



Guidance on sampling composted materials in accordance with BSI PAS100:2018

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1. Scope

The Publicly Available Specifications for composted materials (BSI PAS 100:2018) requires that each final sample sent for testing is representative of the batch (or portion of production) from which it was obtained.

The British Standard 12579 provides general procedure(s) for obtaining representative samples from quantities of soil improvers and growing media – sampling either bulk or packaged material. BS EN 12579 was updated in 2013 to include guidance on sampling in respect of microbiology testing.

This document has been developed to provide specific guidance for the development of standard operating procedure(s) (SOPs) for sampling compost in respect of BSI PAS100:2018. The development and appropriate use of SOPs for compost sampling will enable compost producers to uphold clause 7.1.9 of the latest version of the Compost Certification Scheme Rules.

The incorporation of health and safety requirements for sampling SOPs are of course a priority but beyond the scope of this guidance.

2. Objective

The objective of sampling is to produce a sample of sufficient amount for laboratory testing that is representative of the sampled compost batch. This applies where the sample is an original batch sample or a retest sample following corrective action. The sample for laboratory testing is produced following these steps:

1. taking incremental samples from a batch of compost (bulk or packaged),
2. mixing incremental samples to create a combined sample that represents the batch

As per clause 4.5.3 of BSI PAS100:2018, each person whose activities affect sample quality or who is responsible for taking samples shall be appropriately trained.

The sampling operation should be carried out over a sufficiently short period of time (and a maximum one day) to ensure the sample can be sent to the laboratory within the maximum time from sampling. Necessary steps should be taken to avoid altering sample characteristics during sampling or handling of samples prior to sending to the laboratory (e.g. moisture loss or exposure to microbial contamination).

3. Timing

BSI PAS100:2018 requires that each compost grade shall be sampled and sent for testing:

- during the week after the batch has completed the minimum composting process applicable to the grade (including a maturation step if applicable);
- after particle size screening, if applicable;
- and
- before any blending with wastes, materials, composts, products or additives'

Sampling early in the week (i.e. Monday to Wednesday) is recommended to ensure testing can be started at the laboratory within the required timeframe.

4. Frequency

All compost grades shall undergo sampling and testing at the minimum frequencies specified in Table 2 of BSI PAS100:2018.

- During validation, the required sampling frequency is '*1 sample from each of 3 different batches of the compost grade*'.
- After validation, during routine operation, the PAS 100 specifies '*1 sample representative of every 5000 m³ or 2500 tonnes of the compost grades produced*',

or

'if <5000 m³ or <2500 tonnes of the compost grade is produced per 12 months, 1 sample representative of 1 compost batch'.

If laboratory tests show that a sample fails any of the minimum quality parameters specified in Table 3 and Table 4 of BSI PAS100:2018, this would trigger an investigation for the causes for the failure, identification of corrective actions and a change in sampling frequency (see section 16 of BSI PAS100:2018). The change in sampling frequency will be dependent on the type of the failure; representative samples may need to be taken from one or more batches of compost in order to gain assurance that the quality of compost is not compromised. Suggested actions to be taken in the event of a failure are presented outwith of this guidance.

5. Equipment and consumables

All equipment and consumables used must be clean and dry in order to prevent altering the characteristics of the compost sample. In respect of microbial pathogen testing, the use of fresh sampling consumables should be maximised (as per BS 12579:2013) to avoid cross-contamination (e.g. fresh sample bags and plastic sheeting).

Typical equipment required for sampling are a spade or handheld scoop (the latter suitable only for finer grades) which should be thoroughly cleaned prior to use.

A clean plastic sheet is effective for mixing incremental samples to provide a homogenous sample for the laboratory.

On each sampling occasion use a fresh unused plastic bag, provided by the chosen approved laboratory or sourced elsewhere, in which to place the final homogenous sample.

A cool box with ice packs should be used to ensure the integrity of the sample is maintained until testing.

6. Size and number of increments

In accordance with BS EN 12579:2013 and BSI PAS100:2018, a **sampled portion** should not be more than 5,000 m³. Ensure that the sampled material consists of only one grade of compost. The sampled material should be from one batch.

Take incremental samples from the batch of compost using suitable sampling equipment and consumables (section 5). Ensure that the volume of each incremental sample is **at least** 0.5 litres to ensure that the resulting combined sample will be of sufficient volume for the laboratory. For large compost grades (e.g. 0-40 mm) and/or small batches sizes (<2000 m³), incremental samples

should be at least 1 litre to ensure a sufficient quantity of combined sample is provided to the laboratory for testing.

The number of incremental samples to be taken is based on the batch size as outlined (Table 1) with a minimum of 12 incremental samples for any batch.

Table 1. Number of incremental sampling points according to pile volume

Volume of pile (m ³)	Number of incremental sampling points	Volume of pile (m ³)	Number of incremental sampling points
<500	12	1500	19
500	12	2000	22
600	12	2500	25
700	13	3000	27
800	14	3500	30
900	15	4000	30
1000	16	>4000	30

Using this approach a minimum of 10 litres of compost sample should be prepared for the laboratory for a suite of PAS100 tests. Operators may assess the quantity of material for sending on a weight basis where the typical density is known or has been estimated. Density will vary from product to product depending on feedstock material, particle size and moisture content. Approved laboratories should be consulted for further advice on required sample volume/weight prior to sending samples.

In the case of re-test samples a small volume/weight is required in which case coning and quartering should be used to reduce the sample to the appropriate size for the required test. Approved laboratories should be consulted on the quantity of sample required for specific tests.

7. Sampling approaches

a) Sampling a compost pile

Sampling points must be distributed throughout the sampled batch pile/windrow. Divide the batch into the same number of portions as the number of sampling points required as per Table 1 above. Take incremental samples from each portion, covering the top, middle and bottom zones throughout the length and width of the batch. Ignore material 50 mm from the pile faces or ground to avoid contamination such as bird droppings. The face of the pile can be cleared with a separate implement to avoid contamination.

b) Sampling during loading or discharge

As an alternative to sampling a pile, BS EN 12579:2013 advises that '*Sampling of a sampled portion may be undertaken during loading and discharge. Whenever possible, sampling from the bulk product should be carried out from a moving stream of product, the whole width of the stream being sampled.*' For example, during product screening, take the appropriate number and volume of incremental samples (e.g. part-bucket loads), timed such that together they are representative of the entire batch.

c) Sampling packaged material

The third option is to sample packaged material. Calculate the total volume of the batch and the number of sampling points necessary as per Table 1. Once you know the number of incremental samples required, select as many packages (required minimum 0.5 litre size) randomly from the same batch as many sampling points are required. As per BS EN 12579; *'each sampling point shall be in a different randomly selected package'*.

8. Preparation of combined sample

Regardless of the sampling approach used, the collected incremental samples must be mixed together to create a single combined sample before sending to the laboratory.

Mixing should be carried out on clean plastic sheet (or in a large bucket) using a clean spade or trowel to produce a single well mixed combined sample. Mixing in a bag is unlikely to produce a homogenous sample for testing.

Using the appropriate increment size and number should produce a combined sample of adequate volume for the laboratory. Larger batches will generate a combined sample too large for sending to the laboratory and so this should be reduced by coning and quartering.

Test samples must not be split into further subsamples on site. Subsampling for the various test parameters must be carried out at the testing laboratory in a controlled environment by competent personnel.

No archive sample is required by BS EN 12579:2013. Section 13.3 of BSI PAS100:2018 suggests appropriate conditions for storage of archive samples if taken; however, it should be recognised that the archive sample will not be suitable for testing if the original sample is lost in transit to the laboratory. In the rare event that a sample is lost in transit to the laboratory, a new sample will need to be taken from the batch.

9. Sampling records

The following information should be recorded at each sampling occasion in line with BSI PAS100:2018. Records should be kept on site and be available for inspection during audits:

- sampling date;
- compost grade (if screened, e.g. 0 mm to 25 mm);
- code of the batch from which the sample was taken;
- sample code (can be the same as batch code);
- information that identifies the composting process;
- name of the person who carried out the sampling;
- or
- if the sample taker is not employed by the composter, on whose behalf the sample taker is acting and his / her contact details.

A copy of the completed compost analysis request form (see section 10) maintained on site serves as a record of sampling. The only exception to this is the requirement to maintain a record of the person responsible for sampling.

10. Sample dispatch

As per the requirements of BSI PAS 100:2018, samples must be dispatched for testing within one working day of taking the sample. If a sample is to be tested for pathogens, use a service that will deliver it to the laboratory within 24 hours – the exception to this being extreme geographical locations where a 48 hour service should be used with samples dispatched on the same day as sampling. For samples not scheduled for pathogens, use a service that will deliver it to the laboratory within 48 hours.

In the event of late dispatch, the sample is deemed non-conforming to the requirements in BSI PAS 100:2018. Operators must ensure that the samples are collected from site within one working day.

The sample sent for laboratory testing must be packaged in such a way that sample characteristics are unaltered on arrival at the laboratory. The sample container must be sealed to prevent contamination, spillage or changes in sample characteristics. BSI PAS 100:2018 requires the transit of samples is to be done under cool conditions i.e. using a cool box and ice packs.

A sample label bearing the required sample information should be attached to the laboratory sample packaging/container. **The final sample sent to the laboratory must be accompanied by a completed current version of the Compost Analysis Request form which can be downloaded via the following link**

<https://www.qualitycompost.org.uk/certification/sample-testing>

Ensure that all the details are filled in appropriately without mistakes or ambiguous characters in any text. If there are omissions and/or mistakes on this form it may delay the reporting of results.

Further guidance on sample dispatch can be found via the following link

<http://www.qualitycompost.org.uk/certification/sample-testing>

A copy of this form should be generated and maintained onsite (see section 9).

11. Sample receipt at approved laboratories

The testing laboratory shall send a confirmation to the producer to acknowledge the receipt of sample(s). In absence of a sample receipt from the testing laboratory, producers should seek confirmation that the sample has been received at the laboratory and has been accepted for testing.

In the event of late reception outside of the recommended timeframes, the laboratory may accept the sample for testing but should seek confirmation from the operator.

On receipt of the test sample the laboratory will carry out checks on the sample and accompanying documentation to identify any potential issues before accepting the sample for testing for certification purposes. The sample should also be sent in a cool box with cool packs. The laboratory shall inform the producer should they find any issues with the sample.

Glossary of terms

Batch – material processed under the same conditions. Either a single batch processed together from start to finish or several sanitised portions subsequently combined for maturation

Combined sample – prepared by mixing multiple incremental samples of equal size for sending to the laboratory for testing

Consumable – material used once or a limited number of times for sampling

Incremental sample – a discrete sample taken from a single point on the pile, grab sample during discharge/loading or from a single packet

Portion of production – can be considered comparable with ‘batch’ based on BSI PAS100:2018