

MULLATÖÖMASINAD. OHUTUS. OSA 3: LAADURITELE
ESITATAVAD NÕUDED

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 474-3:2022 sisaldab Euroopa standardi EN 474-3:2022 ingliskeelset teksti.	This Estonian standard EVS-EN 474-3:2022 consists of the English text of the European standard EN 474-3:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 30.03.2022.	Date of Availability of the European standard is 30.03.2022.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 53.100

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

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 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.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

Contents	Page
European foreword	3
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Safety requirements and/or protective/risk reduction measures	9
4.1 General.....	9
4.2 Operator's station.....	9
4.3 Seat.....	9
4.4 Operator's controls and indicators.....	9
4.5 Protectives measures and devices.....	10
4.6 Stability.....	10
4.7 Lifting operation.....	13
5 Verification of the safety requirements and/or protective/risk reduction measures	13
6 Information for use	14
6.1 General.....	14
6.2 Machine safety labels.....	14
6.3 Operator's manual.....	15
Annex A (informative) List of significant hazards	16
Annex B (normative) Telescopic loaders	21
B.1 General.....	21
B.2 Stability.....	21
B.3 Limitation of stroke.....	25
B.4 Verification of LLMI and LLMC.....	25
B.5 Information for use.....	25
B.6 Verification of safety requirements and/or protective/risk reduction measures.....	27
Annex C (informative) Illustrations	29
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2006/42/EC machinery, and amending Directive 95/16/EC (recast) [2006 L157] aimed to be covered	32
Bibliography	37

European foreword

This document (EN 474-3:2022) 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 474-3:2006+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.

For bibliographic references, see EN 474-1:2022.

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
- Part 13: Requirements for rollers

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

The main differences between this document and EN 474-3:2006+A1:2009 are as follows:

- a) safety-related functions of control systems (excluded);
- b) normative references (updated);
- c) safety requirements and information for use for telescopic loaders (Annex B) (added);
- d) verification methods table (Clause 5) (added);
- e) list of significant hazards (Annex A) (updated);
- f) 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.

Introduction

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

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.

1 Scope

This document together with EN 474-1:2022 deals with all significant hazards, hazardous situations and events relevant to loaders when used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Annex A) associated with the whole lifetime 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 loaders.

This document does not provide requirements for main electrical circuits and drives of machinery when the primary source of energy is an external electrical supply.

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:

- Laser;
- Lightning.

This document does not deal with towing of trailers.

This document does not deal with demolition machinery.

This part also deals with fork application, log handling application, single heavy object handling application and lifting operation application.

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

NOTE For travelling on public roads, national traffic regulations apply (e.g. braking, steering, lighting, towing, etc.) until harmonized requirements are available.

2 Normative references

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 1459-1:2017+A1:2020, *Rough-terrain trucks — Safety requirements and verification — Part 1: Variable reach trucks*

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

EN ISO 3457:2008, *Earth-moving machinery — Guards — Definitions and requirements (ISO 3457:2003)*

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

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

EN ISO 13851:2019, *Safety of machinery — Two-hand control devices — Principles for design and selection (ISO 13851:2019)*

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

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

ISO 14397-1:2007, *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 document, the terms and definitions given in EN 474-1:2022, EN ISO 12100:2010 and the definitions below apply.

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>

NOTE Terminology for loaders is specified in ISO 7131:2009 and the most common loaders are illustrated in Annex C of 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 to entry: A loader work cycle normally comprises filling and elevating, and the transporting and discharging of material.

3.2

swing loader

loader (3.1) having a swing-type lift arm which can rotate to the left and the right of the straight position

Note 1 to entry: A swing-loader work cycle is similar to a loader cycle, but additional work can be done with the equipment offset from the longitudinal axis of the machine.

3.3

skid steer loader

loader (3.1) normally having an operator station between or to the side of the attachment-supporting structure(s) and steered by using variation of speed, and/or direction of rotation between traction drives on the opposite sides of a machine having fixed axles on wheels or tracks

3.4

compact loader

loader (3.1) having an operating mass (see ISO 6016:2008, 3.2.1) of 4 500 kg or less for wheeled loaders and 6 000 kg or less for crawler loaders, designed to work in areas with limited space, with the associated need for greater manoeuvrability