

ICS 73.060.20

CCS D 32



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 1508-2002

**Manganese Ores - Determination of Total Iron Content -
Potassium Dichromate Titrimetric Method and
1,10-Phenanthroline Spectrophotometric Method
(English Translation)**

Issued on: September 11, 2002

Implemented on: April 1, 2003

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

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Foreword

There are several separate parts under the general title of Manganese Ores; and this Part is one of them.

This Part includes the Method-I potassium dichromate titrimetric method, and Method-II 1,10-phenanthroline spectrophotometric method. The Method-I, on the basis of GB/T 1508-1979, abandons the mercury method, while adopts the mercury-free method.

The Method-II modifies and adopts ISO 9292.1988 in the technical contents.

Compared with GB/T 1508-1979, Method-I has the major changes as follows.

- Due to the contamination of mercury salts; abandon the mercury method, while adopt the mercury-free method; and use neutral red as an indicator;
- Change the sample decomposition method into hydrochloric acid dissolution and slag return treatment.

Method-II modifies and adopts the international standard ISO 9292.1998; its major changes are as follows.

- The sampling volume is different from the volume of test solution;
- The measurement range (mass fraction) is 0.10%~3.00%.

This Part was proposed by the original State Bureau of Metallurgical Industry.

This Part shall be under the jurisdiction of China Metallurgical Information and Standardization Institute.

Drafting organization of this Part. Guilin Research Institute of Geology for Mineral Resources.

Chief drafting staffs of this Part. Jin Xiaozhu, Yang Zhongping, Shi Yihua.

The historical edition replaced by this Standard is as follows.

--- GB/T 1508-1979.

Manganese Ores - Determination of Total Iron Content

- Potassium Dichromate Titrimetric Method and 1,10-

Phenanthroline Spectrophotometric Method

Warning. This Part does not point out all possible safety issues. It is the responsibility of the user to take appropriate safety and health measures; and ensure compliance with the conditions stipulated by relevant national regulations.

1 Scope

This Part specifies the principle, reagents and materials, instruments, sampling and sample preparation, analytical procedures, result calculation, etc. of using potassium dichromate titrimetric method and 1,10-phenanthroline spectrophotometric method to determine the total iron content.

This Part is applicable to the determination of total iron in the manganese ores and the manganese concentrates with vanadium content (mass fraction) $< 0.02\%$; the test range (mass fraction). Method-I potassium dichromate titrimetric method is $2.00\% \sim 25.00\%$; while Method-II 1,10-phenanthroline spectrophotometric method is $0.10\% \sim 3.00\%$.

2 Normative References

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 2011 Method of Sampling and Sample Preparation of Manganese Ores in

Bulk

3.1 Principle

The sample shall be decomposed by hydrochloric acid; the residue slag shall be melted by potassium pyrosulfate. After leaching, the iron was precipitated and separated by ammonia water; use the hydrochloric acid to dissolve the precipitate.

3.2 Reagents and materials

Unless otherwise specified, only the reagents that are determined to be analytically pure and distilled water or water with equivalent purity shall be used in the analysis.

3.2.13 Sulfur-phosphorus mixed acid. slowly add 150mL of sulfuric acid (rho1.84g/mL)

into 500mL of water; after cooling off, add 150mL of phosphoric acid (3.2.5); use water to dilute to 1000mL; mix evenly.

3.3 Instrument

The general laboratory instruments are used for analysis.

3.4 Sampling and sample preparation

The sampling and sample preparation shall be carried out as per the provisions of GB/T 2011; the specimen shall pass through a 0.080mm sieve.

3.5.1 Sample mass

Take the air-dried sample according to Table 1, accurate to 0.0001g.

Meanwhile, take the air-dried sample according to the wet storage water content measured by GB/T 14949.8-1994.

3.5.2 Blank test

Pipette 10.00mL of iron standard solution (3.2.19); perform the blank test together with the sample.

3.7 Tolerance

The difference in analysis results between laboratories shall be no more than the tolerance in Table 2.

3.8 Test report

The test report shall include the following contents.

4.1 Principle

The sample is decomposed by hydrochloric acid; the remaining slag is melted by potassium pyrosulfate. Use hydroxylamine hydrochloride to reduce the ferric iron into ferrous iron. At the acidity of pH 4~5, the ferrous iron and 1,10-phenanthroline forms a red complex; then measure the absorbance at the wavelength of 510nm; calculate the total iron content.

4.2 Reagents and materials

Unless otherwise specified, the reagents determined to be analytically pure and distilled water or water with equivalent purity shall be used in the analysis.

4.3 Instrument

The general laboratory instruments are used for analysis.

4.4 Sampling and sample preparation

The sampling and sample preparation shall be carried out as per the provisions of GB/T 2011; the specimen shall pass through a 0.080mm sieve.

4.5.1 Sample mass

Take the air-dried sample according to Table 3, accurate to 0.0001g.

Meanwhile, take the air-dried sample according to the wet storage water content measured by GB/T 14949.8-1994.

4.5.2 Blank test

The blank test shall be performed together with sample.