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Earth-moving machinery — Safety —

Part 15: Requirements for compact tool carriers

Engins de terrassement — Sécurité —

Partie 15: Exigences applicables aux porte-outils compacts

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Foreword

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of 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*.

A list of all parts in the ISO 20474 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 in accordance with 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.

Earth-moving machinery — Safety —

Part 15: Requirements for compact tool carriers

1 Scope

This document gives the safety requirements specific to compact tool carriers. 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.

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

ISO 2867, *Earth-moving machinery — Access systems*

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

ISO 6682, *Earth-moving machinery — Zones of comfort and reach for controls*

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

ISO 14397-1, *Earth-moving machinery — Loaders and backhoe loaders — Part 1: Calculation of rated operating capacity and test method for verifying calculated tipping load*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20474-1, ISO 6165 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
compact tool carrier
self-propelled direct-control crawler or wheeled machine having a base machine mass of less than 2 000 kg, having either a pedestrian operating position or a standing *operator platform* (3.6) at the rear of the machine and either front-mounted *interchangeable equipment* (3.2) or lift arms with a quick coupler capable of coupling to interchangeable, front-mounted attachments

[SOURCE: ISO 6165:2012, 4.13, modified — The mass has been increased and changed to “base machine” and the term “attachment bracket” has been updated to “quick coupler".]

3.2
interchangeable equipment
equipment that an operator can change using the *equipment attaching bracket* (3.5) to change the function of the machine

EXAMPLE Loader arm frame, dumper body.

3.3
load carrying attachment
attachment that during its normal use would contain or support a payload

EXAMPLE Bucket, fork, sweeper bucket, grapple fork, concrete mixer.

3.4
non-load carrying attachment
attachment that during its normal use would not contain or support a payload

EXAMPLE Auger, blade, trencher, mower, breaker, tiller, snow blower, soil conditioner.

3.5
equipment attaching bracket
device mounted on the *compact tool carrier* (3.1) to facilitate the quick interchange of equipment from the base machine

3.6
operator platform
surface provided for a ride-on, standing operator to operate the *compact tool carrier* (3.1)

3.7
ground-supported operator platform
operator platform (3.6) that pivots about a connection on the base machine and is supported with one or more trail wheels or skid surfaces that follows the contour of the ground

3.8
powered attachment
attachment that requires power (e.g. hydraulic) from the *compact tool carrier* (3.1) to operate

4 Safety requirements and protective measures

4.1 General

Compact tool carriers 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 Compact tool carriers with operator platform

ISO 20474-1:2017, 4.2, is replaced by the following.

a) An operator platform, if provided, shall have

   — a durable, slip-resistance surface,

   — a maximum height of 400 mm above the ground reference plane,

   — a surface area of at least 1 355 cm^2 and shall be capable of containing a circle with a minimum diameter of 360 mm or minimum dimensions of 430 mm in width by 315 mm in depth. The operator platform does not need to be continuous in its width, provided the standing area for each foot has a minimum dimension of 160 mm in width.

b) Compact tool carriers with an operator platform shall have a handhold in accordance with ISO 2867 to facilitate ingress and egress from the platform.

c) A ground-supported or folding operator platform shall automatically lock in the operating position when the operator platform is lowered, or upward rotation of the operator platform shall be limited to provide clearance for the operator between structural components of the base machine and the pivoting platform. Both small and large operator human physical dimensions in accordance with ISO 3411 shall be considered.

If the compact tool carrier with a pedestrian operator position has a provision to add an operator platform, the platform shall be designed to meet the requirements of 4.2.

4.3 Operator's station

ISO 20474-1:2017, 4.3.1, shall apply with the exception that compact tool carriers shall not be equipped with a cab or with provisions for fitting a cab.

ISO 20474-1:2017, 4.3.2 to 4.3.6, do not apply.

4.4 Operator’s controls and indicators

ISO 20474-1:2017, 4.5, shall apply except for ISO 20474-1:2017, 4.5.9, and with the following additions.

a) A suitable device (e.g., handhold) providing a means of support for the operator during machine travel shall be provided. This device may also be used as the handhold in 4.2. If the compact tool carrier is equipped with an operator platform, the device shall not restrict or impede the operator’s access to and from the platform. The device and the control for travel shall be located so the operator’s hand is within the width of the upper structure of the compact tool carrier when the operator grasps the control or device.

b) Controls of the compact tool carrier shall be designed to provide the operator a means of support while operating the travel and work functions.

c) Compact tool carriers intended to operate powered attachments shall comply with the following, if applicable.

   1) A means shall be provided to automatically remove power to the attachment when the operator leaves the compact tool carrier’s operator position. Controls that return to their neutral position when the operator releases the control (hold-to-run control) meet this requirement. Except for hold-to-run controls, reactivation of the attachment shall only be possible by two or more separate and distinct actions by the operator.

   2) A means may be provided to allow operation of a powered attachment with the operator not in the compact tool carrier’s operator position. Such means shall require an intentional action