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Earth-moving machinery — Safety —

Part 12: Requirements for cable excavators

Engins de terrassement — Sécurité —

Partie 12: Exigences applicables aux pelles à câble

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

This second edition cancels and replaces the first edition (ISO 20474-12:2008), which has been technically revised with the following changes:

— normative references have been updated;

— references to national and regional provisions in the withdrawn ISO/TS 20474-14 have been deleted;

— new safety requirements and protective measures have been added, including requirements for the operator's protective guard.

It is intended to be used in conjunction with ISO 20474-1.

A list of all parts in the ISO 20474 series, published under the general title, *Earth-moving machinery — Safety,* can be found on the ISO website.

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Introduction

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

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 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.

ISO 20474 provides acceptable safety requirements for earth-moving machinery. This standard does not necessarily provide requirements to meet all national and regional regulatory provisions, e.g. Japan does not allow object handling with earth-moving machinery.

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Earth-moving machinery — Safety —

Part 12: Requirements for cable excavators

1 Scope

This document gives the safety requirements specific to cable excavators as defined in ISO 6165. It is intended to be used in conjunction with ISO 20474-1, which specifies general safety requirements common to two or more earth-moving machine families. The specific requirements given in this document take precedence over the general requirements of ISO 20474-1.

This document deals with all significant hazards, hazardous situations and events relevant to the earth-moving machinery within its scope (see ISO 20474-1:2017, Annex A) when used as intended or under conditions of misuse reasonably foreseeable by the manufacturer. It specifies the appropriate technical measures for eliminating or reducing risks arising from relevant hazards, hazardous situations or events during commissioning, operation and maintenance.

It is applicable only to the machine itself if the cable excavator is intended for use in combination with other equipment or attachments such as drill rigs and those for pile driving or extracting and moving (e.g. rail-track, walking legs, pontoon, ship equipment or stationary undercarriages). It does not deal with the specific hazards relevant to such additional equipment or attachments.

This document is not applicable to machines manufactured before the date of its publication.

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.

ISO 4310, *Cranes — Test code and procedures*

ISO 5010, *Earth-moving machinery — Rubber-tyred machines — Steering requirements*

ISO 6165, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6014, *Earth-moving machinery — Determination of ground speed*

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

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

ISO 15219, *Earth-moving machinery — Cable excavators — Terminology and commercial specifications*

IEC 60204-32, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*

ISO 20474-1:2017, *Earth-moving machinery — Safety — Part 1: General requirements*

EN 791:1995, *Drill rigs — Safety*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20474-1, ISO 15219, and the following, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
cable excavator
excavator having a wire-rope-operated upper structure designed primarily for excavation with a dragline bucket, front shovel or grab, used for compacting material with a compaction plate, for demolition work by hook or ball, and for material handling with special *equipment* (3.3) and *attachments* (3.2)

Note 1 to entry: See Annex B for illustrations.

Note 2 to entry: For the definition of *excavator*, see ISO 6165 or ISO 20474-5.

[SOURCE: ISO 6165:2012, 4.4.3, modified — By adding Notes 1 and 2.]

3.2
boom hoist system
boom system comprising lower, intermediate and head sections, and A-frame and boom hoist winch systems

3.3
lift system
main winch system used for earth-moving, demolition, compaction and object-handling (e.g. with hook assembly) applications

3.4
swing
rotation of the upper structure of an excavator in relation to a fixed reference frame on the ground

3.5
working swing revolution speed
turntable-swing speed, reached in a 180° revolution of the upper structure, with maximum rotation command input starting from a still position

Note 1 to entry: It is expressed in revolutions per minute (r/min).

3.6
deceleration swing angle
angle measured in degrees of swing while the swing motion is decelerated from working swing revolution speed to a complete stop

3.7
swing torque
torque which propels the upper structure relative to the undercarriage

Note 1 to entry: It is expressed in Newton metres (N · m).

3.8
swing service brake
device or system used to decelerate the rotation of the upper structure and to bring it to a stop at any position

EXAMPLE Frictional brake, electrically operated brake, hydrostatically or other hydraulically operated brake.

Note 1 to entry: See Annex A.

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3.9
swing parking brake
device or system used to hold the stopped upper structure in any stationary position (e.g. transport position)

Note 1 to entry: See Annex A.

4 Safety requirements and protective measures

4.1 General

Cable excavators shall comply with the safety requirements and protective measures of ISO 20474-1, in as far as those are not modified by the specific requirements of this clause.

4.2 Operator's station

4.2.1 General

ISO 20474-1:2017, 4.3 shall apply, with the additions and modifications given in 4.2.2 and 4.2.3 below.

4.2.2 Roll-over protective structures (ROPS)

ISO 20474-1:2017, 4.3.3, does not apply to cable excavators.

4.2.3 Operator's protective guard

Cable excavators shall be designed such that an operator's protective structure (top and front guard) can be fitted.

A protective structure (top and front guard) shall be offered by the manufacturer and selected by the user according to the existing risk of the application. The protective structures shall be in accordance with ISO 10262:1998, 7.

4.3 Operator's controls and indicators

4.3.1 Controls for driving and steering

ISO 20474-1:2017, 4.5.1 and 4.6.1, shall apply, except that the movements of the controls for driving and steering do not need to correspond to the intended direction of movement if the upper structure is not in the normal driving direction.

4.3.2 Warning indicator

ISO 20474-1:2017, 4.5.1, shall apply. Additionally, warning indicators shall be provided at the operator station or other relevant location to indicate the activation of the free-fall operations (see 4.6.2) and to indicate the deactivation of the load moment limiting devices (see 4.7.1) during dragline bucket, grab and front shovel application.

4.4 Steering

ISO 20474-1:2017, 4.6, shall apply, with the following exceptions.

ISO 20474-1:2017, 4.6.2, shall apply only for rubber-tyred cable excavators with a travel speed of more than 30 km/h, measured according to ISO 6014.

For rubber-tyred machines with a travel speed ≤ 30 km/h, ISO 5010 shall apply, except for the requirements for emergency steering.

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