
**Earth-moving machinery — Loaders —
Terminology and commercial
specifications**

*Engins de terrassement — Chargeuses — Terminologie et
spécifications commerciales*

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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 7131 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 4, *Terminology, commercial nomenclature, classification and rating*.

This third edition cancels and replaces the second edition (ISO 7131:1997), which has been technically revised.

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Earth-moving machinery — Loaders — Terminology and commercial specifications

1 Scope

This International Standard establishes the terminology and content of commercial literature specifications for self-propelled crawler and wheeled loaders as defined in ISO 6165, with their equipment and attachments, used in earth-moving operations.

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 3450, *Earth-moving machinery — Braking systems of rubber-tyred machines — Systems and performance requirements and test procedures*

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

ISO 6016:2008, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

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

ISO 6746:2003 (all parts), *Earth-moving machinery — Definitions of dimensions and codes*

ISO 7457, *Earth-moving machinery — Measurement of turning dimensions of wheeled machines*

ISO 9249, *Earth-moving machinery — Engine test code — Net power*

ISO 10265, *Earth-moving machinery — Crawler machines — Performance requirements and test procedures for braking systems*

ISO 14396, *Reciprocating internal combustion engines — Determination and method for the measurement of engine power — Additional requirements for exhaust emission tests in accordance with ISO 8178*

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 14397-2, *Earth-moving machinery — Loaders and backhoe loaders — Part 2: Test method for measuring breakout forces and lift capacity to maximum lift height*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6165, ISO 6746 and the following apply.

3.1 General

3.1.1 loader

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

NOTE A loader work cycle normally comprises filling, elevating, transporting and discharging of material.

[ISO 6165:2006, definition 4.2]

3.1.1.1

compact loader

loader (3.1.1) having an **operating mass** (3.2.1) of 4 500 kg or less, designed to work in confined spaces with the associated need for greater manoeuvrability

NOTE The general term *compact machine* is defined in ISO 6165.

3.1.1.2

skid steer loader

loader (3.1.1) which normally has an operator station between attachment-supporting structures and which is 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

[ISO 6165:2006, definition 4.2.2]

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3.1.2

base machine

machine with a cab or canopy and operator-protective structures if required, without equipment or attachments but possessing the necessary mountings for such equipment and attachments

[ISO 6746-1:2003, definition 3.3]

NOTE The machine will need to be provided with the necessary mountings to secure equipment and attachments (see Clause 5).

3.2 Masses

3.2.1

operating mass

OM

mass of the **base machine** (3.1.2), with equipment and empty **attachment** (3.3.1) 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

NOTE 1 The mass of an operator is not included for non-riding machines.

NOTE 2 Ballast mass at delivery can be included if specified by the manufacturer.

[ISO 6016:2008, definition 3.2.1]

3.2.2 shipping mass SM

mass of the base machine without an operator, and with fuel level at 10 % of tank capacity or with the minimum fuel level needed for machine shipping purposes as specified by the manufacturer, whichever is higher, with all fluid systems at the levels specified by the manufacturer, and with empty sprinkler tank(s), if required, and with or without equipment, ballast, attachment, cab, canopy, operator-protective structures, wheels and counterweights as stated by the manufacturer

NOTE If the manufacturer intends that the machine be partially disassembled for shipping purposes, the masses of the disassembled items will also be stated.

[ISO 6016:2008, definition 3.2.6]

3.3 Attachments

3.3.1 attachment

assembly of components that can be mounted onto the **base machine** (3.1.2) or equipment for specific use

[ISO 6746-2:2003, definition 3.5]

3.3.1.1 backhoe

attachment (3.3.1) which generally excavates towards the machine and below ground level, and which elevates, swings and dumps material by the action of a boom, arm and bucket

NOTE For dedicated backhoe loaders, see ISO 8812.

3.3.1.2 scarifier

attachment (3.3.1) having teeth for penetrating and loosening to shallow depths materials such as earth, asphalt and gravel for roads and for similar functions

See Figure 19.

NOTE It is usually mounted on the back of the loader but can be mounted on the back of the bucket.

3.3.2 side dump bucket

bucket which loads through forward motion of the machine and which can dump to the side from an end, or dump forwards

See Figure 17.

3.3.3 multi-purpose bucket

bucket having a dozer-type mouldboard with hinges at the top to support a clam which can be opened to various positions, providing for use as a dozer, scraper, clam or bucket

See Figure 17.

**3.3.4
fork arm**

structure having tines for lifting, transporting and discharging warehouse-type pallets

See Figure 22.

NOTE When the fork attachment is fitted to a loader, the machine is still classified as an earth-moving machine, not a rough terrain fork truck.

**3.3.5
log fork
log grapple**

mechanism having tines and a top clamp for lifting, transporting, and discharging logs

See Figure 23.

**3.3.6
winch**

frame equipped with a drum and connected to the rear part of the **base machine** (3.1.2)

See Figure 24.

**3.4
equipment**

set of components mounted onto the base of the machine to provide the primary design function of the loader

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4 Base machine

4.1 Types of loader

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Loaders shall be classified by type of attribute according to their undercarriage, engine location, and steering and drive systems.

4.1.1 Undercarriage

4.1.1.1 Crawler loader (see Figure 1)

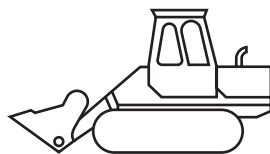


Figure 1 — Crawler loader

4.1.1.2 Wheeled loader (see Figure 2)

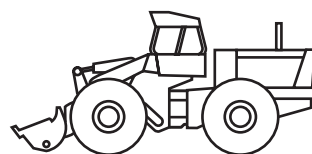


Figure 2 — Wheeled loader

4.1.2 Engine location

4.1.2.1 Front engine (see Figure 3)



Figure 3 — Front engine

4.1.2.2 Rear engine (see Figure 4)



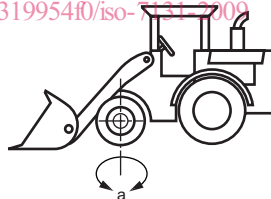
Figure 4 — Rear engine

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4.1.3 Steering system

4.1.3.1 Front-wheel steer (see Figure 5)

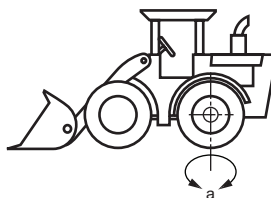
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^a Steerable wheels.

Figure 5 — Front-wheel steer

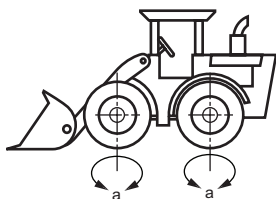
4.1.3.2 Rear-wheel steer (see Figure 6)



^a Steerable wheels.

Figure 6 — Rear-wheel steer

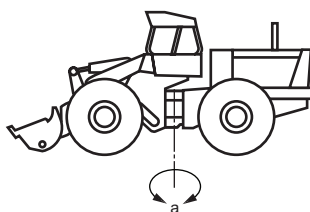
4.1.3.3 All-wheel steer (see Figure 7)



^a Steerable wheels.

Figure 7 — All-wheel steer

4.1.3.4 Articulated steer (see Figure 8)

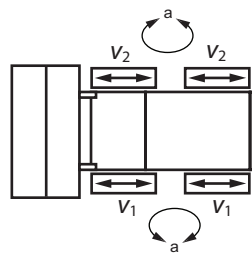
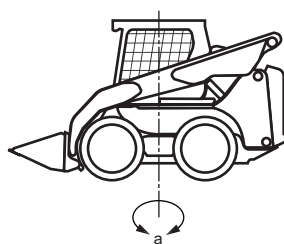


^a Turning centre.

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Figure 8 — Articulated steer

4.1.3.5 Wheel-skid steer (see Figure 9)



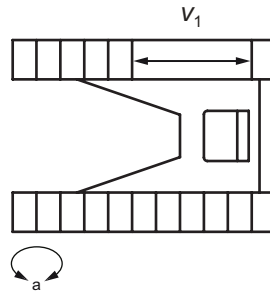
Key

v wheel velocity ($v_1 \neq v_2$)

^a Turning centre.

Figure 9 — Wheel skid steer

4.1.3.6 Crawler pivot steer (see Figure 10)

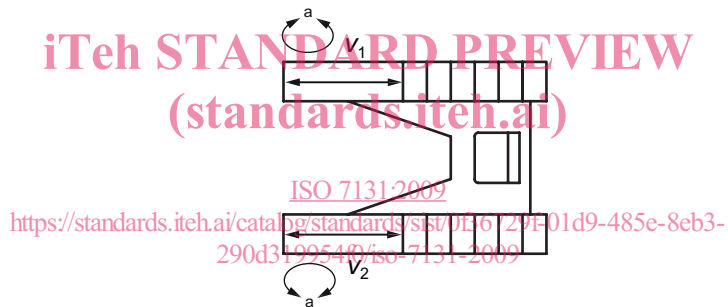


Key

- v_1 track velocity
- a Steerable pivot.

Figure 10 — Crawler pivot steer

4.1.3.7 Crawler independent steer or crawler skid steer (see Figure 11)



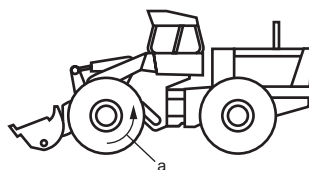
Key

- v track velocity ($v_1 \neq v_2$)
- a Steerable track.

Figure 11 — Crawler independent steer or crawler skid steer

4.1.4 Drive system

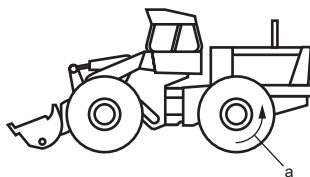
4.1.4.1 Front-wheel drive (see Figure 12)



- a Drive wheels.

Figure 12 — Front-wheel drive

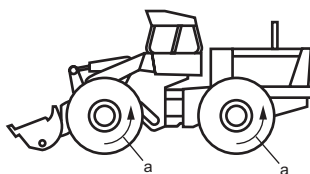
4.1.4.2 Rear-wheel drive (see Figure 13)



a Drive wheels.

Figure 13 — Rear-wheel drive

4.1.4.3 All-wheel drive (see Figure 14)



a Drive wheels.

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