

# SVENSK STANDARD

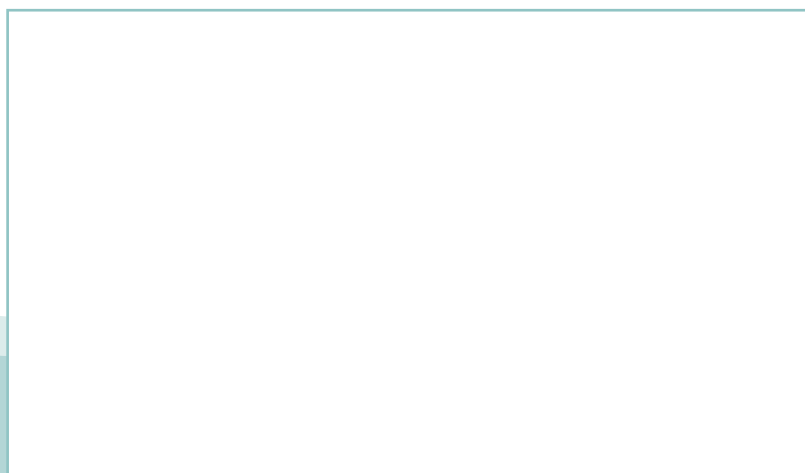
## SS-EN ISO 11274:2014

Fastställt/Approved: 2014-03-30  
Publicerad/Published: 2014-04-01  
Utgåva/Edition: 1  
Språk/Language: engelska/English  
ICS: 13.080.40

---

### **Markundersökningar – Bestämning av den vattenhållande förmågan – Labororiemetoder (ISO 11274:1998 + Cor 1:2009)**

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



# Standarder får världen att fungera

*SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.*

## Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

## Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

## Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

**Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på [www.sis.se](http://www.sis.se) eller ta kontakt med oss på tel 08-555 523 00.**



# Standards make the world go round

*SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.*

## Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

## Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

## Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

**If you want to know more about SIS, or how standards can streamline your organisation, please visit [www.sis.se](http://www.sis.se) or contact us on phone +46 (0)8-555 523 00**



Europastandarden EN ISO 11274:2014 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 11274:2014.

Denna standard ersätter SS-ISO 11274, utgåva 1 och SS-ISO 11274/Cor 1:2009, utgåva 1.

The European Standard EN ISO 11274:2014 has the status of a Swedish Standard. This document contains the official version of EN ISO 11274:2014.

This standard supersedes the Swedish Standard SS-ISO 11274, edition 1 and SS-ISO 11274/Cor 1:2009, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

*Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.*

*Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.*

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

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på [www.sis.se](http://www.sis.se) - där hittar du mer information.



EUROPEAN STANDARD

**EN ISO 11274**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2014

---

ICS 13.080.40

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.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

## 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### 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.

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

## TECHNICAL CORRIGENDUM 1

*Qualité du sol — Détermination de la caractéristique de la rétention en eau — Méthodes de laboratoire*

*RECTIFICATIF TECHNIQUE 1*

Technical Corrigendum 1 to ISO 11274:1998 was prepared by Technical Committee ISO/TC 190, *Soil quality*.

---

### *Page 2, 3.3*

The end of the 2nd line and part of the 3rd line should read : “..., e.g. 0 kPa to –20 kPa, –20 kPa to –100 kPa and –100 kPa to –1 500 kPa.” instead of “..., e.g. 0 kPa to 20 kPa, 20 kPa to 100 kPa and 100 kPa to 1 500 kPa.”.

### *Page 5, Table 2*

3rd column, the subheading should read “Surface of suction tables (–5 kPa matric pressure)”.

4th column, the subheading should read: “Surface of suction tables (–11 kPa matric pressure)”.

5th column, the subheading should read: “Surface of suction tables (–21 kPa matric pressure)”.

**SS-EN ISO 11274:2014 (E)**

Page 6, 5.5.1.2

The end of the 6th line after the equation should read "...cubic centimeter (= 1 g · cm<sup>-3</sup>).".

The end of NOTE 1 should read: "... to give  $m(p_m)$ ".

Page 9, 6.5.1.2

The formula should read:

$$\theta_{(p_m)} = \theta_e + \frac{V_e - V_{(p_m)}}{V}$$

Insert the following at the end of the list after "where".

" $V$  is the volume of soil sample, in cubic centimeters".

Page 14, 8.2.5

The end of the line should read: "...radius of 240 nm (2 400 Å) or 24 nm (240 Å)."



## 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