

BS 3882:2015



BSI Standards Publication

Specification for topsoil

bsi.

...making excellence a habit.
AVA Documents™
Document Sharing Hub

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2015

Published by BSI Standards Limited 2015

ISBN 978 0 580 85949 6

ICS 13.080.01; 93.020

The following BSI references relate to the work on this document:

Committee reference AW/20

Draft for comment 14/30297814 DC

Publication history

First published April 1965

Second edition October 1994

Third edition November 2007

Fourth (current) edition April 2015

Amendments issued since publication

Date	Text affected
------	---------------

Contents

Foreword *iii*

Introduction 1

- 1 Scope 1
- 2 Normative references 2
- 3 Terms and definitions 2
- 4 Topsoil classification and characteristics 3
- 5 Sampling of topsoil 7
- 6 Information to be provided by the supplier to the purchaser 9

Annexes

Annex A (informative) Recommendations for stripping, handling and preparing topsoil 10

Annex B (informative) Information and guidance on low fertility topsoils 13

Annex C (normative) Method of sample reduction and preparation 13

Annex D (normative) Determination of mass loss on ignition 13

Annex E (normative) Determination of mineral carbonate content of soil (as calcium carbonate) 15

Annex F (normative) Determination of the extractable phosphate content of soil 17

Annex G (normative) Extraction of exchangeable cations in soil 20

Annex H (normative) Determination of the specific electrical conductivity of a calcium sulfate extract of soil 21

Annex I (normative) Determination of laboratory density of soil 23

Annex J (normative) Method for determining visible contaminants and sharps 24

Bibliography 26

List of figures

Figure 1 – Textural classification (limiting percentages of sand, silt and clay sized particles for the mineral texture class) and the area of textures that are acceptable within BS 3882:2015 8

Figure A.1 – Preferred method of stripping topsoil 11

Figure A.2 – The loose tipping method for placing topsoil, including subsoil loosening 12

List of tables

Table 1 – Topsoil characteristics 5

Table A.1 – Recommended maximum stone size for different land uses 12

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 26, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 April 2015. It was prepared by Technical Committee AW/20, *Topsoil, other growing media and turf*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes BS 3882:2007, which is withdrawn.

Relationship with other publications

This British Standard is intended to complement BS 8601 which specifies subsoil.

Information about this document

This is a full revision of the standard to bring it up to date and to make it complementary to the new British Standard for subsoil, BS 8601.

Test laboratory accreditation. Users of this British Standard are advised to consider the desirability of selecting test laboratories that are accredited to BS EN ISO/IEC 17025 by a national or international accreditation body.

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.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

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.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause J.1.1, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

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.

Particular attention is drawn to:

- Schedule 9 of the Wildlife and Countryside Act 1981 [1]
- The Environmental Protection Act 1990 (EPA) [2]
- The National Planning Policy Framework (NPPF) [3]
- Contaminated Land Exposure Assessment (CLEA) model (EA/DEFRA:2009) Soil Guideline Values [4]
- Chartered Institute of Environmental Health (CIEH)/Land Quality Management (LQM) Generic assessment criteria for human health risk assessment (2nd Edition, 2009) [5]
- The Waste Management Licensing Regulations 1994 (as amended) [6]
- Definition of waste: Development industry code of practice (Guidance Bulletin GB 03, CL:AIRE, 2011) [7]

Introduction

Topsoil is an important component of most landscape projects [such as gardens, civil engineering, sustainable drainage systems (SuDS) 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 delaying/retarding runoff 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 with additional lime and/or fertilizer, as appropriate, to provide a medium that (with the same chemical, physical and biological processes) 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.

NOTE 2 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, and for SuDS.

1 Scope

This British Standard specifies requirements for the classification and composition of natural and manufactured topsoils that are moved or traded for creating soil profiles intended to support plant growth. The standard is not applicable to subsoil, or to topsoil that is to remain in situ, however, it is not intended to preclude the use of topsoil that is already on site and suitable for its intended purpose. This standard specifies requirements for multipurpose topsoil, which is fit for the majority of needs, and also specific purpose topsoils that have low fertility or are acidic or calcareous, for specialist use where low fertility or acidic or calcareous soil profiles are required. It also specifies requirements for sampling and analysis of topsoil.

NOTE Recommendations for the stripping, handling and trafficking of topsoil are given in Annex A.

2 Normative references

Standards publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 EN 12579:2013, *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*

BS ISO 11277:2009, *Soil quality – Determination of particle size distribution in mineral soil material – Method by sieving and sedimentation*

BS ISO 16729:2013, *Soil quality – Determination of nitric acid soluble fractions of elements*

Other publications

[N1] DEPARTMENT FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS. *Construction code of practice for the sustainable use of soils on construction sites*. London: DEFRA, 2009.

3 Terms and definitions

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

3.1 topsoil

top layer of soil, darker in colour and with more organic matter than the layer below (subsoil), or manufactured soil with similar properties

NOTE The thickness of a natural topsoil varies with land use and management.

3.2 subsoil

soil layer extending between the topsoil and the little weathered parent material below, or material that functions in the same way in a constructed soil profile and on to which topsoil can be spread

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

3.3 soil texture

proportion by mass of sand, silt and clay sized particles in the mineral fraction of the <2 mm fraction of soil

NOTE See Figure 1 (with equivalent spherical diameters as follows: sand: 2 mm to 0.063 mm; silt: 0.063 mm to 0.002 mm; clay <0.002 mm).

3.4 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.

3.5 soil organic matter

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

NOTE It does not include fossil and other unreactive organic matter such as coal.

3.6 soil pH value

measure of the acidity or alkalinity of soil

NOTE pH 7 is neutral, values less than 7 are acid, values greater than 7 are alkaline.

3.7 potentially phytotoxic element

element which, when present in excess, has the potential to inhibit plant growth or kill plants

3.8 visible contaminant

undesirable potentially injurious foreign object discernible by the naked eye

NOTE Examples include metal objects, plastics, treated wood, textiles and sharp fragments of ceramics and glass.

3.9 sharp

noun

sharp inorganic 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

3.10 coarse fragment

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

3.11 soil source

location from which a topsoil is obtained

3.12 supplier

person or organization supplying topsoil from within or outside the site where it is to be used

3.13 incremental sample

quantity of material taken from one sampling point

[SOURCE: BS EN 12579:2013, 3.5]

4 Topsoil classification and characteristics

NOTE If correctly handled, placed over a non-compact subsoil and managed appropriately (including attention to drainage), topsoil is capable of sustainably supporting grass, trees, shrubs, herbaceous plants and other plantings (see Annex A). However, irrespective of its classification, unless correctly handled and managed, a topsoil cannot be expected necessarily to perform these functions satisfactorily.

4.1 Classification

The topsoil shall be classified as:

- a) multipurpose topsoil; or
- b) specific purpose topsoil.

Specific purpose topsoil shall be further classified as follows:

- 1) acidic;

- 2) calcareous;
- 3) low fertility;
- 4) low fertility acidic;
- 5) low fertility calcareous.

NOTE 1 Multipurpose topsoil is the grade suited to most situations where topsoil is required; however, there can be situations where specific purpose topsoil is required [see Note 3]. Some natural topsoils, especially clayey and low organic matter silty topsoils, might not be able to survive the handling involved with trading topsoil.

NOTE 2 Specific purpose topsoils comprise topsoils with characteristics appropriate for specialist applications, e.g. supporting the growth of certain plants or plant communities.

NOTE 3 Specific purpose topsoils might not be appropriate for general landscaping projects.

NOTE 4 When specifying multipurpose or specific purpose topsoil, users, specifiers and suppliers 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 that use.

NOTE 5 The specification of low fertility topsoils is complex because it depends on the intended planting. Specialist advice is recommended. General guidance on low fertility topsoils is given in Annex B.

4.2 Characteristics

The topsoil shall be sampled in accordance with Clause 5. The samples shall be reduced and prepared in accordance with Annex C and tested in accordance with the methods listed in Table 1. The characteristics of the samples shall be as specified in Table 1 and Figure 1.

NOTE 1 Attention is drawn to the documents listed Table 1, Note 2 to Note 5.

NOTE 2 The methods given in Annex F, Annex G and Annex I are based on Reference Book 427 [8] as used and validated by the Agricultural Development and Advisory Service (ADAS).

Table 1 Topsoil characteristics (1 of 2)

NOTE 1 Attention is drawn to the documents listed Note 2 to Note 5 of this table.

Parameter	Multipurpose topsoil	Specific purpose topsoil				Method of test		
		Acidic	Calcareous	Low fertility ^{A)}	Low fertility calcar- acidic ^{A)}		Low fertility calcar- eous ^{A)}	
Soil texture <2 mm fraction % m/m		See area of permitted soil textural classes in Figure 1					BS ISO 11277	
Maximum coarse fragment content % m/m							BS ISO 11277	
>2 mm	30	30	30	30	30	30		
>20 mm	10	10	10	10	10	10		
>50 mm	0	0	0	0	0	0		
Mass loss on ignition % ^{B)}							Annex D	
Clay 5% to 20%	3 to 20	3 to 30	3 to 20	2 to 20	2 to 30	2 to 20		
Clay 20% to 35%	5 to 20	5 to 30	5 to 20	2 to 20	2 to 30	2 to 20		
Soil pH (measured in water)	5.5 to 8.5	3.5 to 5.5	7.5 to 9.0	3.5 to 9.0	3.5 to 5.5	7.5 to 9.0	BS ISO 10390	
Carbonate % m/m	—	—	>1	—	—	>1	Annex E	
Plant nutrient content							BS 7755-3.7	
Total nitrogen % m/m	>0.15	>0.15	>0.15	— ^{C)}	— ^{C)}	— ^{C)}	Annex F and Annex I	
Extractable phosphate mg/L	16 to 140	16 to 140	16 to 140	≤20	≤20	≤20	Annex G and Annex I	
Extractable potassium mg/L	121 to 1 500	121 to 1 500	121 to 1 500	—	—	—	Annex G and Annex I	
Extractable magnesium mg/L	51 to 600	51 to 600	51 to 600	—	—	—	Annex G and Annex I	
Carbon:nitrogen ratio ^{D) E)}		<20:1	<20:1	<35:1	<35:1	<20:1	Annex D and BS 7755-3.7	
Electrical conductivity μS·cm ⁻¹ ^{F)}		3 300						Annex H