

**Markundersökningar – Bestämning av
markvatteninnehåll som volymfraktion utgående
från volymvikt – Gravimetrisk metod**

**Soil quality – Determination of soil water content
as a volume fraction on the basis of known dry
bulk density – Gravimetric method**

Den internationella standarden ISO 16586:2003 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 16586:2003.

The International Standard ISO 16586:2003 has the status of a Swedish Standard. This document contains the official English version of ISO 16586:2003.

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 16586 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 5, *Physical methods*.

Introduction

The determination of water content volume fraction using coring sleeves, which is described in ISO 11461, is the basic method for determination of the water content volume fraction. This International Standard provides a less precise method than that given in ISO 11461.

Soil quality — Determination of soil water content as a volume fraction on the basis of known dry bulk density — Gravimetric method

1 Scope

This International Standard specifies a method for the gravimetric determination of soil water content as a volume fraction on the basis of the ratio of measured water content mass to known dry bulk density.

This International Standard is applicable to all types of non-swelling or non-shrinking soils. It is used as a reference method (e.g. the calibration of indirect methods for determination of water content).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Terms and definitions

3.1

water content

water content mass fraction

water content mass ratio

ratio of the mass of water evaporating from the soil when dried to constant mass at 105 °C, to the dry mass of the soil sample

NOTE For soil with high content of organic matter, drying at a temperature below 70 °C is usual practice.

3.2

dry bulk density

mass of the solid particles divided by the undisturbed bulk volume of the soil

3.3

water content volume fraction

volumetric water content

ratio of the volume of water evaporating from the soil when dried to constant mass at 105 °C, to the original bulk volume of the soil

ISO 16586:2003(E)**4 Symbols**

- s_x sample standard deviation of variation of variable x ;
- w water content (mass fraction), expressed in kilograms per kilogram;
- Δ_x standard deviation of the errors in variable x ;
- φ water content volume fraction, expressed in cubic metres per cubic metre;
- ρ_b dry bulk density, expressed in kilograms per cubic metre;
- ρ_w density of water, expressed in kilograms per cubic metre.

5 Principle

Soil samples are dried to constant mass at 105 °C. The difference in the mass of the soil sample, before and after the drying procedure, is taken as a measure of the water content. The water content (mass fraction) is converted to the water content (volume fraction) by using a known value for the dry bulk density. This method is inherently less accurate than ISO 11461, since the dry bulk density is not determined on the same sample.

NOTE The dry bulk density may be known from previous sampling. If the dry bulk density is not known, it can be determined in accordance with ISO 11272.

6 Apparatus

Equipment for determination of water content as a mass fraction shall be in accordance with ISO 11465.

7 Procedure

Sampling, transport and laboratory treatment of the samples shall be carried out in accordance with ISO 11465.

NOTE Usually larger samples are needed than those specified in ISO 11465. For structured soils, a sample including 20 structural elements is satisfactory for most investigations.

8 Expression of results

Calculate w in accordance with ISO 11465. Compute the water content volume fraction from:

$$\varphi = w \frac{\rho_b}{\rho_w}$$

where

- w is the water content mass fraction;
- φ is the water content volume fraction;
- ρ_b is the dry bulk density of the sample, in kilograms per cubic metre;