

**Soil quality - Laboratory methods for determination of  
microbial soil respiration (ISO 16072:2002)**

This document is a preview generated by EVS

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 16072:2011 sisaldab Euroopa standardi EN ISO 16072:2011 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 29.07.2011 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 22.06.2011.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 16072:2011 consists of the English text of the European standard EN ISO 16072:2011.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 29.07.2011 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 22.06.2011.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

ICS 13.080.30

### Standardite reprodutseerimis- ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonilisse süsteemi või edastamine ükskõik millises vormis või millisel teel on keelatud ilma Eesti Standardikeskuse poolt antud kirjaliku loata.

Kui Teil on küsimusi standardite autorikaitse kohta, palun võtke ühendust Eesti Standardikeskusega:  
Aru 10 Tallinn 10317 Eesti; [www.evs.ee](http://www.evs.ee); Telefon: 605 5050; E-post: [info@evs.ee](mailto:info@evs.ee)

### Right to reproduce and distribute belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from Estonian Centre for Standardisation.

If you have any questions about standards copyright, please contact Estonian Centre for Standardisation:  
Aru str 10 Tallinn 10317 Estonia; [www.evs.ee](http://www.evs.ee); Phone: 605 5050; E-mail: [info@evs.ee](mailto:info@evs.ee)

ICS 13.080.30

English Version

Soil quality - Laboratory methods for determination of microbial  
soil respiration (ISO 16072:2002)

Qualité du sol - Méthodes de laboratoire pour la  
détermination de la respiration microbienne du sol (ISO  
16072:2002)

Bodenbeschaffenheit - Laborverfahren zur Bestimmung der  
mikrobiellen Bodenatmung (ISO 16072:2002)

This European Standard was approved by CEN on 10 June 2011.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

The text of ISO 16072:2002 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 16072:2011 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 December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

### Endorsement notice

The text of ISO 16072:2002 has been approved by CEN as a EN ISO 16072:2011 without any modification.

# Contents

Page

Foreword .....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Procedure .....	2
4.1 General conditions .....	2
4.2 Choice of the measuring system .....	3
5 Measuring systems .....	3
5.1 Determination of O <sub>2</sub> consumption by static incubation in a pressure-compensation system .....	3
5.2 Determination of CO <sub>2</sub> release by titration in a static system .....	4
5.3 Coulometric determination of CO <sub>2</sub> release in a static system .....	6
5.4 Determination of CO <sub>2</sub> release using an infrared gas analyser in a flow-through system .....	7
5.5 Determination of CO <sub>2</sub> release using gas chromatography in a flow-through system and a static system .....	10
5.6 Determination of soil respiration by pressure measurement in a static system .....	15
Bibliography .....	19

## Introduction

This International Standard is derived from the German standard DIN 19737 (see [1]). It describes methods for the determination of microbial soil respiration in the laboratory.

Microbial soil respiration results from the mineralization of organic substances. In this process, organic substances are oxidized to the end products carbon dioxide and water, with concurrent uptake of  $O_2$  for aerobic microorganisms. The soil respiration is measured by the determination of  $O_2$  consumption and/or by  $CO_2$  release. Respiration is a measure of the overall activity of soil microorganisms.

# Soil quality — Laboratory methods for determination of microbial soil respiration

## 1 Scope

This International Standard describes methods for the determination of soil microbial respiration of aerobic, unsaturated soils. The methods are suitable for the determination of O<sub>2</sub> uptake or CO<sub>2</sub> release, either after addition of a substrate (substrate-induced respiration), or without substrate addition (basal respiration).

This International Standard is applicable to the measurement of soil respiration in order to:

- determine the microbial activity in soil (see [3]);
- establish the effect of additives (nutrients, pollutants, soil improvers, etc.) on the metabolic performance of microorganisms;
- determine the microbial biomass (see [4]);
- determine the metabolic quotient  $q\text{CO}_2$ .

## 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 10381-6:1993, *Soil quality — Sampling — Guidance on the collection, handling and storage of soil for the assessment of aerobic microbial processes in the laboratory*

ISO 11274:1998, *Soil quality — Determination of the water-retention characteristic — Laboratory methods*

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

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **basal respiration**

microbial soil respiration without addition of nutrients

### 3.2

#### **substrate-induced respiration**

#### **SIR**

microbial soil respiration after addition of nutrients

NOTE      Glucose is an example of an added nutrient.