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“Step Out From the Old to the New”

Indian Standard

EARTH-MOVING MACHINERY — BASIC TYPES — IDENTIFICATION AND TERMS AND DEFINITIONS

ICS 53.100
NATIONAL FOREWORD

This Indian Standard which is identical with ISO 6165 : 2006 'Earth-moving machinery — Basic types — Identification and terms and definitions' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Material Handling Systems and Equipment Sectional Committee and approval of the Mechanical Engineering Division Council.

This standard supersedes IS 12138 : 1993 'Earth-moving machinery — Basic types — Identification and terms and definitions'.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standards while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

<table>
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<td>ISO 6016:1998</td>
<td>Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components</td>
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<tr>
<td>ISO 10261 :2002</td>
<td>Earth-moving machinery — Product identification numbering system</td>
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Only the English language text of the International Standard has been retained while adopting it in this Indian Standard, and as such the page numbers given here are not the same as in the ISO Publication.
Indian Standard

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, and
— drilling, spreading, compacting or trenching of earth and other materials,
for example, during work on roads and dams, 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.

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 6016:1998, Earth-moving machinery—Methods of measuring the masses of whole machines, their equipment and components


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 or attachment (working tool), or both, primarily designed to perform excavation, loading, transportation, drilling, spreading, compacting or trenching of earth, rock and other materials

NOTE 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 (3.1.2), having an operating mass of 4 500 kg or less

NOTE For the definition of "operating mass", see ISO 6016.

3.1.2 compact excavator
excavator (4.4) having an operating mass of 6 000 kg or less

NOTE For the definition of "operating mass", see ISO 6016.
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 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 control device distant from the machine.

NOTE 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 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 Earth-moving machinery (3.1) comprises the following families:
- dozer (4.1);
- loader (4.2);
- backhoe loader (4.3);
- excavator (4.4);
- trencher (4.5);
- dumper (4.6);
- scraper (4.7);
- grader (4.8);
- landfill compactor (4.9);
- roller (4.10);
- pipelayer (4.11);
- rotating pipelayer (4.12);
- horizontal directional drill (4.13).

See Clause 4.

3.5
machine model

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

NOTE Each 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 The product identification number (PIN), according to ISO 10261 clearly identifies the individual machine.

4 **Machine families**

4.1 **dozer**
self-propelled crawler or wheeled machine with equipment having either a 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

4.2 **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.

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 A swing loader working cycle is similar to a loader cycle, but additional work can be done with the equipment offset from the longitudinal axis of the machine.

4.2.2 **skid steer loader**
loader (4.2) 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

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

NOTE 1 When used in the backhoe mode, the machine is stationary and normally digs below ground level.

NOTE 2 When used in the loader mode (bucket use), the machine loads through forward motion.

NOTE 3 A backhoe work cycle normally comprises excavating, elevating, swinging and 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 and which is primarily designed for excavating with a bucket, without movement of the undercarriage during the work cycle

NOTE 1 An excavator work cycle normally comprises excavating, elevating, swinging and discharging of material.

NOTE 2 An excavator can also be used for object or material handling/transportation.

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 and attachment swinging within 120 % of the width of the undercarriage

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 and attachment.

4.5 trencher
self-propelled crawler or wheeled machine, having rear- and/or front-mounted equipment or attachment, primarily designed to produce a trench in a continuous operation, through motion of the machine.

NOTE The attachment can be a digging chain, wheel, disk, plough blade or similar.

4.6 dumper
self-propelled crawler or wheeled machine with an open body, which transports and dumps or spreads material, and where loading is performed by means other than the dumper.

NOTE A compact dumper can have integral self-loading equipment.

4.6.1 rigid-frame dumper
dumper (4.6) having a rigid frame and wheel or crawler steering.

4.6.2 articulated-frame dumper
(wheeled machine) dumper (4.6) with an articulated frame which accomplishes the steering of the dumper.

4.6.3 swing dumper
dumper (4.6) having a 360° swing upper structure, whose upper structure consists of a rigid frame, the open body and the operator's station, and whose undercarriage consists of a track type or wheeled unit.

4.7 scraper
self-propelled or towed crawler or wheeled machine which has a bowl with a cutting edge positioned between the axles, and which cuts, loads, transports, discharges and spreads material through its forward motion.

NOTE The loading through a forward motion can be assisted by a powered mechanism (elevator) fixed to the scraper bowl.

4.7.1 towed scraper
scraper (4.7) that is not self-propelled but which is propelled instead by a towing machine on which the operator's station is located.

4.8 grader
self-propelled wheeled machine with an adjustable blade positioned between the front and rear axles, which can be equipped with a front-mounted blade or scarifier that can also be located between the front and rear axles.

NOTE The machine is primarily designed for grading, sloping, ditching and scarifying of materials through its forward motion.

4.9 landfill compactor
self-propelled wheeled compaction machine having front-mounted equipment with a dozing or loading attachment and wheels provided with means to crush and compact waste material, which also moves, grades and loads soil, landfill or sanitary (refuse) materials through its motion.

4.10 roller
self-propelled or towed machine having a compaction device, consisting of one or more metallic cylindrical bodies (drums) or rubber tyres, which compacts material such as crushed rock, earth, asphalt or gravel through a rolling and/or vibrating action of the compaction device.
4.10.1 **towed roller**
A roller (4.10) that is not self-propelled but which is instead propelled by a towing machine on which the operator’s station is located.

4.11 **pipelayer**
A machine with rigid upper structure) self-propelled crawler or wheeled machine, having pipe-laying equipment with main frame, load-hoist mechanism, vertically pivotable side boom and counterweight, primarily designed to handle and lay pipes.

4.12 **rotating pipelayer**
Self-propelled crawler or wheeled machine having pipe-laying equipment with main frame, load-hoist mechanism with either a load-hoist drum or winch, and vertically pivotable boom — these being fitted on a rotating upper structure — and counterweight, primarily designed to handle and lay pipes.

4.13 **horizontal directional drill**
Machine that uses a steerable cutting head attached to the end of a drill string for creating a bore through the earth in a horizontal direction.

NOTE 1 Drilling can include fluid injection through the drill string to the cutting head, tracking of the bore by use of sensors or a transponder near the cutting head and subsequent enlargement of the bore by backreaming.

NOTE 2 These machines typically apply force to the drill string using a drill frame parallel to, or inclined up to, 30° relative to the operating earth surface.
Annex A
(informative)

Identification procedure

This annex provides information on the identification structure used by this International Standard and a procedure using the structure for classifying machinery and introducing detailed identifications consistent with the logic implied.

Machines are identified according to their
a) machine family (see Clause 4),
b) operating mass as specified by the manufacturer according to ISO 6016, and
c) operator control configuration (see Annex B).

The machine family structure is based on the chart shown in Figure A.1.

Machine operating mass according to ISO 6016 is used to identify possible mass limits in some machine configurations (e.g. compact machines).

Operator control configuration is related to the way in which the machine is controlled, and to the posture of the operator and location of the operator's station (see Annex B).

In general, earth-moving machinery can be broadly identified by combining specifications from each of the characteristics mentioned above. This allows the unique identification of machines not explicitly referenced in this International Standard, provided that they belong to one of the existing machine families.

EXAMPLE 1 Compact rigid-frame dumper with seated operator.

Other characteristics can be added to provide additional clarification.

EXAMPLE 2 Tracked compact rigid-frame dumper with seated operator.
Earth-moving machine operator control configurations can be arranged into a hierarchical structure according to the control type, operating classification and operator posture, as shown in Figure B.1.

NOTE The structure shown in Figure B.1 does not preclude the possibility of introducing new configurations according to advances in technology.

![Diagram of Earth-moving machine operator control configurations]
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