

Introduction to PAS 100:2005



Summary of the BSI specification for composted materials

the sign
of quality compost





When you see this certification mark, you can be assured that the compost you are buying is produced to the high standard set by the BSI Publicly Available Specification for Composted Materials (BSI PAS 100).

Buy compost of the highest possible standard

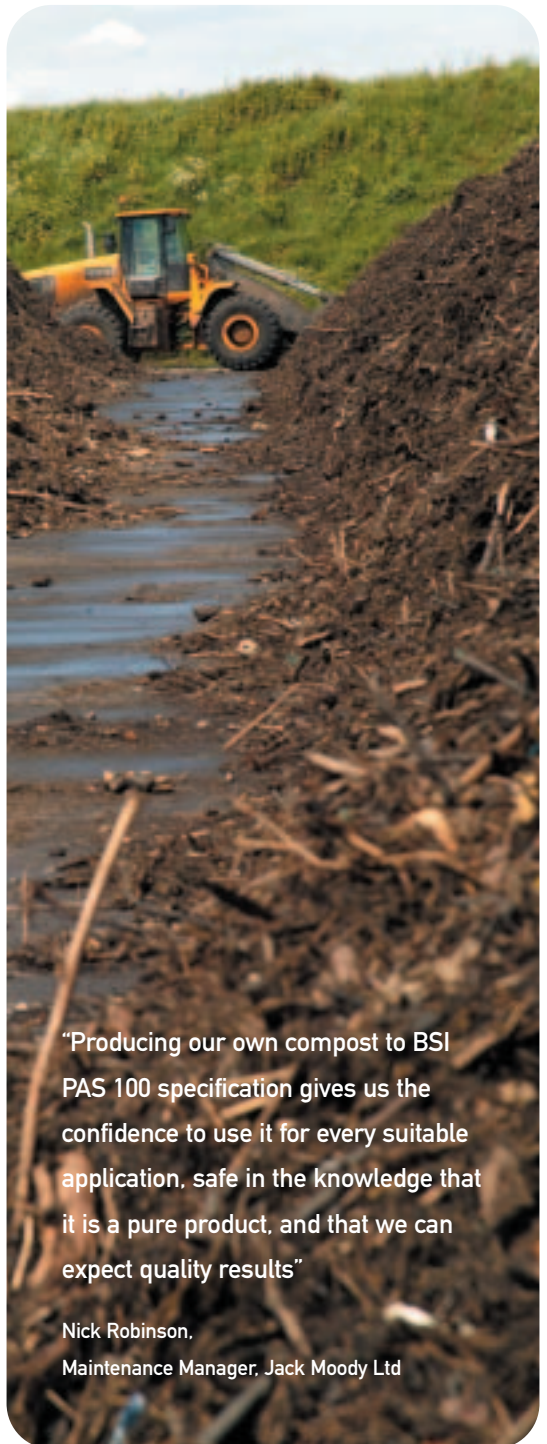
This specification covers the entire process by which compost is produced: from raw materials and production methods, through to quality control and lab testing. It means that the composts certified by The Composting Association are quality assured, traceable, safe and reliable.

The Composting Association Certification Scheme is the only UK scheme providing third party assessment of conformity with BSI PAS 100. The process is reassuringly rigorous and compost producers are inspected annually.

It's well worth it and gives confidence to end users and specifiers.

Beneficial effects of using compost

- Improving the soil structure and creating a better root environment for plants
- Increasing moisture infiltration and moisture holding capacity in lighter soils
- Providing a variety of nutrients (some in slow release forms) often reducing the need for fertilisers
- Providing organic matter to improve soil structure
- Supplying beneficial bacteria which assist nutrient uptake and help suppress soil borne diseases
- Improving plant health, from germination, through growth and to maturity
- Improving resistance to soil compaction and erosion
- Improving the control of weeds when coarse particle grades are used as a mulch



“Producing our own compost to BSI PAS 100 specification gives us the confidence to use it for every suitable application, safe in the knowledge that it is a pure product, and that we can expect quality results”

Nick Robinson,
Maintenance Manager, Jack Moody Ltd



How the product is made

Recycled green and woody plant materials are composted at sites throughout the UK to produce a well decomposed, crumbly, soil-like product that is a good source of organic matter and nutrients, and can be beneficially applied to most soil types.

The process involves a period of rapid decomposition and self-heating which

sanitises the material followed by a cooler, slower decay of the woodier plant organic matter. When the composting process is complete, the compost is graded to achieve a suitable particle size.

Compost is sampled and tested to ensure the product conforms to the compost specification PAS 100 and is fit for use.

More information online, visit our comprehensive website; FAQ...Organics newsletter... Finding a supplier and more...

On the WRAP website you will find a huge amount of information on all aspects of compost. Whether you're looking for a supplier, or you need detailed technical information – all the latest news, facts and guidance can be found at: www.wrap.org.uk/materials/organics

Table 1 – elements covered by BSI PAS 100

Key element	Summary description
Process control	<ul style="list-style-type: none"> • A process control system supported by accurate record keeping and document control procedures must be in operation throughout the composting process • The process control system must use composting and product batch codes to ensure identification of composting material through the process • Compost producers must have a clearly defined quality policy • Compost producers must undertake Hazard Analysis and Critical Control Points (HACCP) analysis • Compost producers must have clearly defined Standard Operating Procedures (SOPs) covering quality management aspects of the composting process • All staff must be appropriately trained and supervised • The process control system must be regularly reviewed and updated as appropriate
Input materials	<ul style="list-style-type: none"> • Criteria must be established for the acceptance or rejection of input materials arriving at the site for composting • Activities for the storage and preparation of input materials must be recorded
Composting activity – sanitisation	<ul style="list-style-type: none"> • All input materials must be sanitised in a defined and identifiable phase (see table 2 for recommended conditions) • Temperature checks must take place every working day during the sanitisation phase • Moisture checks must take place at the start of the sanitisation phase
Composting activity – stabilisation	<ul style="list-style-type: none"> • Procedures to achieve stabilisation of all material composted must be followed
Compost quality requirements	<ul style="list-style-type: none"> • Limits for human pathogens (indicator species), potentially toxic elements, physical contaminants, stability (CO₂ evolution) and weed propagules must not be exceeded (see table 4 for minimum requirements) • Plant response when grown in compost is required to be at least 80% compared with those growing in peat controls and not show any abnormalities

Table 1 – elements covered by BSI PAS 100 continued

Key element	Summary description
Product preparation	<ul style="list-style-type: none"> • Product preparation must be described in the SOPs document, including: criteria for composted material unsuitable for product preparation; the options for distribution, treatment or disposal; and how such decisions will be recorded when the product is unsuitable
Compost maturation	<ul style="list-style-type: none"> • SOPs must describe any maturation phase applicable to any compost grade produced
Compost sampling and analysis	<ul style="list-style-type: none"> • Compost must be sampled and tested when the batch has completed the composting process, after screening and before any blending with other materials (see table 2 for recommended conditions) • Detailed records of sampling must be kept
Final product storage	<ul style="list-style-type: none"> • Provision must be made for final product storage including storage location, conditions and product batch identification
Classification of compost	<ul style="list-style-type: none"> • Compost produced must be classified as one of the following products: <ul style="list-style-type: none"> • soil improver • mulch • growing medium • turf dressing • topsoil (manufactured) • other (as specified by the producer)
Labelling and marking	<ul style="list-style-type: none"> • The compost recipient must receive the following information: <ul style="list-style-type: none"> • Product type (see classification categories above) • Nominal particle size grade • Quantity • Moisture content • Input material types to the composting process • PAS 100 conformity declaration • Information that enables traceability checks (e.g. Product batch code) • Instructions for storage and use • Advice on risks and appropriate precautions for safe handling and use • Contact details of the producer/supplier
Monitoring and traceability	<ul style="list-style-type: none"> • Processes for monitoring, composting-and product-batch identification, and control of non-conforming composting material must be in place

Table 2 – PAS 100 regime for eradication of selected pathogens during sanitisation

The sanitisation step serves as the control for human, animal and plant pathogens. Table B.1 (in the BSI PAS100:2005 document) provides recommendations for how to achieve sanitisation and this information is reproduced below. It is the responsibility of the composter to carry out a sanitisation step, as appropriate to intended users of the compost grades, input material types and capabilities of the composting system.

Temperature	Time ^a	Moisture	Mixing/turning ^b
≥65 C	7 days	≥ 50 % mass/mass	≥ 2 times

a – not necessarily consecutive days

b – applicable if necessary for exposing the entire batch to sanitising conditions, in systems where the batch remains static when in-vessel, insulation may be necessary

Table 3 – Minimum frequency for compost sampling and testing

Parameter	Minimum number of representative samples per quantity of compost produced	
	Validation	On-going activities
Pathogens (human and animal indicator species) in ABP compost	As specified by the competent authority in the 'approval in principal'	As specified by the competent authority, specific to the approved process
Pathogens (human and animal indicator species) in Non-ABP compost	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner
Potentially Toxic Elements	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner
Stability/maturity (microbial respiration rate)	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner
Physical contaminants and stones	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner
Plant response	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner
Weed seeds and propagules	3 consecutive batches	1 per 5,000 m ³ or 1 per 12 months whichever occurs sooner

Table 4 – Minimum compost quality for general use

Parameter	Test Method	Unit	Upper Limit
Pathogens (human and animal indicator species) Product preparation			
<i>Salmonella</i> spp	ABPR 2003, schedule 2, part II or BS EN ISO 6579	25g fresh mass	Absent
<i>Escherichia coli</i>	BSI ISO 11866-3	CFUg ⁻¹ fresh mass	1000
Potentially toxic elements			
Cadmium (Cd)	BS EN 13650 (soluble in aqua regia)	mg kg ⁻¹ dry matter	1.5
Chromium (Cr)	BS EN 13650 (soluble in aqua regia)	mg kg ⁻¹ dry matter	100
Copper (Cu)	BS EN 13650 (soluble in aqua regia)	mg kg ⁻¹ dry matter	200
Lead (Pb)	BS EN 13650 (soluble in aqua regia)	mg kg ⁻¹ dry matter	200
Mercury (Hg)	BS ISO 16772	mg kg ⁻¹ dry matter	1.0
Nickel (Ni)	BS EN 13650 (soluble in aqua regia)	mg kg ⁻¹ dry matter	50
Zinc (Zn)	EN 13650 mg (soluble in aqua regia)	kg ⁻¹ dry matter	400
Stability/maturity			
Microbial respiration rate	ORG0020	mg CO ₂ /g organic matter/day	16
Plant response			
Germination and growth test	BSI PAS 100: 2005, Annex D	Reduction in germination of plants in amended compost as % of germinated plants in peat control	20

Table 4 – Minimum compost quality for general use

Parameter	Test Method	Unit	Upper Limit
Plant response			
		Reduction of plant mass above surface in amended compost as % of plant mass above surface in peat control	20
		Description of any visible abnormalities	No abnormalities
Weed seeds and propagules			
Germinating weed seeds or propagules regrowth	BSI PAS 100: 2005 Annex D	Mean number per litre of compost	0
Physical contaminants			
Total glass, metal, plastic and any 'other' non-stone fragments > 2mm	BSI PAS 100: 2005, Annex E	% mass/mass of 'air-dry' sample	0.5 (of which 0.25 is plastic)
Stones			
Stones > 4mm in grades other than 'mulch'	BSI PAS 100: 2005, Annex E	% mass/mass of 'air-dry' sample	8
Stones >4mm in 'mulch' grade			16

Next steps

To obtain full copies of the BSI PAS 100:2005, telephone The Composting Association on 0870 160 3270 or the WRAP helpline on **0808 100 2040**. The Composting Association can also provide template documents to help compost producers implement the requirements. Details of companies who are producing accredited compost or are undergoing the accreditation process can be viewed in the .pdf file.

http://www.wrap.org.uk/materials/organics/producing_selling/find_a_compost.html



creating markets for recycled resources

The sign of quality compost

The Publicly Available Specification 100 (PAS 100:2005) has been sponsored by the Waste & Resources Action Programme (WRAP) and developed by The Composting Association (TCA), British Standards Institution (BSI) and a steering group of technical specialists. It takes account of consultation responses from composting and related industries and improves upon and supersedes PAS 100:2002, which is withdrawn.

The second edition of PAS 100, published by the BSI, aims to further improve confidence in composted materials among buyers and specifiers, and help producers differentiate products that are safe, reliable and high performance. The Composting Association's Compost Certification Scheme provides independent assessment of conformance with BSI PAS 100 and awards use of its compost quality mark for each compliant compost.

BSI PAS 100 is for biodegradable materials that have been kept separate from non-biodegradables, and can apply to composted materials produced at centralised, on-farm and community composting facilities. It is not applicable to small scale composting operations, e.g. composting at home and at schools. The key elements covered by BSI PAS 100 are outlined in summary table 1 overleaf.

BSI PAS 100 provides a baseline standard for safety and consistency and is complemented by end-use specifications that set out additional limits required for different applications. Working with The Composting Association, the Landscape Institute and specialists in the composting and landscape industries, WRAP has developed the Compost Specifications for the Landscape Industry.

WRAP has also worked with the horticulture and composting industries to develop the Guidelines for the specification of composted green materials used as a growing media component. The guidelines were developed in association with the Growing Media Association. Both these specifications can be found at www.wrap.org.uk/organics or by contacting the WRAP helpline **0800 100 2040**.

✓ quality assured ✓ safe ✓ high performance ✓ sustainable



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