
International Standard



5315

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Fertilizers — Determination of total nitrogen content — Titrimetric method after distillation

Engrais — Dosage de l'azote total — Méthode titrimétrique après distillation

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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 5315 was developed by Technical Committee ISO/TC 134, *Fertilizers and soil conditioners*, and was circulated to the member bodies in May 1982.

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

China	Kenya	South Africa, Rep. of
Czechoslovakia	Korea, Rep. of	Spain
Egypt, Arab Rep. of	Mexico	Sri Lanka
France	Netherlands	Thailand
Germany, F.R.	New Zealand	United Kingdom
Hungary	Norway	USA
India	Poland	USSR
Italy	Portugal	

No member body expressed disapproval of the document.

Fertilizers — Determination of total nitrogen content — Titrimetric method after distillation

1 Scope and field of application

This International Standard specifies a titrimetric method, after distillation, for the determination of the total nitrogen content of fertilizers in all forms, including those which have to be digested.

The method is not recommended for fertilizers containing more than 7 % of organic matter.

2 Principle

Reduction of nitrate to ammonia by chromium powder in acid medium. Conversion of organic and urea nitrogen into ammonium sulfate by digestion with concentrated sulfuric acid in the presence of a catalyst. Distillation of the ammonia from an alkaline solution, absorption in an excess of standard volumetric sulfuric acid solution and back-titration with standard volumetric sodium hydroxide solution in the presence of methyl red or screened methyl red as indicator.

3 Reagents

During the analysis, use only reagents of recognized analytical grade having, in particular, low nitrogen contents (see 5.3), and only distilled water or water of equivalent purity.

3.1 Chromium metal, powder, of particle size less than or equal to 250 μm .

3.2 Aluminium oxide, fused. Pumice is suitable.

3.3 Anti-foaming agent, for example paraffin wax of melting point not lower than 100 $^{\circ}\text{C}$, or a silicone.

3.4 Ammonium nitrate, dried at 100 $^{\circ}\text{C}$ to constant mass.

3.5 Digestion catalyst mixture, finely ground, comprising

- potassium sulfate (K_2SO_4): 1 000 g;
- copper(II) sulfate pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$): 50 g.

3.6 Sulfuric acid, concentrated, ρ approximately 1,84 g/ml.

3.7 Hydrochloric acid, concentrated, ρ approximately 1,18 g/ml.

3.8 Sodium hydroxide, approximately 400 g/l solution.

3.9 Sodium hydroxide, standard volumetric solution, $c(\text{NaOH}) = 0,10 \text{ mol/l}$.¹⁾

3.10 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,25 \text{ mol/l}$.²⁾

3.11 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,10 \text{ mol/l}$.³⁾

3.12 Sulfuric acid, standard volumetric solution, $c(\text{H}_2\text{SO}_4) = 0,05 \text{ mol/l}$.¹⁾

3.13 Indicator, solution.

Use either the screened methyl red solution (3.13.1) or the methyl red solution (3.13.2).

3.13.1 Screened methyl red, ethanolic indicator solution.

Mix 50 ml of a 2 g/l ethanolic solution of methyl red with 50 ml of a 1 g/l ethanolic solution of methylene blue.

3.13.2 Methyl red, ethanolic indicator solution.

Dissolve 0,1 g of methyl red in 50 ml of 95 % (V/V) ethanol.

3.14 pH indicator paper, wide range.

1) Hitherto expressed as "0,10 N standard volumetric solution".

2) Hitherto expressed as "0,50 N standard volumetric solution".

3) Hitherto expressed as "0,20 N standard volumetric solution".