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(JFA/JSA)

**Method for chemical analysis of
ferromanganese—Part 1:
Determination of manganese
content**

ICS 77.100

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In the event of any doubts arising as to the contents,
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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by Japan Ferroalloy Association (JFA)/ Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

Consequently **JIS G 1311**:1998 has been withdrawn and partially replaced with this Standard.

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JIS G 1311 series consists of the following seven parts under the general title “*Method for chemical analysis of ferromanganese*”:

Part 1: Determination of manganese content

Part 2: Determination of carbon content

Part 3: Determination of silicon content

Part 4: Determination of phosphorus content

Part 5: Determination of sulfur content

Part 6: Determination of boron content

Part 7: Determination of nitrogen content

Method for chemical analysis of ferromanganese—Part 1: Determination of manganese content

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **ISO 4159** published in 1978 by modifying some of its technical contents so that they fit the actualities in Japan.

The portions given sidelines or dotted underlines are the matters not given in the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies methods for the determination of the manganese content of ferromanganese.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 4159:1978 *Ferromanganese and ferrosilicomanganese—Determination of manganese content—Potentiometric method* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21-1**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS G 1301 *Ferroalloys—General rules for chemical analysis*

JIS K 8001 *General rule for test methods of reagents*

3 General

General matters of chemical analysis shall be in accordance with **JIS G 1301**.

4 Classification of determination methods

The determination of manganese content shall be in accordance with either of the following methods.

- a) **Potassium permanganate visual titrimetric method** This method shall be applied to the sample of 55 % (mass fraction) or over up to and including 95 % (mass fraction) in manganese content.

- b) **Potassium permanganate potentiometric method** This method shall be applied to the sample of 55 % (mass fraction) or over up to and including 95 % (mass fraction) in manganese content.
- c) **Disodium dihydrogen ethylenediamine tetraacetate titrimetric method**
This method shall be applied to the sample of 55 % (mass fraction) or over up to and including 95 % (mass fraction) in manganese content.

5 Potassium permanganate visual titrimetric method

5.1 Summary

The sample is decomposed with nitric acid, heated by adding sulfuric acid and the nitric acid is removed by generating the white fume of sulfuric acid. It is then neutralized with zinc oxide to remove iron and the like and titrated with potassium permanganate solution.

5.2 Reagents

Reagents shall be as follows.

5.2.1 Hydrochloric acid (1+1)

5.2.2 Nitric acid

5.2.3 Hydrofluoric acid

5.2.4 Sulfuric acid (1+1)

5.2.5 Sodium disulfate

5.2.6 Zinc oxide emulsion Add about 100 ml of water to about 20 g of zinc oxide and stir to make it an emulsion state.

5.2.7 0.02 mol/L potassium permanganate solution The methods of preparation, standardization and calculation shall be in accordance with **JA.5.2 g)** in **JIS K 8001**. The preservation shall be in accordance with **1)** of **JA.5.2 j)** in **JIS K 8001**.

5.3 Test portion

For a sample, take a portion of 0.10 g, weighed to the nearest 0.1 mg.

5.4 Procedure

5.4.1 Preparation of sample solution

The preparation of sample solution shall be carried out according to the following procedures.

- Weigh the sample, transfer to a beaker (300 ml) and cover it with a watch glass.
- Add 20 ml of nitric acid and decompose it by heating.
- Remove the watch glass after washing its rear bottom with water.