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**Earth-moving machinery — Safety —**  
**Part 2:**  
**Requirements for tractor-dozers**

*Engins de terrassement — Sécurité —*

*Partie 2: Exigences applicables aux boteurs*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 20474-2 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

ISO 20474 consists of the following parts, under the general title *Earth-moving machinery — Safety*:

- *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*
- *Part 14: Information on national and regional provisions [Technical Specification]*

## 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.

Provisions that are applicable for Australia, EU, Japan or the USA, and which are mandatory for compliance with specific governmental laws, directives or regulations in force in the particular country or region, are given in ISO/TS 20474-14.

NOTE Other countries or regions may also have regional requirements.

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# Earth-moving machinery — Safety —

## Part 2: Requirements for tractor-dozers

### 1 Scope

This part of ISO 20474 gives the safety requirements specific to wheeled and crawler tractor-dozers as defined in ISO 6165, as well as those for rear-mounted winches on dozers. It is intended to be used in conjunction with ISO 20474-1, which specifies general safety requirements common to earth-moving machine families, and with ISO/TS 20474-14, which gives information on provisions that are mandatory in particular countries or regions. The specific requirements given in this part of ISO 20474 take precedence over the general requirements of ISO 20474-1.

This part of ISO 20474 deals with all significant hazards, hazardous situations and events relevant to the earth-moving machinery within its Scope when used as intended or under conditions of misuse reasonably foreseeable by the manufacturer (see also ISO/TS 20474-14). It specifies the appropriate technical measures for eliminating or reducing risks arising from significant hazards, hazardous situations or events during commissioning, operation and maintenance. It is not applicable to machines manufactured before the date of its publication.

### 2 Normative references

The following referenced documents are indispensable for the application 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 3411:2007, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope*

ISO 6165:2006, *Earth-moving machinery — Basic types — Identification and terms and definitions*

ISO 6405-2, *Earth-moving machinery — Symbols for operator controls and other displays — Part 2: Specific symbols for machines, equipment and accessories*

ISO 6747, *Earth-moving machinery — Tractor-dozers — Terminology and commercial specifications*

ISO 9244, *Earth-moving machinery — Machine safety labels — General principles*

ISO 10968, *Earth-moving machinery — Operator's controls*

ISO 19472, *Machinery for forestry — Winches — Dimensions, performance and safety*

ISO 20474-1:2008, *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 and ISO 6747, and the following apply.

**3.1 tractor-dozers**  
**dozer**  
self-propelled crawler or wheeled machine with equipment having either dozing attachment which cuts, moves, and grades material through forward motion of the machine or a mounted attachment used to exert a push or a pull force

[ISO 6165:2006, definition 4.1]

### 4 Safety requirements and/or protective measures

#### 4.1 General

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

Suspension seats are not required.

If suspension seats are provided as an option, for mandatory national and regional provisions, see ISO/TS 20474-14.

#### 4.2 Operator's seat

For mandatory national and/or regional provisions, see ISO/TS 20474-14.

#### 4.3 Rear window(s)

For mandatory national and/or regional provisions, see ISO/TS 20474-14.

#### 4.4 Rear-mounted winch

##### 4.4.1 Mounting

The means for securing a winch to the machine structure shall be designed to withstand a force of twice the maximum line-pull that can be exerted by the rope without permanent deformation.

ISO 19472 should be used as guidance for design of the mounting system.

##### 4.4.2 Controls

The winch controls shall be located at the operator's station and shall fulfil the requirements stated in ISO 10968.

##### 4.4.3 Protection

Where a rear-mounted winch is fitted, provision shall be made to allow for operator protection in accordance with ISO 19472.

Tractor-dozers equipped with a rear winch shall be equipped with an adequately sized protective screen or screens of a steel wire of minimum diameter 6 mm woven wire mesh and maximum opening of 45 mm × 45 mm, or equivalent protection, between the operator and the winch.

ISO 8084 should be used as guidance for design.

The screen width and height shall cover at least

- the rear window, for machines fitted with cab,
- the rear of the minimum space envelope, as specified in ISO 3411:2007, Figure 4, for machines without a cab.

## 5 Verification of safety requirements and/or protective measures

ISO 20474-1:2008, Clause 5, shall apply.

## 6 Information for use

### 6.1 Safety labels

ISO 20474-1:2008, 6.1, shall apply, with the addition that a specific safety label according to ISO 9244, using a symbol according to ISO 6405-2, shall be used if a winch is fitted.

### 6.2 Operation manual

ISO 20474-1:2008, 6.2, shall apply, with the addition that the manufacturer shall provide instruction for operation and safe use of winches, if fitted.

### 6.3 Machine marking

ISO 20474-1:2008, 6.3, shall apply, with the addition that the maximum pull force of the winch, if fitted, shall be marked.

**Annex A**  
(informative)

**Illustrations**

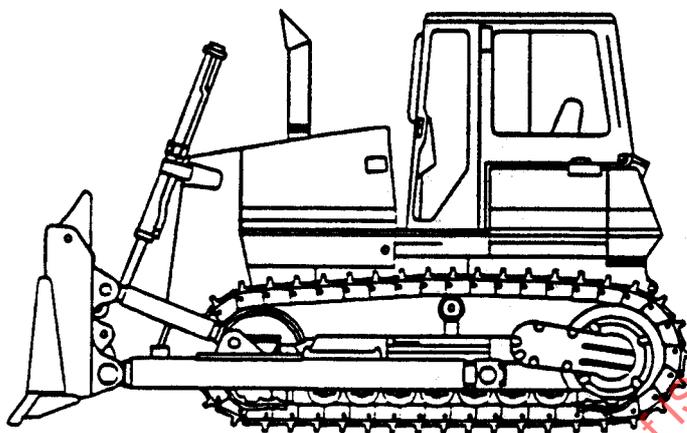


Figure A.1 — Crawler tractor-dozer

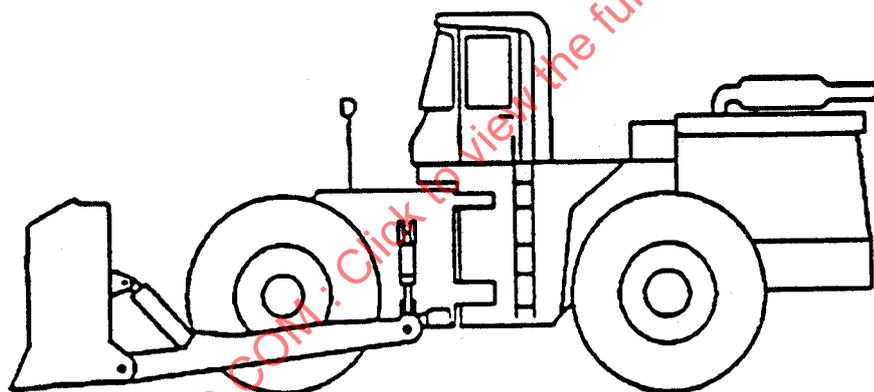


Figure A.2 — Wheeled tractor-dozer

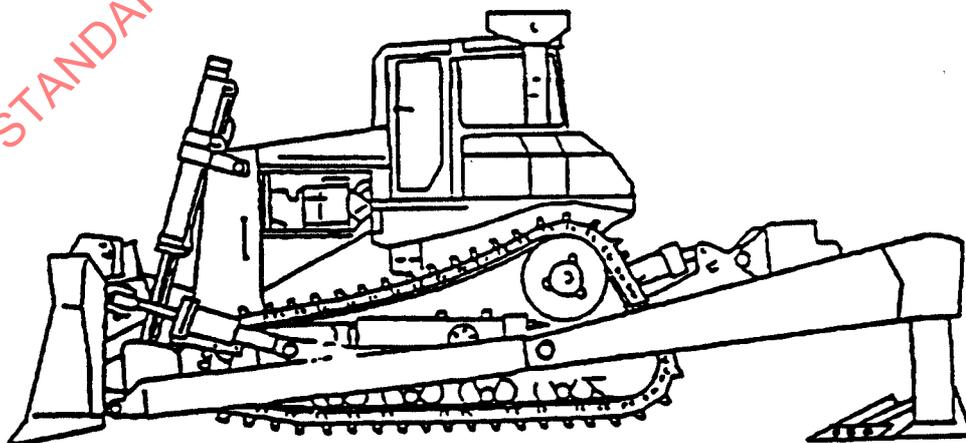


Figure A.3 — Crawler tractor-dozer with plough