INTERNATIONAL STANDARD

**ISO 5416**

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# Direct reduced iron — Determination of metallic iron — Bromine-methanol titrimetric method

*Minerais de fer préréduits — Dosage du fer métallique — Méthode titrimétrique au brome-méthanol*

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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 5416 was prepared by Technical Committee ISO/TC 102, *Iron ore and direct reduced iron*, Subcommittee SC 2, *Chemical analysis*.

This third edition cancels and replaces the second edition (ISO 5416:1997), which has been technically revised. It has been updated to alter the manner in which precision data are presented.



 

# Direct reduced iron — Determination of metallic iron — Bromine-methanol titrimetric method

**WARNING — This International Standard may involve hazardous materials, operations and equipment. This International Standard does not purport to address all of the safety issues associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.**



## 1 Scope

This International Standard specifies a titrimetric method for the determination of the mass fraction of metallic iron in reduced iron ores (direct reduced iron: DRI).

This method is applicable to mass fractions of metallic iron between 15 % and 95 % in DRI.

NOTE The term “metallic iron” means those forms of iron not bonded to oxygen or not present as pyrite.

## 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 385, *Laboratory glassware — Burettes*

ISO 648, *Laboratory glassware — One-mark pipettes*

ISO 1042, *Laboratory glassware — One-mark volumetric flasks*

ISO 2596, *Iron ores — Determination of hygroscopic moisture in analytical samples — Gravimetric, Karl Fischer and mass-loss methods*

ISO 2597-1, *Iron ores — Determination of total iron content — Part 1: Titrimetric method after tin(II) chloride reduction*

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 10835, *Direct reduced iron and hot briquetted iron — Sampling and sample preparation*

## 3 Principle

Metallic iron is dissolved by treatment with bromine-methanol solution. The insoluble residue is separated by filtration. The iron in the filtrate is reduced to iron(II), which is titrated with potassium dichromate solution.

NOTE Other metallic elements, such as chromium, cobalt, manganese, nickel and vanadium, are also dissolved by the bromine-methanol solution but, except for vanadium, they do not interfere with the titration procedure.