

**Soil quality - Determination of the effects of pollutants on soil flora - Part 2: Effects of contaminated soil on the emergence and early growth of higher plants (ISO 11269-2:2012)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 11269-2:2013 sisaldab Euroopa standardi EN ISO 11269-2:2013 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 11269-2:2013 consists of the English text of the European standard EN ISO 11269-2:2013.
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 20.02.2013.	Date of Availability of the European standard is 20.02.2013.
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](mailto:standardiosakond@evs.ee).

ICS 13.080.30

### Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

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

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

### The right to reproduce and distribute standards 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 a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:  
Aru 10, 10317 Tallinn, 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 - Determination of the effects of pollutants on soil  
flora - Part 2: Effects of contaminated soil on the emergence and  
early growth of higher plants (ISO 11269-2:2012)

Qualité du sol - Détermination des effets des polluants sur  
la flore du sol - Partie 2: Effets des sols contaminés sur  
l'émergence et la croissance des végétaux supérieurs (ISO  
11269-2:2012)

Bodenbeschaffenheit - Bestimmung der Wirkungen von  
Schadstoffen auf die Bodenflora - Teil 2: Wirkung von  
verunreinigten Böden auf Saataufgang und frühes  
Wachstum höherer Pflanzen (ISO 11269-2:2012)

This European Standard was approved by CEN on 5 February 2013.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

The text of ISO 11269-2:2012 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 11269-2:2013 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 August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

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 11269-2:2012 has been approved by CEN as EN ISO 11269-2:2013 without any modification.

# Contents

Page

Foreword .....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Units .....	3
5 Principle .....	3
6 Test plants .....	3
7 Materials .....	4
7.1 Test vessels .....	4
7.2 Soil .....	4
8 Equipment .....	6
9 Reference substance .....	6
10 Procedure .....	6
10.1 Experimental design .....	6
10.2 Preparation of the pots .....	7
10.3 Preparation of the seeds .....	7
10.4 Growth conditions .....	8
10.5 Start of the test .....	8
10.6 Handling during the test .....	8
11 Validity criteria .....	9
12 Assessment of the results .....	9
12.1 Data presentation .....	9
12.2 Expression of the results .....	9
13 Statistical analysis .....	9
13.1 General .....	9
13.2 Range-finding test .....	10
13.3 Final test .....	10
14 Test report .....	11
<b>Annex A (informative) Additional recommended plant species based on test results gained by applying Environment Canada Test Method: EPS 1/RM/45<sup>[4]</sup> .....</b>	<b>13</b>
<b>Annex B (informative) Phytotoxic values for reference compounds: sodium trichloro-acetate and boric acid .....</b>	<b>15</b>
<b>Annex C (informative) Recommended method for the measuring of the water-holding capacity of the soil .....</b>	<b>16</b>
<b>Annex D (informative) Recommendations for nutrient supply of soils .....</b>	<b>17</b>
<b>Bibliography .....</b>	<b>18</b>

## Introduction

This part of ISO 11269 describes a procedure for evaluating the quality of soils of different origin carrying unknown contaminations. The evaluation of the effects on plant growth is based on emergence and inhibitory effects on early growth of at least two species of higher plants. Guidance for assessing potential effects of substances on seedling emergence and growth is given in OECD Guideline 208<sup>[14]</sup>.

This part of ISO 11269 refers closely to ISO 22030 and is based on:

- a) results from the German research project “Entwicklung eines innovativen und technischen Instrumentariums zur Optimierung der ökotoxikologischen Bewertung von Böden im Hinblick auf Sanierungsziele und Schutzerfordernisse”;
- b) discussions within the joint project “Ecotoxicological Test Batteries” forming part of the BMBF Joint Research Group “Processes for the Bioremediation of Soil”<sup>[23]</sup>;
- c) results from the BMBF Joint Research Group ERNTE “Erprobung und Vorbereitung einer praktischen Nutzung ökotoxikologischer Testsysteme”<sup>[17]</sup>;
- d) ring-test results of “Ecotoxicological Characterisation of Waste — Results and Experiences from an International Ring Test”<sup>[8]</sup>.

Plant growth can be influenced strongly by soil properties such as texture, pH or levels of nutrients. When testing natural soils either reference soils (uncontaminated soils with the same properties as the test soil) or standard soils are used as mixing and control substrate. In the latter case, variations in plant growth can result from either soil contaminants or differences in soil properties like nutrients and texture. Therefore, results from soil testing can less easily be interpreted than results from testing of chemicals .

# Soil quality — Determination of the effects of pollutants on soil flora —

## Part 2:

## Effects of contaminated soil on the emergence and early growth of higher plants

**WARNING** — Contaminated soils may contain unknown mixtures of toxic, mutagenic, or otherwise harmful chemicals or infectious micro-organisms. Occupational health risks may arise from dust or evaporated chemicals during handling and incubation. Furthermore, test plants might take up chemicals from the soil and safety measures should also be considered when handling the test plants.

### 1 Scope

This part of ISO 11269 describes a method to assess the quality of an unknown soil and the soil habitat function by determining the emergence and early growth response of at least two terrestrial plant species compared to reference or standard control soils. It is applicable to soils of unknown quality, e.g. from contaminated sites, amended soils or soils after remediation.

### 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, *Soil quality — Sampling — Part 6: Guidance on the collection, handling and storage of soil under aerobic conditions for the assessment of microbiological processes, biomass and diversity in the laboratory*

ISO 10390, *Soil quality — Determination of pH*

ISO 10694, *Soil quality — Determination of organic and total carbon after dry combustion (elementary analysis)*

ISO 11260, *Soil quality — Determination of effective cation exchange capacity and base saturation level using barium chloride solution*

ISO 11268-1, *Soil quality — Effects of pollutants on earthworms — Part 1: Determination of acute toxicity to *Eisenia fetida*/*Eisenia andrei**

ISO 11268-2, *Soil quality — Effects of pollutants on earthworms — Part 2: Determination of effects on reproduction to *Eisenia fetida*/*Eisenia andrei**

ISO 11277, *Soil quality — Determination of particle size distribution in mineral soil material — Method by sieving and sedimentation*

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

ISO 22030, *Soil quality — Biological methods — Chronic toxicity in higher plants*

### 3 Terms and definitions

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