SVENSK STANDARD
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Markundersökningar – Bestämning av karbonathalt – Volymetriska metoder (ISO 10693:1995)

Soil quality – Determination of carbonate content – Volumetric method (ISO 10693:1995)

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Europastandarden EN ISO 10693:2014 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 10693:2014.

The European Standard EN ISO 10693:2014 has the status of a Swedish Standard. This document contains the official version of EN ISO 10693:2014.

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Denna standard är framtagen av kommittén för Karaktärisering av avfall, mark och slam, SIS/TK 535.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 10693

March 2014

ICS 13.080.10

English Version

Soil quality - Determination of carbonate content - Volumetric method (ISO 10693:1995)

Qualité du sol - Détermination de la teneur en carbonate - Méthode volumétrique (ISO 10693:1995)

Bodenbeschaffenheit - Bestimmung des Carbonatgehaltes - Volumetrisches Verfahren (ISO 10693:1995)

This European Standard was approved by CEN on 13 March 2014.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN ISO 10693:2014 E

Foreword

The text of ISO 10693:1995 has been prepared by Technical Committee ISO/TC 190 “Soil quality” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 10693:2014 by Technical Committee CEN/TC 345 “Characterization of soils” the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.

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Endorsement notice

The text of ISO 10693:1995 has been approved by CEN as EN ISO 10693:2014 without any modification.

Soil quality — Determination of carbonate content — Volumetric method

1 Scope

This International Standard specifies a method for the determination of carbonate content in soil samples.

It is applicable to all types of air-dried soil samples.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods.*

ISO 11464:1994, *Soil quality — Pretreatment of samples for physico-chemical analyses.*

ISO 11465:1993, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method.*

3 Principle

Hydrochloric acid is added to a soil sample to decompose any carbonates present. The reaction in simplified form reads as follows (Me means metal):

$$MeCO_3 + 2H^+ \rightarrow Me^{2+} + H_2CO_3$$

$$H_2CO_3 \rightarrow H_2O + CO_2 \text{ (gaseous state)}$$

The volume of the carbon dioxide produced is measured by using a Scheibler apparatus (5.1), and is compared with the volume of carbon dioxide produced by pure calcium carbonate. To avoid making corrections for differences in temperature and pressure, all determinations are carried out under the same conditions. The determination should be carried out in a temperature-controlled room.

NOTES

1 The carbonate content is expressed as an equivalent concentration of calcium carbonate ($CaCO_3$). In fact all carbonates and bicarbonates present in the sample are measured. Many carbonates appear in the form of calcite and aragonite ($CaCO_3$), dolomite [$CaMg(CO_3)_2$], siderite ($FeCO_3$) and rhodochrosite ($MnCO_3$). In soils in dry (arid) regions, soda ($Na_2CO_3 \cdot 10H_2O$) may be present. When it is known that a certain form of carbonate, other than calcium carbonate, is mainly present in the soil under study, the final concentration of this form can be used.

2 Other gases that are produced [e.g. hydrogen sulfide (H_2S) in samples of anaerobic soil containing sulfides] may result in an overestimate of the carbonate content. In these cases the gas produced should be purified and its volume measured in another way (see [1] in annex A). When sulfides are known to be present in the soil samples, mercury(II) chloride ($HgCl_2$) is added to the hydrochloric acid solution to form insoluble mercury(II) sulfide (HgS).

4 Reagents

Use only reagents of recognized analytical grade.

4.1 Water, with a specific electrical conductivity not higher than 0,2 mS/m at 25 °C (conforming to grade 2 of ISO 3696).

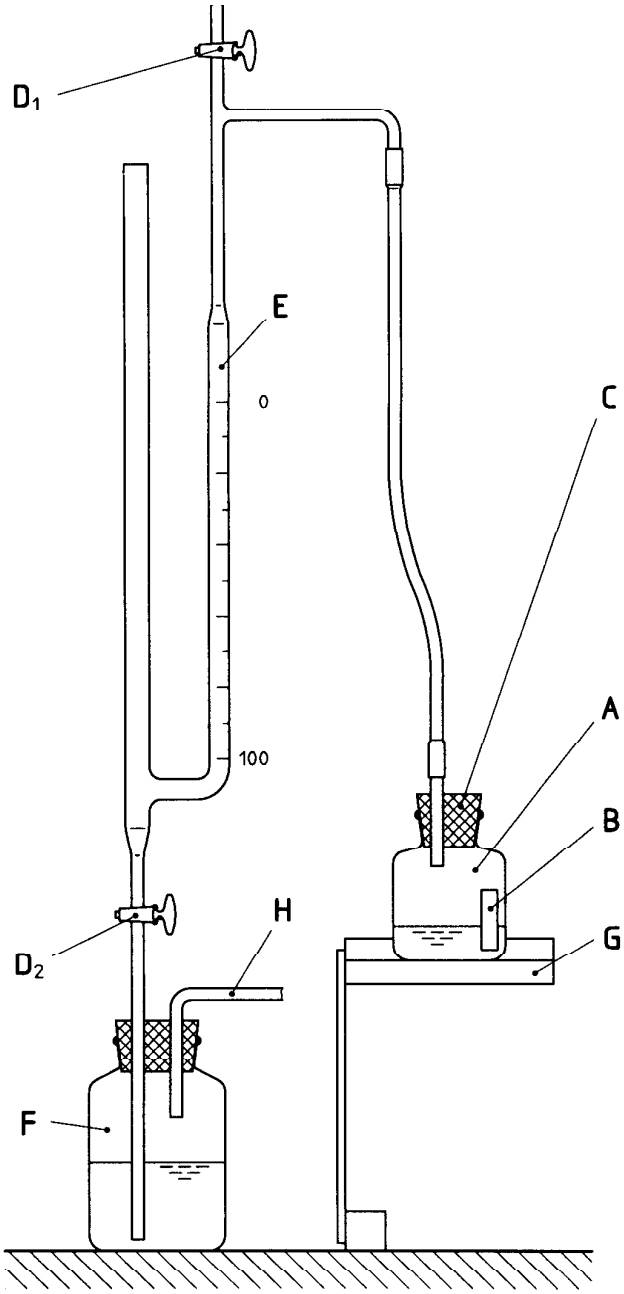
4.2 Hydrochloric acid, $c(HCl) = 4$ mol/l.

Dilute 340 ml of concentrated hydrochloric acid ($\rho = 1{,}19$ g/ml) to 1 000 ml with water (4.1).

4.3 Calcium carbonate ($CaCO_3$), powder.

5 Apparatus and glassware

5.1 Scheibler apparatus, adapted for carrying out a single sample determination (see figure 1). An example of a single unit of apparatus, together with an indication of the water level before and after the measurement, is given in figure 2.



Key

A Reaction vessel (5.3)
B Plastics cup (5.4) with hydrochloric acid (4.2)
C Rubber stopper
D_1 Stop-cock
D_2 Stop-cock
E U-shaped calibration tube
F Storage vessel with water
G Shaking beam
H Air-inlet tube

Figure 1 — Example of a Scheibler unit for a single sample determination