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

*Engins de terrassement — Principaux types — Identification et  
termes et définitions*

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<b>Contents</b>		Page
<b>Foreword</b> .....		<b>iv</b>
<b>1 Scope</b> .....		<b>1</b>
<b>2 Normative references</b> .....		<b>1</b>
<b>3 Terms and definitions</b> .....		<b>1</b>
<b>4 Machine families</b> .....		<b>4</b>
<b>Annex A (informative) Identification procedure</b> .....		<b>8</b>
<b>Annex B (informative) Earth-moving machinery operator control configurations</b> .....		<b>10</b>
<b>Bibliography</b> .....		<b>11</b>

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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 6165 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Terminology, commercial nomenclature, classification and ratings*.

This sixth edition cancels and replaces the fifth edition (ISO 6165:2006), which has been technically revised.

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# Earth-moving machinery — Basic types — Identification and terms and definitions

## 1 Scope

This International Standard gives terms and definitions 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 International Standard is to provide a clear means of identifying machines according to their function and design configurations.

Annex A provides a procedure based on the identification structure used by this International Standard for classifying the machinery and for introducing detailed identifications consistent with the logic implied by the structure.

Annex B provides a hierarchy of the operator control configurations for earth-moving machinery.

The Bibliography provides a list of terminology standards for many of the machine families identified in this International Standard. Included in those terminology standards are figures depicting different configurations of the machine types in each machine family.

## 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 10261, *Earth-moving machinery — Product identification numbering system*

## 3 Terms and definitions

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

### 3.1

#### **earth-moving machinery**

self-propelled or towed machine on wheels, crawlers or legs, having *equipment* (3.9) or *attachment* (3.10) (working tool), or both, primarily designed to perform excavation, loading, transportation, drilling, spreading, compacting or trenching of earth, rock and other materials

Note to entry: Earth-moving machinery can be of a type either directly controlled by an operator riding or not riding on the machine, or can be remotely controlled by wired or wireless means with or without direct view on the working area. See Annex B for types of operator control configurations.

### 3.1.1

#### **compact machine**

*earth-moving machinery* (3.1), except for *compact excavators* (4.4.4) and *compact loaders* (4.2.3), having an *operating mass* (3.7) of 4 500 kg or less

### 3.2

#### **direct-control machine**

self-propelled *earth-moving machinery* (3.1) where the machine is controlled by an operator in physical contact with the machine

#### 3.2.1

##### **ride-on machine**

self-propelled *direct-control machine* (3.2) where the control devices are located on the machine and the machine is controlled by a seated or standing operator

#### 3.2.2

##### **non-riding machine**

self-propelled *direct-control machine* (3.2) 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)

### 3.3

#### **remote-control machine**

self-propelled *earth-moving machinery* (3.1) where the machine is controlled by the transmission of signals from a control box (transmitter) that is not located on the machine to a receiving unit (receiver) located on the machine

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

#### 3.3.1

##### **wire-controlled machine**

self-propelled *remote-control machine* (3.3) where the control of the machine is accomplished by signals transmitted through wires from an operator-controlled device distant from the machine

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

#### 3.3.2

##### **wireless-controlled machine**

self-propelled *remote-control machine* (3.3) where the control of the machine is accomplished by signals transmitted through the air from an operator-controlled device distant from the machine

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

### 3.4

#### **machine family**

group of machines designed for the same type of operation

Note to entry: *Earth-moving machinery* (3.1) comprises the following machine families:

- *dozers* (4.1);
- *loaders* (4.2);
- *backhoe loaders* (4.3);
- *excavators* (4.4);
- *trenchers* (4.5);
- *dumpers* (4.6);
- *scrapers* (4.7);
- *graders* (4.8);

- *landfill compactors* (4.9);
- *rollers* (4.10);
- *pipelayers* (4.11);
- *horizontal directional drills* (4.12);
- *compact tool carriers* (4.13).

### 3.5

#### **machine model**

#### **machine type**

manufacturer's designation of a *machine family* (3.4)

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

### 3.6

#### **individual machine**

machine having a unique identification number for each manufactured machine

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

### 3.7

#### **operating mass**

mass of the *base machine* (3.8), with *equipment* (3.9) and empty *attachment* (3.10) 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 sprinkler water tank(s) half full

[SOURCE: ISO 6016:2008, 3.2.1.]

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

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

### 3.8

#### **base machine**

machine with a cab or canopy and operator-protective structures if required, without *equipment* (3.9) or *attachments* (3.10) but possessing the necessary mounting for such equipment and attachments

[SOURCE: ISO 6746-2:2003, 3.3.]

### 3.9

#### **equipment**

set of components mounted onto the *base machine* (3.8) that allows an *attachment* (3.10) to perform the primary design function of the machine

[SOURCE: ISO 6746-2:2003, 3.4.]

### 3.10

#### **attachment**

assembly of components that can be mounted onto the *base machine* (3.8) or *equipment* (3.9) for specific use

[SOURCE: ISO 6746-2:2003, 3.5.]

### 3.11 Derivative machines

#### 3.11.1

##### **derivative earth-moving machinery**

*earth-moving machinery* (3.1) that is a combination of features from other earth-moving *machine families* (3.4), creating a different configuration or arrangement

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

#### 3.11.2

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

machinery derived from an earth-moving *machine family* (3.4), 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 with the dumper body removed and replaced by a water tank for wetting of haul roads or by a fuel tank/lubrication body.

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

## 4 Machine families

### 4.1

#### **dozer**

self-propelled crawler or wheeled machine with *equipment* (3.9) having either a dozing *attachment* (3.10) 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

### 4.2

#### **loader**

self-propelled crawler or wheeled machine having front-mounted *equipment* (3.9), primarily designed for loading operation (bucket use), which loads or excavates through forward motion of the machine

Note to entry: A loader work cycle normally comprises filling and elevating, and the transporting and discharging of material.

#### 4.2.1

##### **swing loader**

*loader* (4.2) having a swing-type lift arm which can rotate to the left and the right of the straight position

Note to entry: A swing-loader work cycle is similar to a loader cycle, but additional work can be done with the *equipment* (3.9) offset from the longitudinal axis of the machine.

#### 4.2.2

##### **skid steer loader**

*loader* (4.2) 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

#### 4.2.3

##### **compact loader**

*loader* (4.2) having an *operating mass* (3.7) 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



**4.3****backhoe loader**

self-propelled crawler or wheeled machine having a main frame designed to carry both front-mounted *equipment* (3.9) 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 the discharging of material. A loader work cycle normally comprises filling, elevating, transporting and discharging of material.

**4.4****excavator**

self-propelled machine on crawlers, wheels or legs, having an upper structure capable of a 360° swing with mounted *equipment* (3.9) and which is primarily designed for excavating with a bucket, without movement of the undercarriage during the work cycle

Note 1 to entry: An excavator work cycle normally comprises excavating, elevating, swinging and the discharging of material.

Note 2 to entry: An excavator can also be used for object or material handling/transportation.

Note 3 to entry: Unless specifically identified as a cable excavator (4.4.3), an excavator is also commonly referred to as a hydraulic excavator.

**4.4.1****minimal swing radius excavator****MSRX**

*excavator* (4.4) designed for operation in a confined space, having an upper structure with a short swinging radius and with its *equipment* (3.9) and *attachment* (3.10) swinging within 120 % of the width of the undercarriage

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**4.4.2****walking excavator**

*excavator* (4.4) with three or more supporting legs, which can be articulated, telescopic or both, and which can be fitted with wheels

**4.4.3****cable excavator**

*excavator* (4.4) 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* (3.9) and *attachments* (3.10)

**4.4.4****compact excavator**

*excavator* (4.4) having an *operating mass* (3.7) of 6 000 kg or less

**4.5****trencher**

self-propelled crawler or wheeled machine, having rear- and/or front-mounted *equipment* (3.9) or *attachment* (3.10), primarily designed to produce a trench in a continuous operation, through motion of the machine

Note to entry: The attachment can be a digging chain, wheel, disk, plough blade or similar.

**4.6****dumper**

self-propelled or towed crawler or wheeled machine with an open body, which transports and dumps or spreads material, and where loading is performed by means external to the dumper

Note to entry: A compact dumper can have integral self-loading equipment.