Soil quality - Determination of the water-retention characteristic - Laboratory methods (ISO 11274:1998 + Cor 1:2009)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11274:2014 sisaldab Euroopa standardi EN ISO 11274:2014 inglisekeelset teksti.	This Estonian standard EVS-EN ISO 11274:2014 consists of the English text of the European standard EN ISO 11274:2014.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 26.03.2014.	Date of Availability of the European standard is 26.03.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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English Version

Soil quality - Determination of the water-retention characteristic - Laboratory methods (ISO 11274:1998 + Cor 1:2009)

Qualité du sol - Détermination de la caractéristique de la rétention en eau - Méthodes de laboratoire (ISO 11274:1998 + Cor 1:2009)

Bodenbeschaffenheit - Bestimmung des Wasserrückhaltevermögens - Laborverfahren (ISO 11274:1998 + Cor 1:2009)

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

The text of ISO 11274:1998, including Cor 1:2009 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 11274:2014 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of an identical text or by endorsement, at the latest by September 2014, and conflicting national standards shall be withdrawn at the latest by September 2014.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 11274:1998, including Cor 1:2009 has been approved by CEN as EN ISO 11274:2014 without any modification.

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Introduction

Soil water content and matric pressure are related to each other and determine the water-retention characteristics of a soil. Soil water which is in equilibrium with free water is at zero matric pressure (or suction) and the soil is saturated. As the soil dries, matric pressure decreases (i.e. becomes more negative), and the largest pores empty of water. Progressive decreases in matric pressure will continue to empty finer pores until eventually water is held in only the finest pores. Not only is water removed from soil pores, but the films of water held around soil particles are reduced in thickness. Therefore a decreasing matric pressure is associated with a decreasing soil water content [5], [6]. Laboratory or field measurements of these two parameters can be made and the relationship plotted as a curve, called the soil water-retention characteristic. The relationship extends from saturated soil (approximately 0 kPa) to oven-dry soil (about -10^6 kPa).

The soil water-retention characteristic is different for each soil type. The shape and position of the curve relative to the axes depend on soil properties such as texture, density and hysteresis associated with the wetting and drying history. Individual points on the water-retention characteristic may be determined for specific purposes.

The results obtained using these methods can be used, for example:

- to provide an assessment of the equivalent pore size distribution (e.g. identification of macro- and micropores);
- to determine indices of plant-available water in the soil and to classify soil accordingly (e.g. for irrigation purposes);
- to determine the drainable pore space (e.g. for drainage design, pollution risk assessments);
- to monitor changes in the structure of a soil (caused by e.g. tillage, compaction or addition of organic matter or synthetic soil conditioners);
- to ascertain the relationship between the negative matric pressure and other soil physical properties (e.g. hydraulic conductivity, thermal conductivity);
- to determine water content at specific negative matric pressures (e.g. for microbiological degradation studies);
- to estimate other soil physical properties (e.g. hydraulic conductivity).

Soil quality — Determination of the water-retention characteristic — Laboratory methods

1 Scope

This International Standard specifies laboratory methods for determination of the soil water-retention characteristic.

This International Standard applies only to measurements of the drying or desorption curve.

Four methods are described to cover the complete range of soil water pressures as follows:

a) method using sand, kaolin or ceramic suction tables for determination of matric pressures from 0 kPa to – 50 kPa;

b) method using a porous plate and burette apparatus for determination of matric pressures from 0 kPa to – 20 kPa;

c) method using a pressurized gas and a pressure plate extractor for determination of matric pressures from – 5 kPa to – 1500 kPa;

d) method using a pressurized gas and pressure membrane cells for determination of matric pressures from – 33 kPa to – 1500 kPa.

Guidelines are given to select the most suitable method in a particular case.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1
soil water-retention characteristic
relation between soil water content and soil matric head of a given soil sample

2.2
matric pressure
amount of work that must be done in order to transport, reversibly and isothermally, an infinitesimal quantity of water, identical in composition to the soil water, from a pool at the elevation and the external gas pressure of the point under consideration, to the soil water at the point under consideration, divided by the volume of water transported