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

HJ 658-2013

**Soil. Determination of organic carbon. Combustion
oxidation-titration method**

土壤 有机碳的测定 燃烧氧化-滴定法

(English Translation)

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Foreword

To implement the "Environmental Protection Law of the People's Republic of China", protect the environment, protect human health, and regulate organic carbon in soil the method of determination is to develop this standard.

This standard specifies the combustion oxidation-titration method for the determination of organic carbon in soil.

This standard is the first release.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Dalian Environmental Monitoring Center.

This standard is verified by. Anshan Environmental Monitoring Center Station, Jinzhou Environmental Monitoring Center Station, and Yingkou City Environmental Monitoring Xinzhan, Fushun Environmental Monitoring Center Station, Changchun Environmental Monitoring Center Station, Harbin Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on August 16, 2013.

This standard has been implemented since September 1, 2013.

This standard is explained by the Ministry of Environmental Protection.

Determination of soil organic carbon - combustion oxidation - titration

1 Scope of application

This standard specifies the combustion oxidation-titration method for the determination of organic carbon in soil.

This standard applies to the determination of organic carbon in soil, and is not applicable to the determination of organic carbon in sludge-contaminated soil.

When the sample amount is 0.50 g, the detection limit of this method is 0.004%, the lower limit of determination is 0.016%, and the upper limit of measurement it is 4.00%. When the organic carbon content in the sample is high, the sampling amount can be reduced, but the minimum can not be less than 0.050 g.

2 Normative references

The contents of this standard refer to the following documents or their terms. For undated references, the valid version is appropriate.

Used in this standard.

HJ/T 166 Technical Specifications for Soil Environmental Monitoring HJ/T 613
Determination of dry matter and moisture in soils - Gravimetric method

3 Principle of the method

The air-dried soil sample is heated to more than 900°C in a furnace, and the organic carbon in the sample is oxidized to carbon dioxide.

The carbon dioxide is absorbed by an excess of cesium hydroxide solution to form a cerium carbonate precipitate, and the remaining cerium hydroxide after the reaction is dissolved with oxalic acid.

The droplet is determined, and the volume difference of the oxalic acid standard solution consumed by the blank titration and the sample titration is used to calculate the carbon dioxide generation, according to the dioxin.

The amount of carbon produced is used to calculate the organic carbon content in the soil.

4 Interference and elimination

When the sample is heated above 200 °C, all carbonates are completely decomposed to produce carbon dioxide.

Positive interference is generated and can be removed by adding an appropriate amount of hydrochloric acid.

Carbon dioxide in the air produces a positive interference equivalent to 0.2% organic carbon, which is removed by subtracting the blank.

5 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis.

5.1

Carbon dioxide-free water. It is ready for use, and the conductivity is ≤ 0.2 mS/m (25°C).

5.2

Concentrated hydrochloric acid. $\rho(\text{HCl}) = 1.19$ g/ml.

5.3

n-butanol. $\phi(\text{C}_4\text{H}_9\text{OH}) \geq 99.0\%$.

5.4

Ethanol. $\phi(\text{C}_2\text{H}_5\text{OH}) = 95\%$.

5.5

Oxalic acid ($\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$). a reference reagent.

5.6 Hydrochloric acid solution. $c(\text{HCl}) = 4 \text{ mol/L}$

Measure 340 ml of concentrated hydrochloric acid (5.2), slowly pour into 500 ml of water (5.1) while stirring, and dilute with water (5.1) until Mix 1000 ml.

5.7 Barium hydroxide ($\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$).

5.8 Barium chloride ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$).

5.9 Barium hydroxide absorption solution I. $\rho[\text{Ba}(\text{OH})_2] = 1.40 \text{ g/L}$

Weigh 1.40 g of barium hydroxide (5.7) and 0.08 g of barium chloride (5.8) dissolved in 800 ml of water (5.1) and add 3 ml.

N-butanol (5.3), dilute to 1000 ml with water (5.1), and mix.

5.10 Barium hydroxide absorption liquid II. $\rho[\text{Ba}(\text{OH})_2] = 2.80 \text{ g/L}$

Weigh 2.80 g of barium hydroxide (5.7) and 0.16 g of barium chloride (5.8) dissolved in 800 ml of water (5.1) and add 3 ml.

N-butanol (5.3), dilute to 1000 ml with water (5.1), and mix.

Note: After the above two kinds of absorbing liquids are prepared, they are sealed and stored, and placed for 1 d to precipitate.

5.11 Oxalic acid standard solution. $\rho(\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}) = 0.5637 \text{ g/L}$

Weigh 0.5637 g of oxalic acid (5.5) dissolved in water (5.1), transfer to a 1000 ml volumetric flask, and dilute with water (5.1).

Release to the marking line and mix. 1 ml This solution is equivalent to 0.1 ml of carbon dioxide under standard conditions (101.325 kPa, 273.15 K).

Available now.

5.12 Phenolphthalein indicator

Weigh 0.5 g of phenolphthalein in 50 ml of ethanol (5.4), then add 50 ml of water (5.1) and shake well.

6 Instruments and equipment

6.1

Tube furnace. using silicon carbon tube as heating body, can heat the sample to above 900 °C, the temperature can be adjusted, the precision is 1 °C;

The high temperature zone is longer than 90 mm.