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# Iron ores — Determination of bulk density

*Minerais de fer — Détermination de la masse volumique apparente*



Reference number
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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3852 was prepared by Technical Committee ISO/TC 102, *Iron ores.*

This second edition cancels and replaces the first edition (ISO 3852 : 1977) and ISO 5464 : 1980, and includes the determination of bulk density for particles greater than 40 mm.



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# Iron ores — Determination of bulk density

## 1 Scope

This International Standard specifies two methods for measuring the bulk density of natural and processed iron ores.

Method 1 is applicable to iron ores having a maximum particle size of 40 mm or smaller.

Method 2 is applicable to iron ores having any maximum particle size.

NOTE — The measured bulk density does not necessarily represent the bulk density of compacted or piled-up natural and processed iron ores.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3081 : 1986, *Iron ores — Increment sampling — Manual method.*

ISO 3082 : 1987, *Iron ores — Increment sampling and sample preparation — Mechanical method.*

ISO 3083 : 1986, *Iron ores — Preparation of samples — Manual method.*

ISO 3087 : 1987, *Iron ores — Determination of moisture content of a consignment.*

ISO 4701 : 1985, *Iron ores — Determination of size distribution by sieving.*

## 3 Definitions

For the purposes of this International Standard, the following definitions apply.

**3.1 maximum particle size:** The particle size expressed in terms of the aperture of the sieve on which approximately 5 % ($m/m$) of an iron ore is retained.

**3.2 bulk density:** The mass in air of a unit volume of an iron ore, including the voids within and between the particles.

## 4 Apparatus

### 4.1 Method 1

**4.1.1 Small container,** made of metal, cylindrical in form, and having an internal diameter of 400 mm ± 2 mm and an internal height of 400 mm ± 2 mm (inner volume: approximately 0,05 $m^3$).

The container shall be constructed of metal of sufficient thickness to ensure the rigidity of the walls and the base of the container under the conditions of the test.

The container shall be reinforced by a steel band around the outside periphery at the top, and shall have two handles, 180° apart, attached to the outer surface by welding. A carriage or other suitable device may be provided to facilitate transportation of the container within the laboratory.

The volume of the container, $V$, in litres, shall be determined with a precision of 0,1 litre using potable water of known density.

**4.1.2 Weighing device,** having a sensitivity of 1/1 000 or better, and a capacity adequate for the masses to be determined.

**4.1.3 Drying oven,** suitably ventilated, capable of being controlled at 105 °C ± 5 °C and of sufficient size to accommodate the test sample.

**4.1.4 Increment shovel,** No. 50, as specified in table 6 of ISO 3081.

### 4.2 Method 2

**4.2.1 Container(s),** such as a truck or railway wagon, of regular geometrical shape, with smooth inner surfaces of the walls and bottom, and in good general condition. The container shall have sufficient capacity to hold, when filled, a minimum of 10 tonnes of sample and a minimum height of the sample bed of 500 mm. The minimum length, width and height of the containers should be 10 times the maximum particle size of the sample.

**4.2.2 Weighing device,** preferably of the platform type, having a sensitivity of 1/200 or better and a capacity adequate for the masses to be determined.