
**Earth-moving machinery — Basic
types — Identification and vocabulary**

*Engins de terrassement — Principaux types — Identification et
vocabulaire*

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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).

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Terminology, commercial nomenclature, classification and ratings*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 151, *Construction equipment and building material machines - Safety*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This seventh edition cancels and replaces the sixth edition (ISO 6165:2012), which has been technically revised.

The main changes are as follows:

- the following terms were added: operator protective structure (3.1.14), canopy (3.1.15), cab (3.1.16), minimal tail radius excavator (3.2.4.2) and vacuum excavator (3.2.13);
- the definition for compact tool carrier (3.2.12) was revised;
- the definition for compactor (3.2.9) was revised;
- the terminological entry for horizontal directional drill was deleted;
- Annexes A and B were revised according to the modification text.

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 establishes the vocabulary for earth-moving machinery according to the function and configuration. The safety requirements, for most of machine families listed in this document, are provided in the ISO 20474 series.

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Earth-moving machinery — Basic types — Identification and vocabulary

1 Scope

This document provides vocabulary and an identification structure for classifying earth-moving machinery designed to perform the following operations:

- excavation;
- loading;
- transportation;
- drilling, spreading, compacting or trenching of earth, rock and other materials, during work, for example, on roads and dams, in quarries and mines and on building sites.

The purpose of this document is to provide a clear means to identify earth-moving machinery according to its function and design configurations which can include additional classifications according to its operating mass and control operator configuration.

[Annex A](#) provides a procedure based on the identification structure used by this document to classify the machinery and introduce detailed identifications consistent with the logic implied by the structure.

[Annex B](#) provides a hierarchy of the operator control configurations for earth-moving machinery.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 Machine characteristics and operating classification

3.1.1

earth-moving machinery

self-propelled or towed *base machine* (3.1.11) on wheels (drums or tyres), crawlers, legs, which can have *equipment* (3.1.12) or *attachment* (3.1.13), or both, primarily designed to perform excavation, loading, transportation, drilling, spreading, compacting or trenching of earth, rock and other materials

Note 1 to entry: Earth-moving machinery can be either direct-controlled or be remote-controlled. It can also operate autonomously or semi-autonomously.

Note 2 to entry: See [Annex B](#) for types of operator control configurations.

3.1.1.1

compact machine

earth-moving machinery (3.1.1), except for *compact excavators* (3.2.4.5) and *compact loaders* (3.2.2.3), having an *operating mass* (3.1.10) of 4 500 kg or less

3.1.2

direct-control machine

self-propelled *earth-moving machinery* (3.1.1) where the machine is controlled by an operator in physical contact with the machine

3.1.2.1

ride-on machine

direct-control machine (3.1.2) where the control devices are located on the machine and the machine is controlled by a seated or standing operator on the machine

3.1.2.2

non-riding machine

direct-control machine (3.1.2) where the control devices are located on the machine and the machine is controlled by a pedestrian operator (neither seated nor standing on the machine)

3.1.3

remote-control machine

self-propelled *earth-moving machinery* (3.1.1) where the machine is controlled by the transmission of signals from a remote-control box that is not located on the machine to a receiving unit located on the machine

Note 1 to entry: The remote control can either be wireless or by wire.

3.1.3.1

wire-controlled machine

remote-control machine (3.1.3) where the control of the machine is accomplished by signals transmitted through wires from an operator-controlled device distant from the machine

Note 1 to entry: Normally, a wire-controlled machine is operated with a direct view on the working area.

3.1.3.2

wireless-controlled machine

remote-control machine (3.1.3) where the control of the machine is accomplished by signals transmitted through the air from an operator-controlled device distant from the machine

Note 1 to entry: A wireless-controlled machine is operated with or without a direct view on the working area.

3.1.4

autonomous mode

mode of operation in which an *earth-moving machinery* (3.1.1) performs all machine safety-critical and earth-moving or mining functions related to its defined operations without operator interaction

3.1.5

autonomous machine

earth-moving machinery (3.1.1) intended to operate in *autonomous mode* (3.1.4) during its normal operating cycle

3.1.6

semi-autonomous machine

earth-moving machinery (3.1.1) intended to operate in *autonomous mode* (3.1.4) during part of its operating cycle and which requires active control by an operator to complete some of the tasks assigned to the machine

3.1.7**machine family**

group of machines designed for the same type of operation

Note 1 to entry: *Earth-moving machinery* (3.1.1) comprises the following machine families:

- *dozers* (3.2.1);
- *loaders* (3.2.2);
- *backhoe loaders* (3.2.3);
- *excavators* (3.2.4);
- *trenchers* (3.2.5);
- *dumpers* (3.2.6);
- *scrapers* (3.2.7);
- *graders* (3.2.8);
- *compactors* (3.2.9);
- *rollers* (3.2.10);
- *pipelayers* (3.2.11);
- *compact tool carriers* (3.2.12);
- *vacuum excavators* (3.2.13).

3.1.8**machine model**

machine type

manufacturer's designation of a *machine family* (3.1.7)

Note 1 to entry: A machine family can have several models or types which are the manufacturer's type designation of the machine.

3.1.9**individual machine**

machine having a unique identification number for each manufactured machine

Note 1 to entry: The product identification number (PIN) according to ISO 10261 clearly identifies the individual machine.

3.1.10**operating mass**

mass of the *base machine* (3.1.11), with *equipment* (3.1.12) and empty *attachment* (3.1.13) in the most usual configuration as specified by the manufacturer, and with the operator (75 kg), full fuel tank and all fluid systems (i.e. hydraulic oil, transmission oil, engine oil, engine coolant) at the levels specified by the manufacturer and, when applicable, with the sprinkler water tank(s) half full

Note 1 to entry: The mass of the operator is not included for *non-riding machines* (3.1.2.2).

Note 2 to entry: Ballast mass at delivery can be included if it is specified by the manufacturer.

3.1.11**base machine**

machine with or without a *cab* (3.1.16) or a *canopy* (3.1.15) and *operator-protective structure* (3.1.14) if required, without *equipment* (3.1.12) or *attachments* (3.1.13) but possessing the necessary mounting for such equipment and attachments

**3.1.12
equipment**

set of components mounted onto the *base machine* (3.1.11) which allows an *attachment* (3.1.13) to perform the primary design function of the machine

**3.1.13
attachment**

assembly of components that can be mounted onto the *base machine* (3.1.11) or *equipment* (3.1.12) for specific use

**3.1.14
operator protective structure**

system of structural members whose purpose is to provide operator with reasonable protection from hazards related to machine tip-over, machine roll-over, falling objects or penetrating objects

Note 1 to entry: In other words, it can be roll-over protective structure (ROPS), tip-over protection structure (TOPS), falling-object protective structure (FOPS) and operator protective guard (see ISO 10262, ISO 3471, ISO 3449, ISO 12117 and ISO 12117-2).

**3.1.15
canopy**

structure with at least a roof which affords a degree of weather protection (e.g. rain, sun) to the operator

Note 1 to entry: A ROPS with a roof, or a FOPS can provide the functionality of a canopy.

**3.1.16
cab**

enclosed compartment to shield the operator(s) from surrounding atmospheric elements such as heat, cold, wind, noise and dust

Note 1 to entry: A cab can meet requirements for *operator protective structure* (3.1.14).

**3.1.17
Derivative machine**

**3.1.17.1
derivative earth-moving machinery**

earth-moving machinery (3.1.1) that is a combination of features from other earth-moving *machine families* (3.1.7), creating a different configuration or arrangement

EXAMPLE Machine having the front-mounted *equipment* (3.1.12) of a *loader* (3.2.2) and a non-self-loading, rear-mounted dumper body.

**3.1.17.2
derivative support machinery used on earth-moving worksites**

machinery derived from an earth-moving *machine family* (3.1.7), creating a different configuration or arrangement with a different intended use, primarily intended to be operated on earth-moving worksites or other building sites

EXAMPLE *Articulated-frame dumper* (3.2.6.2) with the dumper body removed and replaced by a water tank for wetting of haul roads or by a fuel tank/lubrication body.

Note 1 to entry: Such support machines are typically used to perform jobsite or machine maintenance tasks.

3.2 Machine families

3.2.1

dozer

self-propelled crawler or wheeled machine with *equipment* (3.1.12) having either a dozing *attachment* (3.1.13) 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

Note 1 to entry: Terminology and commercial specifications for dozers are given in ISO 6747.

3.2.2

loader

self-propelled crawler or wheeled machine having front-mounted *equipment* (3.1.12), 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, elevating, transporting and discharging of material.

Note 2 to entry: Terminology and commercial specifications for loaders are given in ISO 7131.

3.2.2.1

swing loader

loader (3.2.2) 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* (3.1.12) offset from the longitudinal axis of the machine.

3.2.2.2

skid steer loader

loader (3.2.2) 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

3.2.2.3

compact loader

loader (3.2.2) having an *operating mass* (3.1.10) 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

3.2.2.4

telescopic loader

loader (3.2.2) having a centre mounted telescopic boom with the pivot point in front of the operator's station

3.2.3

backhoe loader

self-propelled crawler or wheeled machine having a main frame designed to carry both front-mounted *equipment* (3.1.12) and rear-mounted backhoe equipment (normally with outriggers or stabilizers)

Note 1 to entry: When used in the backhoe mode, the machine is stationary and normally digs below ground level.

Note 2 to entry: When used in the loader mode (bucket use), the machine loads through forward motion.

Note 3 to entry: A backhoe work cycle normally comprises excavating, elevating, swinging and discharging of material.

Note 4 to entry: Terminology and commercial specifications for backhoe loaders are given in ISO 8812.