

Soil quality —

Part 3: Chemical methods —

Section 3.5 Pretreatment of samples for physico-chemical analyses

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee EPC/48, Soil quality, upon which the following bodies were represented:

- Association of Consulting Scientists
- Association of County Councils
- Association of Environmental Consultants
- Association of Public Analysts
- British Gas plc
- British Geological Survey
- British Society of Soil Science
- Chemical Industries' Association
- Confederation of British Industry
- Department of Agriculture Northern Ireland
- Department of the Environment
- Department of the Environment (Drinking Water Inspectorate)
- Department of Trade and Industry
- Department of Trade and Industry (Laboratory of the Government Chemist)
- Institute of Groundsmanship
- Institute of Terrestrial Ecology
- Institution of Environmental Health Officers
- Institution of Water and Environmental Management
- Macaulay Land Use Research Institute
- Ministry of Agriculture, Fisheries and Food
- Soil Survey and Land Research Centre
- Water Research Centre
- Water Services Association of England and Wales

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- British Ceramic Research Ltd.
- Institute of Occupational Medicine
- National Rivers Authority
- Royal Society of Chemistry
- Society of Chemical Industry

This British Standard, having been prepared under the direction of the Health and Environment Sector Board, was published under the authority of the Standards Board and comes into effect on 15 February 1995

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The following BSI references relate to the work on this standard:
Committee reference EPC/48
Draft for comment 92/51655 DC

ISBN 0 580 23843 1

Amendments issued since publication

Amd. No.	Date	Comments

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National foreword

This Section of BS 7755 has been prepared under the direction of the Health and Environment Sector Board. It is identical with ISO 11464:1994 *Soil quality — Pretreatment of samples for physico-chemical analyses*, published by the International Organization for Standardization (ISO). ISO 11464 was prepared by Subcommittee 3, Chemical methods, of Technical Committee ISO/TC 190, Soil quality, with the active participation and approval of the UK.

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-reference

The Technical Committee has reviewed the provisions of ISO 565:1990 to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This International Standard specifies the pretreatments required for soil samples that are to be subjected to physico-chemical analyses and describes the following five types of pretreatment of samples: drying, crushing, sieving, dividing and milling.

The pretreatment procedures described in this International Standard are not applicable if they affect the results of the determinations to be made. In general, International Standards for analytical methods will state when it is necessary to adopt other procedures.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards. ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*.

3 Principle

Soil samples are dried in the air, or in an oven at a temperature not exceeding 40 °C, or freeze-dried (see 5.2). If necessary, the soil sample is crushed while still damp and friable and again after drying (see 5.3). The soil is sieved (see 5.4) and the fraction smaller than 2 mm is divided into portions mechanically or by hand, to enable representative subsampling for analysis (see 5.5). If small subsamples (< 2 g) are required for analysis, the size of the particles of the fraction smaller than 2 mm is further decreased (see 5.6). The necessary procedures are given in the flow diagram in Figure 1.

NOTE 1 A drying temperature of 40 °C in an oven is preferable to air drying at room temperature because the increased speed of the drying limits changes due to microbial activity.

NOTE 2 It should be noted that every type of pretreatment will have an influence on several soil properties.

NOTE 3 Storing soil samples, including samples that are as received, air dried, refrigerated or stored in the absence of light, for a long time may have an influence on a number of soil parameters, especially solubilities of both inorganic and organic fractions. See [1].

NOTE 4 Special measures should usually be taken for samples from contaminated soils. It is important to avoid contact with the skin and special measures should be taken when drying such samples (ventilation, air removal, etc.). Samples may be hazardous because of the presence of chemical contaminants etc., fungal spores, or pathogens such as leptospirosis, and appropriate safety precautions should be taken.

NOTE 5 In this International Standard, it is generally assumed that at least 500 g of fresh soil is available.

4 Apparatus

It is essential that the apparatus used does not add or remove any of the substances under investigation (e.g. heavy metals). If the use of certain equipment and/or materials is not permitted in pretreatment of samples required for particular physico-chemical analysis, this should be mentioned in the relevant International Standards on analysis (see note 6).

4.1 *Drying oven*, thermostatically controlled, with forced ventilation, capable of maintaining a temperature of 40 °C ± 2 °C.

4.2 *Freeze-drier*, optional.

4.3 *Crusher(s)*, mill(s), mortar and pestle, wooden or other soft-faced hammer (see note 6).

4.4 *Plate sieve*, complying with ISO 565, with an aperture of 2 mm.

4.5 *Mechanical mixer(s)*.

4.6 *Mechanical sieve shaker*, optional (see note 6).

4.7 *Subsampler or sample divider*, (see note 6).

4.8 *Mesh sieve*, complying with ISO 565, with apertures of 250 µm or of the size specified in the relevant test method.

4.9 *Analytical balance*, readable and accurate to 0,1 g.

4.10 *Balance*, readable and accurate to 1 g.

NOTE 6 The apparatus to be used is not specified in detail, although drawings of some suitable items of equipment are provided in Figure A.1 to Figure A.4. Most comparable national standards contain detailed equipment specifications and these may be used, provided they meet the basic performance requirements indicated in this International Standard.

5 Procedure

The procedures for drying, fraction separation and size reduction are set out in 5.2 and 5.3. At several stages in the procedure, the analyst will be required to make decisions, referring in particular to whether size fractions are to be combined or treated separately: this will depend on the nature of the soil and the objectives of the analytical programme.

The sample shall be rehomogenized after any separation, sieving, crushing or milling operation (that may have resulted in segregation of different sized particles) has been carried out.