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

**GB/T 3049-2006**

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**Chemical products for industrial use - General method for  
determination of iron content. 1, 10-Phenanthroline  
spectrophotometric method**

**(English Translation)**

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## Foreword

This Standard is identical to the international standard ISO 6685:1982

"Chemical products for industrial use - General method for determination of iron content - 1, 10-Phenanthroline spectrophotometric method".

This Standard is identical in technical content to the international standard ISO 6685:1982 (E), but contains the following minor editorial changes:

- Replace the comma "," with a decimal point ".";
- Replace "this International Standard" with "this Standard";
- CHANGE "Annex" to "Annex A (Informative)".

This Standard replaces GB/T 3049-1986 "Chemical products for industrial use

- General method for determination of iron content - o-Phenanthroline spectrophotometric method".

Compared with GB/T 3049-1986, the main changes of this Standard are as follows:

- The concentration of the reagents used in the test has changed (Clause 3 of the 1986 edition; Clause 4 of this edition);
- Due to changes in reagent concentration, the amount of reagent added has

also changed (Clause 5 of the 1986 edition; Clause 6 of this edition);

- ADD cells with an optical path of 4 cm or 5 cm and delete cells with an optical path of 0.5 cm and 3 cm (4.2 of the 1986 edition; 5.1 of this edition);
- Specify the color development time to be not less than 15 min (Clause 6 of this edition);
- According to international standards, delete the non-interfering ions  $\text{La}^{3+}$ ,  $\text{Ce}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Th}^{4+}$ ,  $\text{ClO}_4^-$ , and  $\text{CO}_3^{2-}$  in Annex B (Annex B of the 1986 edition; Clause 2 of this edition);
- Delete the interfering ions  $\text{S}^{2-}$ ,  $\text{S}_2\text{O}_3^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{MnO}_4^-$ ,  $\text{Cr}^{3+}$ , and  $\text{F}^-$  and the corresponding methods for eliminating interference in Annex C and Annex D (Annex C and Annex D of the 1986 edition; Annex A of this edition);
- ADD methods for eliminating some interfering ions (Annex C and Annex D of the 1986 edition; Annex A of this edition).

Annex A of this Standard is an informative annex.

This Standard was proposed by China Petroleum and Chemical Industry Federation.

This Standard shall be under the jurisdiction of Subcommittee 1 on Inorganic Chemical Industry, National Standardization Technical Committee of Chemical (SAC/TC 63/SC 1).

Main drafting organizations of this Standard: Tianjin Entry-Exit Inspection and Quarantine Bureau, Shandong Entry-Exit Inspection and Quarantine Bureau, Tianjin Chemical Research and Design Institute.

Main drafters of this Standard: Liu Shaocong, Zhao Zuliang, Liu Youruo, Sun Shujun, Lu Siwei.

The previous editions of the standard replaced by this Standard were released as follows: GB/T 3049-1986.

Chemical products for industrial use - General method  
for determination of iron content - 1, 10-

## Phenanthroline spectrophotometric method

### 1 Scope

This Standard specifies a general 1, 10-phenanthroline spectrophotometric method for the determination of the iron content of chemical products.

This Standard describes a technique for the determination of the content of iron in a solution. Reference should be made, for the preparation of the test solution, to the standard relating to the product to be analysed, which should indicate the modifications necessary to make the method applicable to that product.

### 2 Field of application

This Standard is applicable to test solutions from which an aliquot portion can be taken containing between 10 and 500  $\mu\text{g}$  of Fe in a volume of not more than

#### **60 ml.**

Large amounts of alkali metals, calcium, strontium, barium, magnesium, manganese (II), arsenic (III), arsenic (V), uranium (VI), lead, chloride, bromide, iodide, thiocyanate, acetate, chlorate, nitrate, sulphate, sulphide, metaborate, selenate, citrate, tartrate, phosphate and up to 100 mg of germanium (IV), in the test solution, do not interfere. In the presence of tartrate, citrate, arsenate or more than 100 mg of phosphate, colour development is, however, liable to be slower.

Details of certain interferences and means by which they can be overcome are given in Annex A.

### 3 Principle

Reduction of all the iron (III) present in the test solution to iron (II) with ascorbic acid. Formation of the orange-red complex between iron (II) and 1, 10-phenanthroline at a pH between 2 and 9, and spectrophotometric measurement of the absorbance of the complex at the wavelength of maximum absorption (510 nm).

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