

How manufacturing topsoil using PAS100 compost can reduce costs for the construction industry

This leaflet presents the results of a recent trial using PAS100 compost to manufacture soil for use in the construction industry. It also provides good practice for using it.

Summary

- Construction sites often suffer from a lack of topsoil for landscaping.
- Certified compost can be readily sourced and imported on to site to manufacture topsoil.
- Manufactured topsoil can out-perform imported 'natural' topsoil in terms of grass growth and soil development.
- The cost of on-site topsoil manufacture is usually considerably less than importing topsoil.
- The process of manufacturing topsoil on site should be overseen by a landscape architect, landscape contractor or soils consultant, to ensure the specific landscaping soil requirements are met.

What is compost?

Compost is the result of the controlled breakdown of biodegradable material, under aerobic conditions.

There are two main types of compost: green and green/food compost. Green compost is solely derived from garden waste from sources such as domestic gardens and municipal parks. Green/food compost is made from similar inputs, but with the addition of food waste, such as that collected from households. Both kinds of compost are excellent soil conditioners, the main difference between them being the rate they release nutrients, which tends to be higher in green/food compost.

All compost certified under the Compost Certification Scheme must meet the quality requirements of the PAS100 specification, ensuring its quality and allowing it to be used for landscaping without any need for environmental permits.



Using compost to make topsoil

Certified compost is already being used successfully in topsoil manufacturing on development projects. Topsoil is produced by mixing compost with recycled inert materials already present on site, such as surplus sub-soil, stone fines and other mineral soil-forming

materials. The particular blend of certified compost and soil-forming material will vary according to the landscaping needs to each individual site, but all manufactured topsoil should conform to the requirements of BS3882:2007.

Grass growth trial

The Llanelli School regeneration scheme offered an excellent case study of the use of certified compost for large-scale urban landscaping in the construction industry. A trial was undertaken comparing the performance of amenity and wildflower grasses established on manufactured and imported topsoil.

One test area used standard imported soil. The second test area used topsoil that was manufactured onsite by incorporating PAS100 certified (green) compost at the rate of 10% by volume within the top 20 to 40 cm of prepared subsoil. This was achieved by spreading the compost to a depth of 4 cm across the subsoil surface and rotavating it in. A small tractor-mounted rotavator could be

used for larger-scale operations.

Moisture content of the subsoil during manufacture is critical. It needs to be friable to allow the clods to break up easily to incorporate the compost.

The plots were monitored visually, and grass production was measured over a period between July and October to determine the effectiveness of manufactured soil compared with imported soil.

Grass growth results

Laboratory results show the compost had twice the organic matter content of topsoil, nearly twice the total nitrogen content, five times the readily-available nitrogen, and twice the available potassium and phosphorus.

Consequently, using compost allowed for the importation of a concentrated form of plant nutrients onto the site without bringing in the weight of the mineral matter in topsoil. The grass growth trials have shown that over a single season between June and October



Grass growth on the wildflower seed mix plots. Twice the growth is noted on the plots manufactured on-site with PAS100 compost.



Grass growth on the amenity seed mix plots. Twice the growth is noted on the plots manufactured on-site with PAS100 compost.

2014, the topsoil manufactured with certified compost outperformed the imported soils by a factor of two. This means it had approximately 100% more growth than the imported soils (see table 1 and photos above).

Cost benefit

Considerable variations in costs of topsoil and compost can be expected from site to site, and the costing savings below are based on those relating to the Llanelli School scheme.

Type of topsoil	Amenity grass seed mix		Wildflower grass seed mix	
	Imported	Manufactured	Imported	Manufactured
Dry weight of cut grass/m ² (g)	113	224	72	160

Table 1 Grass growth results

Soil development effects

A sharp boundary surface can be created if imported or manufactured topsoil is simply placed on the site surface. This can lead to topsoil slippage on slopes. In addition, root penetration can be restricted if density is significantly high.



Soil development. Imported soil



Soil development. On-site manufactured soil

Root penetration in deeper soil results in faster soil development. This is particularly important on sites that need soil stabilisation and access to water reserves, especially when dry conditions are expected. By incorporating PAS100 certified compost into manufactured topsoil, these risks can be reduced.

The cost of importing topsoil would have been £20 per tonne delivered to site. Spreading this at 10 cm depth (with 1 tonne covering 10 m²) would cost £2 per m².

The compost cost was around £35 per tonne delivered to site. Spreading it to a depth of 4 cm over 25m² cost £1.40 per m².

An additional estimated cost of £0.25 per m² for compost incorporation was added to the cost of spreading the imported topsoil.

Based on these estimates, topsoil manufacture with certified compost would cost between 15% and 20% less than importing topsoil. There are also likely to be additional medium and long-term benefits from the added nutrients in the compost.

The results from the trial showed an increased grass growth in the manufactured topsoil. However, if this degree of growth is not required or desirable, you could reduce the compost rate to less than half of the amount of imported topsoil used to gain further cost savings.

While we have tried to make sure this information sheet is accurate, we cannot accept responsibility or be held legally responsible for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. You can copy it free of charge as long as the material is accurate and not used in a misleading context. You must identify the source of the material and acknowledge our copyright. You must not use material to endorse or suggest we have endorsed a commercial product or service. For more details please see our terms and conditions on our website at www.wrap.org.uk

**Rhaglen Gweithredu'r
Cynllun Gwastraff ac
Adnoddau**
Tŷ Carlyle
5-7 Heol y Gadeirlan
Caerdydd
CF11 9RH

**Waste & Resources
Action Programme**
*Carlyle House
5-7 Cathedral Road
Cardiff
CF11 9RH*

T 02920 100 100
W www.wrap.org.uk

www.wrap.org.uk/category/sector/landscape-and-regeneration



Helpu Cymru i leihau
ei Hôl Troed Carbon
Help Wales reduce
its Carbon Footprint

