

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

HJ 717-2014

**Soil quality. Determination of total nitrogen. Modified
Kjeldahlmethod**

土壤质量 全氮的测定 凯氏法

(English Translation)

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Foreword

To implement the "People's Republic of China Environmental Protection Law", protecting the environment, safeguarding human health and regulating the determination of total nitrogen in soil, Development of this standard.

This standard specifies the determination of total nitrogen in soil samples Kjeldahl method.

This standard is the first release.

Appendix A of this standard is an informative annex.

This standard is developed by the Ministry of Environmental Protection Science, Technology organization.

Drafting of this standard. Tianjin Environmental Monitoring Center.

The standard verification unit. State Key Lab of odor pollution control environmental protection, scientific research and monitoring by the Ministry of Agriculture, Environmental Protection, Tianjin River Eastern Environmental Monitoring Station, Tianjin Tanggu District Environmental Monitoring Station, Tianjin Dongli District, Tianjin, Hebei District environmental monitoring and environmental monitoring stations.

This standard is approved by the Ministry of Environmental Protection November 27, 2014.

This standard since January 1, 2015 implementation.

The standard explanation by the Ministry of Environmental Protection.

1 Soil quality - Determination of total nitrogen Kjeldahl method

WARNING. The reagents used in this method has a certain corrosive, the operation should avoid direct contact with these chemicals, Sample digestion process should be carried out in a fume hood; thermal contact with organic perchlorate explosive, so decomposed solution must be cooled Perchloric acid was added.

1 Scope

This standard specifies the determination of total nitrogen in soil samples Kjeldahl method.

This standard applies to the determination of total nitrogen in the soil.

When the sample volume is 1g, the present standard method detection limit of 48 mg/kg.

2 Normative references

This standard refers to the contents of the following documents or the terms. For undated references, the effective version applies to this standard.

HJ 537 Water quality - Determination of ammonia distillation - and titration HJ 613 Determination of dry matter and soil moisture weight method HJ/T 166 soil environmental monitoring technical specifications

3 Terms and Definitions

The following terms and definitions apply to this standard.

TN total nitrogen

The sum of the nitrogen content of the sample under the conditions specified in this standard can be measured, including organic nitrogen (such as proteins, amino acids, nucleic acids, Urea, etc.), nitrate, nitrite and ammonium nitrogen, but also including some linked nitrogen, nitrogen-containing azo compounds and azide.

4 Principle of the method

Total nitrogen in soil under the action of sodium thiosulfate, concentrated sulfuric acid, perchloric acid and the catalyst, the oxidation-reduction reaction is completely converted to ammonium nitrogen. Alkalized solution after digestion distilled ammonia is absorbed by boric acid titration with a standard solution of hydrochloric acid, according to the amount of standard solution of hydrochloric acid to calculate Total nitrogen content of the soil.

5 Reagents and materials

The reagents used in this standard, unless otherwise indicated, the use of chemical reagents analytical line with national standards of analysis, test water-free ammonia (5.1).

5.1 No ammonia

Per liter of water was added 0.10 ml of concentrated sulfuric acid (5.2) distillation, collecting the distillate in a stoppered glass container, it can also be used to freshly prepared Deionized water.

5.2 Concentrated sulfuric acid. ρ (H_2SO_4) = 1.84 g/ml, pure class distinctions.

5.3 of concentrated hydrochloric acid. ρ (HCl) = 1.19 g/ml.

5.4 perchloric acid. ρ (HClO_4) = 1.768 g/ml.

Ethanol 25.5. ρ ($\text{C}_2\text{H}_6\text{O}$) = 0.79 g/ml.

5.6 potassium sulfate (K_2SO_4).

5.7 pentahydrate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$).

5.8 Titanium dioxide (TiO_2). pure class distinctions.

5.9, sodium thiosulfate pentahydrate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$).

5.10 sodium hydroxide (NaOH). pure class distinctions.

5.11 boric acid (H_3BO_3). pure class distinctions.

5.12 anhydrous sodium carbonate (Na_2CO_3). reference reagents.

5.13 Catalyst. 200 g potassium sulphate (5.6), 6 g of copper sulfate pentahydrate (5.7) and 6 g of titanium dioxide (5.8) in a glass mortar (6.2) are thoroughly mixed Uniform, fine, stored in the reagent bottle to save.

5.14 reductant. sodium thiosulfate pentahydrate (5.9) after grinding through the 0.25 mm (60 mesh) sieve (6.3), with the existing Pro.

5.15 Sodium hydroxide solution. $\rho(\text{NaOH}) = 400 \text{ g/L}$.

Weigh 400 g of sodium hydroxide (5.10) was dissolved in 500 ml of water, cooled to room temperature and diluted to 1000 ml.

5.16 boric acid solution. $\rho(\text{H}_3\text{BO}_3) = 20 \text{ g/L}$.

Weigh 20 g of boric acid (5.11) dissolved in water and diluted to 1000 ml.

5.17 Sodium carbonate standard solution. $c(1/2 \text{ Na}_2\text{CO}_3) = 0.0500 \text{ mol/L}$.

Weigh 2.6498 g (dried at 250 °C 4h and cooled to room temperature, the dryer) of anhydrous sodium carbonate (5.12), was dissolved in a small amount of water, Moved into 1000 ml flask, diluted with water to the mark, shake. Stored in polyethylene bottles, storage time should not exceed one week.

5.18 methyl orange indicator solution. $\rho = 0.5 \text{ g/L}$.

Weigh 0.1 g of methyl orange dissolved in water and diluted to 200 ml.

5.19 hydrochloric acid standard stock solution. $c(\text{HCl}) \sim 0.05 \text{ mol/L}$.

The indexing Pipette 4.20 ml of concentrated hydrochloric acid (5.3), and diluted with water to 1000 ml, the solution concentration of about 0.05 mol/L. Its quasi Calibration concentration determined in the following manner.

With no indexing Pipette 25.00 ml of standard solution of sodium carbonate (5.17) in 250 ml Erlenmeyer flask, dilute with water to about 100 ml, Add 3 drops of methyl orange indicator solution (5.18), with a hydrochloric acid standard stock solution was titrated to an orange color from orange to become just recorded hydrochloric acid standard the amount of standard solution. Its exact concentration is calculated as follows.

$$0.0500 \times 25.00 \times V = (1)$$

Where. Standard C-- hydrochloric acid solution concentration, mol/L;

V - the amount of hydrochloric acid standard solution, ml.

5.20 hydrochloric acid standard solution. $c(\text{HCl}) \sim 0.01 \text{ mol/L}$.

Draw 50.00 ml stock standard solution of hydrochloric acid (5.19) in 250 ml flask, diluted with water to the mark.

5.21 mixed indicator. A 0.1 g and 0.02 g bromocresol green methyl red dissolved in 100 ml of anhydrous ethanol (5.5) in.