

Soil Quality —

Part 4: Biological methods —

Section 4.2: Effects of pollutants on soil fauna —

Subsection 4.2.4: Inhibition of reproduction of *Collembola* (*Folsomia candida*) by soil pollutants

ICS 13.080.30

National foreword

This British Standard reproduces verbatim ISO 11267:1999 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee EH/4, Soil quality, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

BS 7755 is being published in a series of Parts subdivided into Sections and Subsections that will generally correspond to particular international standards. Other Parts of BS 7755 are, or will be, as follows.

Part 1 *Terminology and classification*

Part 2 *Sampling*

Part 3 *Chemical methods*

Part 4 *Biological methods*

Part 5 *Physical methods*

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

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Soil quality — Inhibition of reproduction of Collembola (*Folsomia candida*) by soil pollutants

Qualité du sol — Inhibition de la reproduction de Collembola (Folsomia candida) par des polluants du sol



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

International Standard ISO 11267 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 4, *Biological methods*.

Annexes A to E of this International Standard are for information only.

Introduction

This International Standard describes a method for testing the effects of chemicals on the reproduction of Collembola in artificial soil. It can be adapted for use for testing or comparing soils to assess, for example, the effects of remediation treatments, and for assessing sublethal effects and no-effect levels for pesticides or other added chemicals.

Soil quality — Inhibition of reproduction of *Collembola* (*Folsomia candida*) by soil pollutants

1 Scope

This International Standard describes a method for determining the effects of substances on the reproduction of *Folsomia candida* by dermal and alimentary uptake in a defined artificial soil substrate.

The method is not applicable to volatile substances, i.e. substances for which H (Henry's constant) or the air/water partition coefficient is greater than 1, or for which the vapour pressure exceeds 0,013 3 Pa at 25 °C.

NOTE 1 The stability of the test substance cannot be assured over the test period. No allowance is made in the test method described for possible degradation of the test substance over the course of the experiment..

NOTE 2 Recommendations for adapting the method for comparing or monitoring soil quality are given in annex E.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 10390:1994, *Soil quality — Determination of pH*.

ISO 11268-1:1993, *Soil quality — Effects of pollutants on earthworms (Eisenia fetida) — Part 1: Determination of acute toxicity using artificial soil substrate*.

ISO 11274, *Soil quality — Determination of the water retention characteristic — Laboratory methods*.

3 Terms and definitions

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

3.1

LOEC

lowest observed effect concentration

lowest concentration of the test substance which is observed to have a significant effect when compared with the control

NOTE All test concentrations above the LOEC have a harmful effect equal to, or greater than that observed at the LOEC.

3.2**NOEC****no observed effect concentration**

highest tested concentration of a test substance at which no lethal or other effect (such as mass alteration) is observed

3.3**EC10**

concentration estimated to reduce the reproduction rate at the end of the test by 10 % compared to the control

NOTE All effect concentrations are expressed as mass of test substance per dry mass of the test substrate (5.2.1).

3.4**EC50**

concentration estimated to reduce the reproduction rate at the end of the test by 50 % compared to the control

NOTE All effect concentrations are expressed as mass of test substance per dry mass of the test substrate (5.2).

3.5**reproduction**

increase in the mean numbers of offspring in each test vessel after 28 days incubation under the specified test conditions

4 Principle

The effects of different concentrations of test substance on the reproduction of 10- to 12-day old springtails (*Folsomia candida*) in a defined artificial substrate are determined. The springtails are incubated until offspring (F_1) emerge from eggs laid by mature adults, and the number of offspring are determined. Normally offspring emerge after 28 days in control experiments.

5 Reagents**5.1 Biological material.**

In this test, 10- to 12-day old juvenile springtails of the species *Folsomia candida* (Willem) are used (see A.1. for details on synchronization of breeding).

5.2 Test substrate, consisting of the wet basic soil substrate (defined artificial soil in accordance with ISO 11268-1) the test substance and deionized water.

5.2.1 Soil substrate.

Component	Dry mass fraction
Sphagnum peat, air-dried, finely ground and with no visible plant remains	10 %
Kaolinite clay (air-dry) containing not less than 30 % kaolinite	20 %
Industrial quartz sand (air dried, and predominantly fine sand with more than 50 % of particle size 0,05 mm to 0,2 mm)	70 %

Add sufficient (usually 0,5 % to 1 %) calcium carbonate (CaCO_3), pulverized and of recognized analytical grade, to bring the pH (as measured in 1 mol/l KCl solution) to $6,0 \pm 0,5$ at the start of the test. The pH shall be determined in accordance with ISO 10390.

NOTE 1 The amount of calcium carbonate required will depend on the components of the soil substrate and should be determined by measurements on subsamples (see annex D) immediately before the test.