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INTERNATIONAL STANDARD 4274

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Urea for industrial use — Determination of biuret content — Flame atomic absorption and photometric absorption methods

Urée à usage industriel — Dosage du biuret — Méthodes par absorption atomique dans la flamme et par photométrie d'absorption

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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 4274 was developed by Technical Committee ISO/TC 47, *Chemistry,* and was circulated to the member bodies in November 1975.

It has been approved by the member bodies of the following countries :

Austria	Hungary	South Africa, Rep. of
Belgium	India	Thailand
Brazil	Israel	Turkey
Chile	Mexico	United Kingdom
Czechoslovakia	Netherlands	Yugoslavia
France	Poland	
Germany	Romania	

The member body of the following country expressed disapproval of the document on technical grounds :

U.S.S.R.

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

Printed in Switzerland

Urea for industrial use — Determination of biuret content — Flame atomic absorption and photometric absorption methods

1 SCOPE

This International Standard specifies a flame atomic absorption method and a photometric absorption method for the determination of the biuret ($H_2N.CO.NH.CO.NH_2$) content of urea for industrial use.

2 FIELD OF APPLICATION

These methods are applicable to products having biuret contents equal to or greater than 0,05 % (*m/m*) for the flame atomic absorption method and equal to or greater than 0,1 % (*m/m*) for the photometric absorption method.

3 PRINCIPLE

Formation of a complex between the biuret and copper(II) sulphate in alkaline medium. Fixation of this complex on an anion exchange resin; elution of the copper, first with a potassium nitrate solution and then with a nitric acid solution. Determination of the copper content by one of the following two methods :

— *Flame atomic absorption method*

Aspiration of the solution into an air-acetylene flame and measurement of the absorption of the 325 nm line emitted by a hollow-cathode copper lamp, using an atomic absorption spectrophotometer.

— *Photometric absorption method*

Formation of a coloured complex between the copper and zinc dibenzyldithiocarbamate. Extraction of this complex with carbon tetrachloride and measurement at a wavelength of approximately 435 nm, using a spectrophotometer or a photoelectric absorptiometer.

4 REAGENTS

During the analysis, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

4.1 Carbon tetrachloride, redistilled.

4.2 Biuret ($H_2N.CO.NH.CO.NH_2$).

4.3 Copper(II) sulphate, approximately 0,05 M solution.

Dissolve 12,5 g of copper(II) sulphate pentahydrate ($CuSO_4.5H_2O$) in water, dilute to 1 000 ml and mix.

4.4 Ammonia solution, approximately 9 M.

Dilute 700 ml of ammonia solution, ρ approximately 0,91 g/ml, about 24 % (*m/m*) solution, to 1 000 ml with water and mix.

4.5 Sodium hydroxide, approximately 3 N solution.

Dissolve 120 g of sodium hydroxide in about 500 ml of water and, after cooling, dilute to 1 000 ml and mix.

4.6 Alkaline washing solution.

Mix 100 ml of the ammonium hydroxide solution (4.4) and 100 ml of the sodium hydroxide solution (4.5), dilute to 1 000 ml and mix.

4.7 Potassium nitrate, approximately 2 M solution.

Dissolve 202,2 g of potassium nitrate in water, dilute to 1 000 ml and mix.

4.8 Nitric acid, approximately 0,2 M solution.

Dilute 13,3 ml of nitric acid solution, ρ approximately 1,40 g/ml, about 68 % (*m/m*) solution, with water. Dilute to 1 000 ml and mix.