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INTERNATIONAL STANDARD 1657

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Raw rubber and rubber latex — Determination of iron content — 1,10-Phenanthroline photometric method

Élastomères bruts et latex d'élastomère — Dosage du fer — Méthode photométrique à la phénanthroline-1,10

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FOREWORD

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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.

International Standard ISO 1657 was drawn up by Technical Committee ISO/TC 45, *Rubber and rubber products,* and circulated to the Member Bodies in May 1970.

It has been approved by the Member Bodies of the following countries :

Austria	India	Spain
Brazil	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Egypt, Arab Rep. of	Netherlands	Thailand
France	New Zealand	Turkey
Germany	Poland	United Kingdom
Greece	Romania	U.S.A.
Hungary	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

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Raw rubber and rubber latex — Determination of iron content — 1,10-Phenanthroline photometric method

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a 1,10-phenanthroline photometric method for the determination of small amounts of iron in uncompounded natural rubber, uncompounded synthetic rubbers which do not contain chlorine, and the corresponding uncompounded latices.

2 REFERENCES

ISO 123, *Rubber latex — Sampling.*

ISO 124, *Rubber latices — Determination of total solids content.*

ISO 1795, *Raw rubber in bales — Sampling.*

ISO 1796, *Raw rubber — Sample preparation.*

3 PRINCIPLE

Ashing of the raw rubber or the dried latex solids in a crucible. Extraction of the ash with hydrochloric acid and making up of the solution to standard volume. After adjustment of the pH by the addition of buffer solution, treatment of an aliquot part of the solution with hydroxylammonium chloride and 1,10-phenanthroline with which the iron forms a coloured complex. Photometric measurement of the absorbance of this solution, which is proportional to the concentration of iron.

4 REAGENTS

All reagents shall be of recognized high purity analytical reagent quality suitable for use in trace metal analysis. Distilled water shall be used whenever water is specified.

4.1 Hydrochloric acid, ρ 1,19 g/cm³ *.

4.2 1,10-Phenanthroline solution.

Dissolve 0,5 g of 1,10-phenanthroline monohydrate in hot water and dilute the solution to 500 cm³.

4.3 Hydroxylammonium chloride solution.

Dissolve 10 g of hydroxylammonium chloride in 100 cm³ of water.

4.4 Buffer solution

Dissolve 164 g of anhydrous sodium acetate in approximately 250 cm³ of water and to the solution add 28,5 cm³ of glacial acetic acid, ρ 1,05 g/cm³. Dilute this mixture to 500 cm³ and filter immediately before use if it is cloudy. If this buffer solution gives highly coloured reference solutions in the preparation of the calibration curve, an alternative buffer solution may be prepared by dissolving 80 g of sodium hydroxide or 106 g of anhydrous sodium carbonate in 200 cm³ of water, adding 142,5 cm³ of glacial acetic acid, ρ 1,05 g/cm³, and diluting the solution to 500 cm³.

4.5 Standard iron solution (1 cm³ contains 0,1 mg of Fe).

Dissolve 0,702 1 g of ammonium iron(II) sulphate hexahydrate $[(NH_4)_2Fe(SO_4)_2.6H_2O]$ in water in a 1 000 cm³ volumetric flask. Add 3 cm³ of concentrated hydrochloric acid, ρ 1,19 g/cm³, and dilute to the mark with water. *This solution should remain stable for at least* 1 month.

4.6 Standard iron solution for calibration (1 cm³ contains 0,01 mg of Fe).

Pipette 10 cm³ of the standard iron solution (4.5) into a 100 cm³ volumetric flask and dilute to the mark with water. This solution shall be freshly prepared from the stock solution (4.5) when required.

5 APPARATUS

Ordinary laboratory apparatus and

5.1 Electrophotometer or **spectrophotometer,** capable of measuring absorbance at approximately 510 nm, and **matched cells.**

5.2 Silica or porcelain crucible, nominal capacity 50 to 80 cm³.

5.3 Muffle furnace, capable of maintaining a temperature of 525 ± 25 °C.

5.4 Asbestos board approximately 100 mm square and 6 mm thick, with a hole in the centre to support the crucible so that approximately two-thirds projects below the board.

5.5 Volumetric flasks, 50, 100, 1 000 cm³.

* The term millilitre (ml) is commonly used as a special name for the cubic centimetre (cm³), in accordance with a decision of the Twelfth Conférence Générale des Poids et Mesures. The term millilitre is acceptable, in general, for references in International Standards to capacities of volumetric glassware and to liquid volumes.