

BRITISH STANDARD

Specification for topsoil and requirements for use

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Contents

Foreword *ii*

Introduction *1*

- 1** Scope *2*
- 2** Normative references *2*
- 3** Terms and definitions *2*
- 4** Topsoil classification and characteristics *4*
- 5** Use and handling of topsoil *5*

Annexes

Annex A (normative) Determination of the extractable phosphate content *10*

Annex B (normative) Extraction of the exchangeable cations in soil *13*

Annex C (normative) Calculation of exchangeable sodium percentage of soil *15*

Annex D (normative) Determination of phytotoxic contaminants and trace elements *16*

Annex E (normative) Supplier's declaration of compliance *17*

Annex F (normative) Method for laboratory density of soil *19*

Annex G (normative) Method for preparing a laboratory sample of air-dried soil *20*

Bibliography *21*

List of figures

Figure 1 – Textural classification (limiting percentage of sand, silt and clay sized particles for the mineral texture class) *9*

List of tables

Table 1 – Topsoil characteristics *6*

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 21 and a back cover.



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Foreword

Publishing information

This British Standard was published by BSI and came into effect on 30 November 2007. It was prepared by Technical Committee AW/20, *Topsoil and other growing media*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 3882:1994, which is withdrawn.

Use of this document

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Introduction

Topsoil is an important component of most landscape projects (such as private gardens, civil engineering and reclamation sites), where it provides the function of supporting the growth of vegetation. It does this by providing an anchorage for plant roots, by slowly releasing nutrients, by providing oxygen, by draining excess water whilst retaining moisture and by retaining moisture to sustain plant growth during dry periods. The underlying subsoil or other substrate can provide additional rooting depth, moisture storage and drainage.

Topsoil can be both naturally-occurring and manufactured. Naturally-occurring topsoil is the product of dynamic chemical, physical and biological processes acting on weathered mineral matter. Topsoil can also be manufactured by combining organic matter, mineral material and lime and/or fertilizer as appropriate to provide a medium that can develop properties similar to naturally-occurring topsoil.

During natural soil formation, organic matter (typically from decaying vegetation) becomes incorporated by biological activity into the surface layers to form a (characteristically) darkened topsoil over a lighter subsoil, the latter typically of lower organic content and fertility. In many places this process has become modified by human intervention through cultivation and/or by the addition of fertilizer and organic materials.

Topsoil is a dynamic and fragile material, which when managed appropriately, fulfils its function, but is easily damaged by mishandling. It is important that topsoil is lifted, transported, stored and spread carefully over a non-compact substrate. Damage during handling can result in a rapid deterioration in the functions topsoil provides.

NOTE 1 Transporting soil involves mechanical handling, i.e. excavation, loading, transport and distribution on site. Not all naturally-occurring topsoils would survive such handling and retain the ability to develop into an acceptable soil in a reasonable time at the new site, even though in their undisturbed, naturally-occurring condition they might be very productive and capable of sustaining plant growth over long periods of time. For example, clay textured soil could be very productive in situ but its structure might suffer damage during stripping (or other handling activities) that could only be reversed by years of careful management.

In the context of soil profile construction, the subsoil is also an important medium for root growth since it provides reserves of water and available plant nutrients and mechanical anchorage.

NOTE 2 Attention is drawn to 5.2, which specifies the minimum information the supplier is to provide (or have available).

1 Scope

This British Standard specifies requirements for topsoils (see **3.1**) that are moved or traded. The standard is not intended (or appropriate) for the grading, classification or standardization of topsoil or subsoil that remains in situ. It describes multipurpose and also specific purpose topsoils. As the name implies, multipurpose topsoil is fit for the majority of needs. The standard includes specific purpose topsoils that have low fertility or are acidic or calcareous for the particular specialist needs where such topsoils are required. It also provides guidance on sampling and analysis to ensure compliance with the specifications given in the standard.

NOTE When specifying multipurpose or specific purpose topsoil, suppliers, specifiers and users of topsoil should take into account the intended use of the site at which the topsoil is to be deployed so that the particular properties are fit for the intended planting.

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.

BS 7755-3.7:1995, *Soil quality – Part 3: Chemical methods – Section 3.7 Determination of total nitrogen – Modified Kjeldahl method*

BS 7755-3.10:1995, *Soil quality – Part 3: Chemical methods – Section 3.10 Determination of carbonate content – Volumetric method*

BS 7755-5.4:1998, *Soil quality – Part 5: Physical methods – Section 5.4 Determination of particle size distribution in mineral soil material – Method by sieving and sedimentation*

BS EN 12579:2000, *Soil improvers and growing media – Sampling*

BS EN ISO 3696:1995, *Water for analytical laboratory use – Specification and test methods*

BS ISO 10390:2005, *Soil quality – Determination of pH*

PAS 100:2005, *Specification for composted materials*

3 Terms and definitions

For the purposes of this British Standard, the following definitions apply.

3.1 topsoil

natural topsoil (see **3.2**) or manufactured topsoil (see **3.3**) in which plants can grow healthily

3.2 natural topsoil

upper layer of an in situ soil profile, usually darker in colour and more fertile than the layer below (subsoil), and which is a product of natural chemical, physical, biological and environmental processes

NOTE The thickness of a natural topsoil varies with land use and management from only 100 mm to 300 mm in some sites to more than 350 mm in deeply cultivated agricultural sites.

3.3 manufactured topsoil

material produced by combining mineral matter and organic matter (and, where appropriate, fertilizer and lime), and which provides the same function as topsoil (see **3.1**)

3.4 subsoil

soil layer extending between the topsoil and the little weathered material below, or material that functions as subsoil in a constructed soil in a landscaping project on to which topsoil can be spread

NOTE Usually subsoil has a lower concentration of organic matter and available plant nutrients than topsoil.

3.5 soil texture

proportion by mass of the mineral fractions (sand, silt and clay sized particles, as defined by BS 7755-5-4:1998) (see Figure 1) in the <2 mm fraction of soil (sand: 2 mm to 0.063 mm; silt: 0.063 mm to 0.002 mm; clay <0.002 mm equivalent spherical diameter particles)

3.6 soil structure

arrangement formed by aggregation of primary soil particles (mineral and organic) into larger units

NOTE It is the spaces (pores) between these larger units (aggregates) that allow the flow of air and water, and root penetration.

3.7 soil organic matter

well decomposed remains of plants, animals, organic manures or other forms of decomposed organic matter

NOTE 1 Fossil and other unreactive organic matter such as coal are excluded.

NOTE 2 The factor to convert soil organic carbon (SOC) to soil organic matter (SOM) is $\times 1.72$; i.e. $SOC \times 1.72 = SOM$.

3.8 soil pH value

measure of the acidity or alkalinity of soil

NOTE The pH scale is 0 to 14; pH 7 is neutral, values less than 7 are acid, greater than 7 are alkaline.

3.9 available plant nutrient content

concentration of nutrients available for use by plants

3.10 soil electrical conductivity

measurement relating to the concentration of soluble ionic constituents, particularly ammonium, calcium, chloride, magnesium, nitrate, phosphate, potassium, sodium and sulfate

NOTE A high soil electrical conductivity might indicate a detrimentally high level of salinity; this can be verified by analysis.

3.11 carbon:nitrogen ratio

indication of the potential for a soil to release nitrogen for plant growth

NOTE 1 The potential to release (or immobilize) nitrogen also depends on the bioavailability of the carbon and of the nitrogen.

NOTE 2 Excluding very acidic soil (pH <5) and poorly drained soils, the carbon:nitrogen (C:N) ratios of topsoils fall within the range of 10 to 14.

3.12 soil contaminant

substance which, when present in excess, can inhibit soil function or cause a risk to animals, plants, humans or the environment

3.13 visible contaminant

foreign object discernable by the naked eye

NOTE Examples include a metal object, plastic, treated wood, textile and sharp fragment of glass and ceramic.

3.14 sharp

inorganic soil contaminant such as a glass fragment, nail or needle that can cause physical injury to the hands of a user of topsoil when handling it without protective gloves

3.15 coarse fragment

particle of greater than 2 mm diameter that is not a visible contaminant or sharp

3.16 soil source

location from which a topsoil is obtained

4 Topsoil classification and characteristics

4.1 Classification

The topsoil shall be classified as follows:

a) Multipurpose topsoil

Multipurpose topsoil includes natural topsoil or manufactured topsoil. If correctly handled, placed over a non-compact subsoil and managed appropriately (including attention to drainage), it is capable of sustainably supporting grass, trees, shrubs, herbaceous plants and other plantings (see Clause 5). This is the grade suited to most situations where topsoil is required; however, there can be situations where specific purpose topsoil is required [see 4.1b)]. Some natural topsoils, especially clayey and low organic matter, silty or sandy topsoils, might not be able to survive the handling involved with trading topsoil.

b) Specific purpose topsoil

Specific purpose topsoil includes natural or manufactured topsoil. It comprises topsoils with characteristics appropriate for specialist applications, e.g. supporting the growth of certain plants or plant communities. Specific purpose topsoil can be specified by one or more of the following qualifiers.

- 1) Acidic.
- 2) Calcareous.
- 3) Low fertility.
- 4) Low fertility acidic.
- 5) Low fertility calcareous.

These topsoils are not appropriate for general landscaping projects.