AS ISO 7451:2021
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# Earth-moving machinery — Volumetric ratings for hoe-type and grab-type buckets of hydraulic excavators and backhoe loaders



AS ISO 7451:2021

This Australian Standard ® was prepared by ME-063, Earthmoving Equipment. It was approved on behalf of the Council of Standards Australia on 24 March 2021.

This Standard was published on 9 April 2021.

The following are represented on Committee ME-063:

Australian Industry Group
Better Regulation Division — SafeWork NSW
Construction and Mining Equipment Industry Group
Department of Natural Resources, Mines and Energy, Qld
Department of Regional NSW
Engineers Australia
Institute of Instrumentation, Control & Automation Australia
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This Standard was issued in draft form for comment as DR AS ISO 7451:2020.

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ISBN 978 1 76113 277 3

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First published as AS ISO 7451:2021.

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# Preface

This Standard was prepared by the Standards Australia Committee ME-063, Earthmoving Equipment.

The objective of this document is to specify a method for estimating the volume of materials which a hoe-type or grab-type bucket of a hydraulic excavator or backhoe loader can normally contain. The volume assessments are based on the internal dimensions of the bucket and on the representative volumes at the top of the bucket.

The method employs the technique of dividing the complex shape of the material in the bucket into simple geometric shapes.

This method of assessment is intended to provide a conventional means of comparing bucket capacities. It is not intended to be used to define true capacities.

This document is not applicable to buckets of cable excavators.

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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 7451 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 1, *Test methods relating to machine performance*.

This third edition cancels and replaces the second edition (ISO 7451:1997), which has been technically revised. It also incorporates the Technical Corrigendum ISO 7451:1997/Cor.1:1998.

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# Earth-moving machinery — Volumetric ratings for hoe-type and grab-type buckets of hydraulic excavators and backhoe loaders

## 1 Scope

This International Standard specifies a method for estimating the volume of materials which a hoe-type or grab-type bucket of a hydraulic excavator or backhoe loader can normally contain. The volume assessments are based on the internal dimensions of the bucket and on the representative volumes at the top of the bucket.

The method employs the technique of dividing the complex shape of the material in the bucket into simple geometric shapes.

This method of assessment is intended to provide a conventional means of comparing bucket capacities. It is not intended to be used to define true capacities.

This International Standard is not applicable to buckets of cable excavators.

## 2 Terms and definitions

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

**2.1**
**hydraulic 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 to entry: An excavator work cycle normally comprises excavating, elevating, swinging and discharging of material.

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

Note 3 to entry: For hoe-type bucket components (see Figure 2).

Note 4 to entry: Adapted from ISO 6165:2006.

**2.2**
**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 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. A loader work cycle normally comprises filling, elevating, transporting and discharging of material.

[SOURCE: ISO 6165:2006, definition 4.3]

**2.3**
***X* dimension**
***X***
distance between the cutting edge (or face) of the leading edge and the contact edge of the strike plane on the backsheet of a hoe-type bucket (see Figure 3)

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