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

GB/T 47298-2026

Determination of carbonate content of soil - Volumetric method

土壤碳酸盐含量的测定 气量法

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is modified to adopt ISO 10693:1995 "Soil quality - Determination of carbonate content - Gas method".

The technical differences between this document and ISO 10693:1995, and the reasons therefor, are as follows.

---The conductivity requirements for test water have been modified (see 5.1, 4.1 of ISO 10693:1995) to suit domestic conditions;

---A method for drying calcium carbonate has been added (see 5.3) to standardize the operation;

---A sealing solution and its preparation method have been added (see 5.4) to standardize operations;

---The mesh size of the soil samples has been changed (see Chapter 7, Chapter 6 of ISO 10693:1995) to suit domestic conditions;

---The apparatus for single-sample determination (see Figure 1 in ISO 10693:1995) has been removed to suit domestic conditions;

---Added symbols for the initial and final volumes corresponding to the liquid surface positions of the closed liquid (see 8.2) to standardize calculations.

The following editorial changes have been made to this document.

---To align with existing standards, the standard name has been changed to "Determination of Soil Carbonate Content by Gas Measurement Method";

---Added index numbers for the liquid level positions of the sealed liquid before and after measurement (see Figure 1);

---The note regarding the use of multiple devices in series has been changed (see note 3 in 6.1);

---The wording of the carbonate content range has been changed (see Table 1);

---Appendix A of ISO 10693:1995 has been deleted.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Ministry of Agriculture and Rural Affairs of the People's Republic of China.

This document is under the jurisdiction of the National Technical Committee on Soil Quality Standardization (SAC/TC404).

1 Scope

This document describes a method for determining the carbonate content in soil samples using a gaseous method.

This document applies to all types of air-dried soil samples.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 6682 Specifications and test methods for water used in analytical laboratories GB/T 42363 Soil Quality - Pretreatment of Soil Samples for Physicochemical Analysis (GB/T 42363-2023, ISO 11464:2006) IDT) ISO 11465 Determination of dry residue or moisture

content and calculation of dry matter content in sludge and solid environmental substrates (Sludge)

3 Terms and Definitions

This document does not contain any terms or definitions that need to be defined.

4 Principles

Hydrochloric acid is added to a soil sample to decompose the existing carbonates. The simplified form of this reaction is (Me represents a metal).

$\text{MeCO}_3 + 2\text{H} \rightarrow \text{Me} + \text{H}_2\text{CO}_3$ $\text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{CO}_2$ (CO_2 - gaseous state) the volume of carbon dioxide produced was measured using the measuring device (6.1), and compared with the volume of carbon dioxide produced by the calcium carbonate standard.

Comparison is necessary. Testing under identical conditions avoids the need for corrections due to differences in temperature and pressure. Measurements should ideally be taken in a temperature-controlled room.

It will be carried out internally.

Note 1: Carbonate content is expressed as the equivalent concentration of calcium carbonate (CaCO_3). In fact, this experiment investigated both carbonates and bicarbonates present in the soil.

Determination was performed on many carbonates, including calcite and aragonite (CaCO_3), dolomite [$\text{CaMg}(\text{CO}_3)_2$], siderite (FeCO_3), and rhodochrosite.

It appears in the form of (MnCO_3). Soils in arid regions may contain soda ash ($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$). If it is known that the main component of the soil under study is...

There exists a form of carbonate other than calcium carbonate, and this form of carbonate can be used to represent the final content.

Note 2: If other gases are present in the generated gas [such as hydrogen sulfide (H_2S) produced by anaerobic soil samples containing sulfides], the measurement results may be too high.

In these cases, the generated gas needs to be purified, and its volume should be measured using alternative methods. If sulfidation is known to be present in the soil sample...

When mercuric chloride (HgCl_2) is added to hydrochloric acid solution, insoluble mercuric sulfide (HgS) is formed.

5 Reagents

Unless otherwise stated, all reagents in this document are of analytical grade.