BS EN 474-4:2022

BSI Standards Publication

Earth-moving machinery — Safety

Part 4: Requirements for backhoe loaders

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National foreword

This British Standard is the UK implementation of EN 474-4:2022. It supersedes BS EN 474-4:2006+A2:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/513/1, Earth moving machinery (International).

A list of organizations represented on this committee can be obtained on request to its committee manager.

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March 2022

ICS 53.100

Supersedes EN 474-4:2006+A2:2012

English Version

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

Erdbaumaschinen - Sicherheit - Teil 4: Anforderungen für Baggerlader

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Full document details: BS EN 474-4:2022

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 ... 8
4.1 General ... 8
4.2 Operator's station ... 8
4.3 Seat ... 8
4.4 Operator's controls and indicators ... 8
4.5 Outrigger up protective device ... 8
4.6 Horn for the backhoe portion ... 8
4.7 Stability ... 9
4.8 Lifting operation ... 11
4.9 Travelling and transportation ... 12
4.10 Quick coupler ... 12
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 ... 14
6.4 Other instructions for backhoe loader machinery ... 14
Annex A (informative) List of significant hazards ... 15
Annex B (normative) Test method for backhoe loader lift capacity at the backhoe portion ... 20
B.1 General ... 20
B.2 Terms and definitions ... 20
B.3 Apparatus ... 20
B.4 Test site ... 20
B.5 Preparation for test ... 21
B.6 Capacity test ... 21
B.7 Rated lift capacity in bucket or shovel application ... 22
B.8 Rated lift capacity in lifting operation ... 22
B.9 Rated lift capacity with attachment ... 22
Annex C (informative) Illustrations ... 23
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 ... 25
Bibliography ... 30

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Full document details: BS EN 474-4:2022

European foreword

This document (EN 474-4:2022) 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 474-4:2006+A2:2012.

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.

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Full document details: BS EN 474-4:2022

The main differences between this document and EN 474-4:2006+A2:2012 are as follows:

a) safety-related functions of control systems (excluded);

b) requirements for attachments, multi-purpose and derivative machinery (deleted);

c) the normative references (updated) (Clause 2);

d) definition of compact crawler backhoe loader up to 6t (modified);

e) requirements for lifting operation of backhoe portion (updated);

f) verification methods table (added) (Clause 5);

g) requirements for quick couplers (added);

h) list of significant hazards (Annex A) (updated);

i) 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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Full document details: BS EN 474-4:2022

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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1 Scope

This document together with EN 474-1:2022 deals with all significant hazards, hazardous situations and events relevant to backhoe 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 backhoe 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).

This document does not deal with demolition machinery.

This document also deals with fork application, log handling application and lifting operation application.

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

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 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)*

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

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

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

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

ISO 9533:2010, *Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria*

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*

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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 backhoe loaders is specified in ISO 8812:2016 and most common backhoe loaders are illustrated in Annex C 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
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 6165:2012)

Note 1 to entry: 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 to entry: 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
wheeled backhoe loader with an operating mass (see ISO 6016:2008) of ≤ 4 500 kg, or crawler backhoe loader with an operating mass of ≤ 6 000 kg designed to work in confined spaces with the associated needs for greater manoeuvrability

3.3
load centre of gravity distance
distance “D” in mm from the centre of gravity “G” of the load measured horizontally to the front face of the fork shanks as specified in Figure 1

3.4
lift point radius
horizontal distance between the bucket pivot pin and the swing pivot centre

Note 1 to entry: The bucket pivot pin and the swing pivot centre are illustrated in ISO 8812:2016, Figure 15a, Position 4 and 13.

3.5
rated lift capacity
smaller of either the maximum load or the rated hydraulic lift capacity

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