

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

HJ 695-2014

**Soil. Determination of organic carbon. Combustion oxidation
nondispersive infrared absorption method**

土壤 有机碳的测定 燃烧氧化-非分散红外法

(English Translation)

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9.1 Calculation of results

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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-non-dispersive infrared 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. Fushun Environmental Monitoring Center Station, Heilongjiang Environmental Monitoring Center Station, Panjin City Environmental Monitoring Central Station, Suzhou Environmental Monitoring Center Station, Shenzhen Environmental Monitoring Center Station and Tianjin Environmental Monitoring Center.

This standard was approved by the Ministry of Environmental Protection on March 13, 2014.

This standard has been implemented since July 1, 2014.

This standard is explained by the Ministry of Environmental Protection.

Determination of soil organic carbon - combustion oxidation - non-dispersive infrared method

1 Scope of application

This standard specifies the combustion oxidation-non-dispersive infrared 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 0.050 g, the detection limit of this method is 0.008%, and the lower limit of determination is 0.032%.

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 613 Determination of dry matter and moisture in soils - Gravimetric method

3 Principle of the method

The air-dried soil sample is heated to above 680°C in an oxygen-rich carrier gas, and the organic carbon in the sample is oxidized to dioxide.

Carbon, the carbon dioxide produced is introduced into the non-dispersive infrared detector, and the infrared absorption of carbon dioxide is strong within a certain concentration range.

The degree is proportional to its concentration, and the organic carbon content in the soil is calculated based on the amount of carbon dioxide produced.

4 Interference and elimination

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

Positive interference is produced and can be removed by adding an appropriate amount of phosphoric acid.

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 phosphoric acid. $\rho(\text{H}_3\text{PO}_4) = 85\%$, excellent grade pure.

5.3

Sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{12}$). Reference reagent.

Note 1: Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) can also be used instead of sucrose.

5.4 Sucrose solution. $\rho(\text{organic carbon, C}) = 10.0$ g/L

Weigh 2.375 g of sucrose (5.3) which has been dried at 104 °C for 2 h, dissolved in an appropriate amount of water (5.1), and transferred to a capacity of 100 ml.

In the bottle, dilute to the mark with water (5.1) and mix. Stored at room temperature, valid for two weeks.

5.5 Phosphoric acid solution. $\rho(\text{H}_3\text{PO}_4) = 5\%$

Measure 59 ml of concentrated phosphoric acid (5.2) dissolved in 700 ml of water (5.1), cool to room temperature, and dilute with water (5.1) until 1000 ml. Stored at room temperature, valid for two weeks.

5.6 Carrier gas. nitrogen, purity 99.99%.

5.7 Gas. oxygen, purity 99.99%.

6 Instruments and equipment

6.1

Total organic carbon analyzer. with solid combustion device, can be heated to above 680

°C, temperature can be adjusted, accuracy 1 °C;

Features a non-dispersive infrared detector with a quartz cup.

6.2

Balance. Accuracy is 0.1 mg.

6.3

Soil screen. 2 mm (10 mesh), 0.097 mm (160 mesh), stainless steel.

6.4

Microinjector..200 µl.

6.5

Common instruments and equipment used in general laboratories.

7.1 Sample collection and preservation

The collection and storage of soil samples is carried out in accordance with the relevant provisions of HJ/T 166.

7.2 Preparation of samples

Place the soil sample in the air-drying tray and spread it into a thin layer of 2 ~ 3 cm thick, first removing the residues such as plants, insects, stones, etc.

Crush the clods with a hammer or a porcelain abrasive rod, flip it several times a day, and air dry.

Mix the air-dried soil thoroughly, use the quadruple method, take two parts, one part is retained, one part is ground to all over 2 mm (10 Mesh) soil sieve. Take 10 ~ 20 g of the sieved soil sample and grind it to the entire 0.097 mm (160 mesh) soil sieve.

Load into a brown stoppered glass bottle for testing.

7.3 Determination of dry matter content

The air-dried soil samples after 2 mm (10 mesh) sieve were accurately weighed, and the dry matter content of the soil was determined by reference to HJ 613.

8.1 Instrument Commissioning

Set the condition parameters and debug according to the instructions of the total organic carbon analyzer.