



The essential guide

Get it right the first time ✓



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Understanding topsoil

Good topsoil is a mixture of mineral particles, water, nutrients, organic matter, air and living organisms.

Nutrients

Nitrogen

Required for the growth of leaves and stems, its deficiency causes weak, stunted growth and yellowing of older leaves. However, excess nitrogen can also be detrimental causing such effects as disproportionate leaf growth at the expense of other parts of the plant (e.g. flowers).

Phosphorous

Principle nutrient for root growth and development, deficiencies may be seen through stunted root systems whilst the leaves on some plants may also exhibit a dull green or purple coloration.

Magnesium

A constituent of chlorophyll, the green pigment which enables plants to photosynthesise, magnesium deficiency may be noted by the interveinal yellowing of the plant's older leaves.

Organic Matter

Organic matter consists of living organisms and is very important to soil function and plant growth as it influences soil structure (and hence aeration, drainage and root growth), water-holding capacity and soil fertility. It binds mineral particles into granular or crumb structures and the proportion of water that is available for plant uptake. It is a major source of essential plant nutrients including nitrogen, phosphorus, potassium and sulphur; it is also the food for soil organisms, and without it, biochemical activity, which is essential for ecosystem functioning, would cease.

pH

pH is the measure of the acidity or alkalinity of a soil. It affects nearly all soil properties and is a major factor in determining where trees, shrubs and grasses will grow. It influences structural stability, plant nutrient availability, microbe activity and soil pollutant mobility.

Electrical Conductivity

General measure of the soluble salt content or salinity of a soil, a good quality topsoil should have an electrical conductivity value within the range of 100-1500uS/cm (soil : water extract).

Potentially Toxic Elements (PTEs)

Excessive concentrations may be hazardous to health and inhibit plant growth. Laboratory analysis is necessary to indicate the levels of PTEs.

Leaching

The removal of materials in solution from the soil, often as a result of excessive rainfall.

British Standard

for topsoil (BS3882:2015)

The British Standard for topsoil BS3882:2015 replaces the 2007 version.

Topsoil is an important aspect of many civil engineering, public and private landscaping projects where it should support healthy plant growth.

There are two grades:

Multipurpose grade:

This is a grade suited to most situations where topsoil is required.

Specific Purpose:

This grade comprises characteristics appropriate for specialist applications, e.g. low fertility, acidic or alkaline.

The Standard gives up-to-date advice on correct soil sampling, handling, storage, subsoil preparation and depth of topsoil.

The Standard also draws attention to the need for potentially toxic elements analysis and to the possibility that Site Specific Assessment Criteria (SSAC) or Generic Assessment Criteria (GAC) might have been set for the intended recipient site.

Note 4 in table 1 of the standard references the Contaminated Land Exposure Assessment (CLEA) model (EA/DEFRA:2009) Soil Guidelines Values and Chartered Institute of Environment Health (CIEH) /Land Quality Management (LQM) Generic assessment criteria for human health risk assessment.

Topsoil suppliers are required to provide a Declaration of Analysis to include:

- Location of topsoil source
- Previous and current land use for Natural Soils
- Date of Sampling and Analysis
- BS3882:2015 compliant topsoil must be sampled every 5000 cubic metres (8000t) traded
- Test results including Contamination Parameters
- Written confirmation of compliance with BS3882:2015.

All purchasers and users of topsoil should ask their topsoil supplier for a copy of the following:

- BS3882:2015 Declaration of Analysis
- Analysis Certificate
- Sampling Protocol

Copies of **BS3882:2015** are available from:
BSI Customer Services Department
Tel: (0845 086 9001)

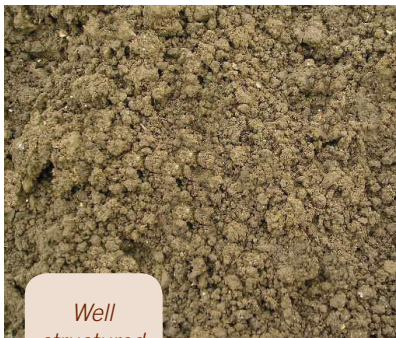
Further information is available at:
www.bstopsoil.co.uk

Topsoil - Terminology

What is Soil Structure?

Soil structure is the aggregation of soil particles (sand, silt, clay and organic matter) into granules, crumbs or blocks. It is the shape that the soil takes based on its physical, chemical and biological properties; it is very important since (along with texture) it affects drainage and aeration capacity of the soil.

Without structure a soil collapses and compacts, resulting in a number of problems for landscaping and civil projects. It can be considered as the “framework” of a Soil Profile.



Well structured soil

What is a Soil Profile?

Soils develop over long periods of time and generally become deeper and develop distinct layers or horizons. A soil profile is made up of three layers: **topsoil**, **subsoil** and **parent material**.

Topsoil

This thin layer (usually less than 30cm) is normally the most fertile because of the organic matter that has accumulated from plant and biological activity.

In this layer, the majority of a plant's feeder roots are present which take up nutrients.

Subsoil

Usually lighter in colour as it does not contain as much organic matter as topsoil. This layer can be composed of varying proportions of clay, sand, silt and stones.



Parent Material

This is the original material from which the soil is developed. This layer has deposits of sand, gravel, pebbles, boulders and rock in various mixtures.

Typical soil profile



Poorly-structured, cloddy soil

Why is Structure Important?

Virtually all soils need an open structure through the soil profile in order to function effectively as a growing medium. In particular, soil structure influences the main soil and plant root functions, aeration, drainage and root development.

Without structure, soils will suffer from anaerobism, waterlogging and nutrient lock-up and, ultimately, plants will die!



Trial pit showing anaerobism (grey colour)

What is Compaction?

Compaction destroys soil structure because it increases the density of the soil by packing the particles closer together; this causes a layer within the soil profile that is impregnable to plant roots, water and air. It can occur in the topsoil and the subsoil layers.

Topsoil is easier to restore than subsoil but the latter cannot be ignored as rooting alone will not break up or restructure a compacted subsoil.

Main causes of compaction

- Misuse of heavy equipment
- Trampling or trafficking over soils
- Handling soils when wet and plastic
- Stockpiling soils inappropriately

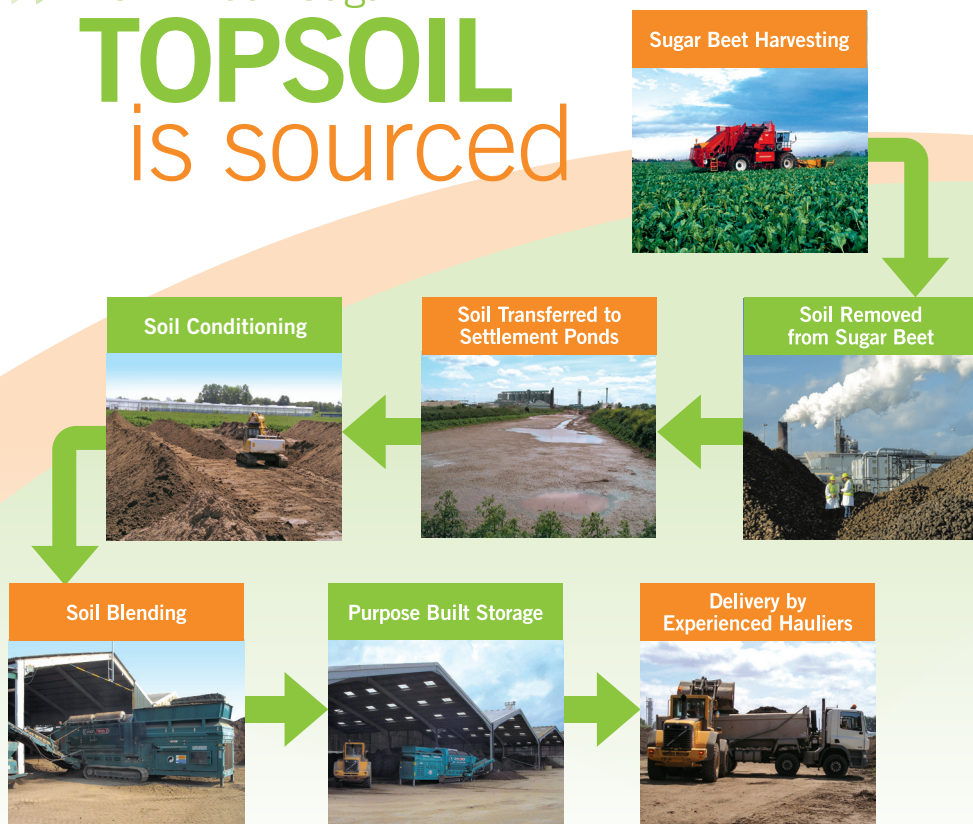
Danger signs of compaction

Anaerobism and waterlogging are the biggest soil-related causes of plant failures in landscaping projects but both can be avoided with the right ground preparation.

How you can detect compaction

- Ponding of water on the surface
- Resistance experienced when pushing a soil probe or spade into a soil
- Black, anaerobic layer with a sour odour in a turf-rooting layer
- Uneven plant growth
- Yellowing leaves
- Waterlogging
- Poor root development and shallow root systems
- Anaerobism

>> How British Sugar **TOPSOIL** is sourced



NHBC Statement

The National House Building Council has allowed TOPSOIL to use the following statement:

“ British Sugar TOPSOIL **can help builders** meet the requirements of NHBC Standards, Chapter 10.2 - 10.28 “**Drives, paths and landscaping**”, for topsoil ”

Analysis

your guarantee of quality

In order to avoid unsuitable soil for your project, we strongly advise you obtain a comprehensive analysis of the topsoil from your chosen supplier. It is also vital that this analysis conforms to the recently revised British Standard for topsoil BS3882:2015.

All British Sugar's TOPSOIL products are analysed by an independent laboratory, the accredited Tim O'Hare Associates based in Oxfordshire.

The initial visual examination describes the product (colour, moisture level, friability, etc.) and covers whether stones, weeds, roots or rhizomes of pernicious weeds are present.

The sample is then submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the absence of potential contaminants.

Quality

All products are quality assured by regular independent analysis. Unlike 'muckaway' and other inconsistent material, they are free of contamination, glass or building material residue and are **devoid of invasive weeds**, such as Japanese Knotweed. As natural products, none are sterilised, so annual weeds may appear.

Storage

All TOPSOIL products are delivered in optimum condition. To maintain the consistency and ensure easy application, it is advisable to keep them covered when not being used.

The following parameters are determined:

- particle size analysis and stone content
- pH value
- electrical conductivity values (CaSO₄ and water extracts)
- major plant nutrients (N, P, K, Mg)
- organic matter content
- heavy metals (As, Ba, Br, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn, B)
- soluble sulphate, elemental sulphur, acid volatile sulphide
- total cyanide and total (mono) phenols
- total petroleum hydrocarbons (C10-C40)
- speciated PAHs (US EPA16 suite)
- aromatic and aliphatic TPH (C5-C35 banding)
- BTEX
- asbestos

Finally, the results are presented on a Certificate of Analysis along with an interpretation of the results.

Parameter	Result	Requirement
pH	6.5	5.5 - 7.5
Electrical Conductivity (1:2.5 water extract)	250	≤ 250
Electrical Conductivity (1:5 CaCl ₂ extract)	4.5	≤ 4.5
Major Plant Nutrients (N, P, K, Mg)	1.0, 1.0, 1.0, 1.0	≥ 1.0, ≥ 1.0, ≥ 1.0, ≥ 1.0
Organic Matter	1.0	≥ 1.0
Heavy Metals (As, Ba, Br, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn, B)	0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0	≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0, ≤ 0.0

Planning your order

Order only what you need

Use the following as a guide for ordering the correct amount of topsoil:

1. Calculate the volume (cubic metres) needed for the site:

Multiply the width x length x depth

2. Use the following formula to estimate the tonnage required:

Cubic metre = 1.7 tonne of topsoil

Take account of any site restrictions

When you talk to your supplier/contractor make sure you cover details such as site access as this could affect what size of vehicle can be used; deliveries tend to be made by articulated trucks carrying 29 tonnes or rigid vehicles carrying 20 tonnes. Also consider any effect on local residents and any possible delivery time restrictions.

The dimensions below are based on the truck approaching the entrance in a straight line, **if the approach access is at an angle then more space will be required.**

Articulated Truck

Gross weight: 44 tonne
Net weight: 29 tonne
Width: 3.2 metres
Length: 12.8 metres
Height: 4 metres



Deliveries tend to be made by 29 tonne articulated, or 20 tonne rigid trucks



Rigid Truck

Gross weight: 32 tonne
Net weight: 20 tonne
Width: 3.2 metres
Length: 11.5 metres
Height: 3.7 metres



Working with **topsoil**

1 Site evaluation

- Evaluate the soils on the recipient site for potentially toxic elements* and the site's drainage potential
- See CLEA model for further guidance

* *if contamination is present, use this evaluation to establish a remediation strategy*



SAFETY

Health & Safety signage must be set-up on the site before any work takes place and the site closed off to the public. Personal Protective Equipment (PPE) must be worn at all times while working on the site.

2 Imported topsoil

- The topsoil you import must comply with BS3882:2015 in order to be fit for purpose
- A certificate of analysis will help you establish if the soil is a true topsoil or derived from screened demolition or skip waste
- Samples may not be representative – if in doubt, view the topsoil for yourself

3 Deliveries

- Check there are no site access restrictions for large trucks
- Use immediately or stockpile it on a high, clean, segregated area to reduce standing water. Cover with a large, secured waterproof sheet
- Small quantities should be laid on clean, strong, flat boards to ensure the soil is kept off the ground, minimising contamination



4 Preparation of the existing site

- Remove all contaminants, e.g. wood, concrete, bricks, tarmac etc
- Minimise pedestrian and vehicle traffic movement especially in wet conditions. If machinery and foot traffic has affected the site then it should be de-compacted to a depth of at least 300mm
- Perennial and evasive weeds such as couch grass or Japanese Knotweed must be controlled / removed in accordance with statutory requirements prior to soil application

5 Planting & Turfing

- Avoid handling topsoil in wet conditions
- Planting area should be cultivated to at least 300mm depth for shrubs (200mm for turf) then levelled-off and consolidated with boards (these will spread the weight)
- Seeding requires only a light cultivation and then consolidation for good seed/soil contact
- For shrub and tree planting, loosen the bottom and sides of the hole to aerate and add new topsoil to aid root development (trees require a thicker layer)



- Backfill with topsoil once the plant is in position and heel-in firmly
- For turf repair on worn or sunken areas, lift the turf, build up the level with imported topsoil, replace the turf and consolidate with a board
- For shrub and tree planting, loosen the bottom and sides of the hole to aerate and add new topsoil to aid root development (trees may require a specialist tree soil)



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TOPSOIL is a business of British Sugar plc