil 3: Anforderungen für Lader

This European Standard was approved by CEN on 17 April 2006.

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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 Central Secretariat has the same status as the official versions.

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Foreword

This document (EN 474-3:2006) 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of an identical text or by endorsement, at the latest by May 2007, and conflicting national standards shall be withdrawn at the latest by November 2008.

This European Standard supersedes EN 474-3:1996.

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.

For relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

For bibliographic references, see EN 474-1:2006.

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 organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 the United Kingdom.

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 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, single heavy object handling application, object handling application and log handling.

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

This part does not repeat the requirements from EN 474-1:2006, but adds or replaces the requirements for application for 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 loaders.

This European Standard is not applicable to loaders 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.

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

[SIST EN 474-3:2007](#)

EN ISO 2867:1998, *Earth-moving machinery — Access systems (ISO 2867:1994)*

[http://standards.iteh.ai/catalog/standards/sist-en-474-3-2007/iso-2867-1994/1f-82e9-b9cf879984ff/sist-en-474-3-2007](#)

EN ISO 3164:1999, *Earth-moving machinery — Laboratory evaluations of protective structures — Specifications for deflecting-limiting volume (ISO 3164:1995)*

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

EN ISO 3457:2003, *Earth-moving machinery — Guards — Definitions and requirements (ISO 3457:2003)*

EN ISO 6682:1995, *Earth-moving machinery — Zones of comfort and reach for controls (ISO 6682:1986 including Amendment 1:1989)*

EN ISO 7096:2000, *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*

ISO 6016:1998, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

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

ISO 14397-1:2002, *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 EN 474-1:2006, EN ISO 12100-1:2003 and the following apply.

Terminology for loaders is specified in ISO 7131:1997 and the most common loaders are illustrated in Annex B of this European Standard.

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

3.1

loader

self-propelled crawler or wheeled machine, having a front-mounted equipment primarily designed for loading operation (bucket use), which loads or excavates through forward motion of the machine

NOTE 1 A loader work cycle normally comprises filling, elevating, transporting and discharging material.

NOTE 2 Derivative machinery; loaders can also be used for derivative application (see EN 474-1:2006, 3.1.2).

3.2

compact loader

loader with an operating mass (see ISO 6016:1998) of 4 500 kg or less, designed to work in confined spaces with the associated needs for greater manoeuvrability

3.3

skid steer loader

loader normally having an operator's station between attachment-supporting structures and steered by using variation of speed and/or direction of rotation between traction drives on opposite sides of a machine with fixed axles

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3.4

swing loader

loader having a swing type lift arm with a swinging angle to the left and right from a straight position

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NOTE A swing loader work cycle is normally similar to a loader cycle but additionally work can be done offset of the machine track.

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

Loaders shall comply with the requirements of EN 474-1:2006, as far as not modified or replaced by the requirements of this part.

5.2 Loaders with front access

5.2.1 General

For loaders with front access the reference to EN ISO 2867:1998 applies with the deviations given in 5.2.2 and 5.2.3.

5.2.2 Primary access opening

The primary opening shall not be less than:

- opening height 875 mm;
- opening width 550 mm.

5.2.3 Alternative egress opening (emergency exit)

An alternative opening shall be provided.

Minimum dimension of the emergency exit shall comply with 11.2.2 of EN ISO 2867:1998.

5.3 Operator's seat

EN 474-1:2006, 5.4.1 applies with the addition that the seat shall meet the requirements of the following input spectral class according to EN ISO 7096:2000:

- EM3 for wheel loaders greater than 4 500 kg;
- EM6 for crawler loaders; [SIST EN 474-3:2007](https://standards.iteh.ai/catalog/standards/sist/b6ae8fd4-b6a5-421f-82e9-910101010101/sist-en-474-3-2007)
- EM8 for compact wheel loaders less or equal than 4 500 kg; <https://standards.iteh.ai/catalog/standards/sist/b6ae8fd4-b6a5-421f-82e9-910101010101/sist-en-474-3-2007>
- EM9 for skid steer loaders.

5.4 Rear window(s)

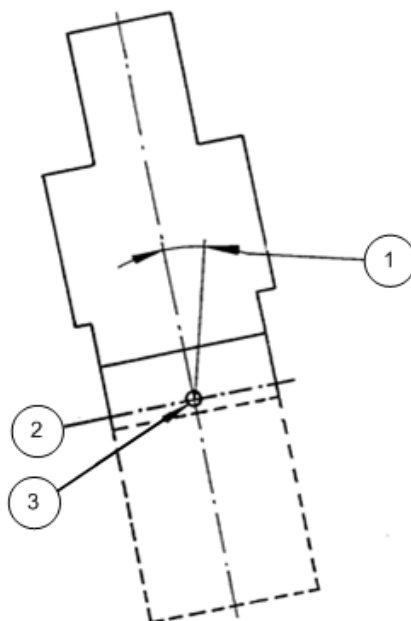
The requirements of EN 474-1:2006, 5.3.2.7 and 5.3.2.9 for the rear window(s) apply, with the exception that no motorized wiper(s) and washers are required for loaders with a cab width less than or equal to 750 mm measured outside of the cab in the height of SIP.

5.5 Protection

5.5.1 Roll-over protective structures (ROPS)

EN 474-1:2006, 5.3.3, applies with the following addition for compact loaders:

The portion of deflection-limiting volume (DLV) above the LA (SIP) line according to EN ISO 3164:1999 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.

**Key**

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

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

5.5.2 Falling object protective structures (FOPS)

EN 474-1:2006, 5.3.4 applies with the following addition for compact loaders:

Machines with an operating mass less than or equal to 700 kg according to ISO 6016:1998 shall be designed and built so that a FOPS can be fitted. If a FOPS is fitted, it shall meet the performance requirements of EN ISO 3449:2005, level 1.

5.5.3 Fenders

EN 474-1:2006, 5.14.7 does not apply to compact loaders with front access.

5.5.4 Operator's controls and indicators

EN 474-1:2006, 5.5 applies with the following additions for compact loaders with front access:

Controls for lifting and lowering the loader linkage, machine movement and hydraulically controlled attachments (e. g. multi-purpose bucket) shall be either automatically mechanically secured, e. g. by a safety bar; or automatically deactivated when the operator leaves/enters the operator's compartment.

5.5.5 Guarding for loaders

Loaders shall be fitted with side protection that prevents the operator from reaching the trapping parts between the side arm(s) and fixed parts of the machine when the operator is seated in the operator's position. Opening in the guards shall comply with EN ISO 3457:2003. For the lower limbs, guards are required within the zone of reach according to EN ISO 6682:1995 with a minimum height of 200 mm from the floor plate.

NOTE EN 294:1992 is not fully complied with as this would cause the hazard of restricted visibility to the working area.