PAS 100:2018

Specification for composted materials

REAL
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Foreword

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- Zero Waste Scotland

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This PAS is not intended to restrict new developments in design and materials. Accordingly, all feedback about it and proposals for future work will be considered. It will be reviewed as and when the technical need arises or after two years, whichever is sooner. BSI reserves the right to withdraw or amend this PAS on receipt of authoritative advice that it is appropriate to do so.

Due acknowledgment is given to the Food and Agriculture Organization of the United Nations (FAO) with regards to **3.23** to **3.27, 3.29, 3.35, 3.39, 3.40, 3.41, 3.50, 3.72, 3.80, 3.81** and text within **4.4**.

Source: Food and Agriculture Organization of the United Nations, 2009. The Codex Alimentarius Commission, *Food Hygiene (Basic Texts)* Fourth Edition, www.fao.org/docrep/012/a1552e/a1552e00.htm. Reproduced with permission, with or without modification.

Presentational conventions

The provisions of this PAS are presented in upright, roman type. Its requirements are expressed in sentences in which the principal auxiliary verb is 'shall'.

Commentary, explanation (guidance) and general informative material is presented in smaller italic type, and does not constitute normative elements (requirements). Much of this appears as notes in this PAS, each beginning with 'NOTE', and other such material appears in the annexes marked 'informative'.

Conformity and certification

Marking PAS 100:2018 on or in association with compost represents a composter's declaration of conformity, i.e. a claim by or on behalf of the composter that the requirements of this PAS have been met. The accuracy of the claim is therefore solely the responsibility of the person or organization making the claim. Such a declaration is different from third party certification of conformity with this PAS. Composters should note the Compost Quality Protocol's (QP) requirement for third party certification when demonstrating that compost derived from controlled biowaste is no longer subject to waste regulatory controls (see Introduction's **0.2**, fourth paragraph).

Contractual and legal considerations

This PAS does not purport to include all the necessary provisions of a contract. Composters and any other parties who use this PAS are responsible for its correct application.

Compliance with a PAS does not in itself confer immunity from legal obligations. Neither does certification of conformity by a third-party.

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NOTE 1 *In England and Wales, processes that compost controlled source segregated biowastes are required under legislation to have an authorization to operate or register an exemption from authorization. An example of an authorization is an environmental permit (permits include waste management licences and exemptions issued prior to 6 April 2008 when the environmental permitting regulations [7] came into effect).*

NOTE 2 *In Scotland and Northern Ireland, processes that compost biowastes must have a Waste Management Licence (WML) or register an exemption from licensing (see [8] & [9] for Scotland and [10] for Northern Ireland). For facilities treating Category 3 Animal By-Products, a Pollution, Prevention and Control Permit (PPC) may be required (see [9] for Scotland and [11] for Northern Ireland).*

NOTE 3 *The use of composts made from controlled, source segregated biowastes is subject to environmental permitting in England and Wales [7], or waste management licensing regulations in Scotland [8] & [9] or Northern Ireland [10] & [11]. However, see* **0.2** *of the Introduction of this PAS for circumstances in which composts derived from controlled biowastes may be transported, stored and used without waste regulatory controls.*

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0 Introduction

0.1 Use of composts

Composts derived from source segregated biodegradable materials and wastes are used in agricultural, horticultural, land restoration, soft landscaping, sports recreation, and other markets in the UK. According to their grade (in terms of particle size range) and other properties, composts are supplied for use as soil improvers and mulches, as substrates for growing media, and as a significant ingredient in manufactured topsoils and turf dressings. Awareness of suitable uses for composts, the associated benefits and compost availability has improved considerably in recent years. Provisions for investment in composting are now routinely made with compost quality and potential markets in mind.

0.2 Waste recovery

Efforts are being made to significantly reduce the millions of tonnes of biodegradable waste that are landfilled every year in the UK. The composting of biodegradable wastes prior to their landfill helps reduce later generation and emissions of methane. This benefit is maximized when composted material is permanently diverted from landfill and is of sufficient quality for supply to diverse markets.

The production, transport, storage and use of composts derived from controlled biowastes is subject to waste management controls and pollution prevention regulations, according to the country in which those activities take place.

Uncertainty over the point at which waste has been fully recovered and ceases to be waste within the meaning of Article 3(1) of the EU Waste Framework Directive (2008/98/EC) [12] has inhibited the development and marketing of materials produced from waste which could be used beneficially without damaging human health and the environment. Interpretation of EU legislation is ultimately a matter for the European Court of Justice and there is now a substantial body of case law on the interpretation of the definition of waste in Article 3(1) of the Waste Framework Directive. Drawing on the principles established in this case law, it is possible to identify the point at which certain wastes cease to be waste and thus when the Waste Framework Directive's waste management controls no longer apply. It is now possible to specify a set of criteria for the product of a waste treatment process such that, if they are met, the product will no longer be regarded by the relevant regulatory authorities as waste.

In countries that have adopted the Compost Quality Protocol (QP) [a] once biowaste-derived compost has been produced in compliance with the Compost QP (which includes conformance with PAS 100) and provided it is destined for use in a market designated in the Compost QP, it is not normally subject to waste regulatory controls. In a UK country that has not adopted the Compost QP, biowaste-derived compost may no longer be subject to waste regulatory controls when PAS 100's requirements and any additional conditions set by the regulatory authority have been met. In countries that have adopted the Compost QP, third party certification of conformity to PAS 100 and the Compost QP is necessary for biowaste-derived compost to no longer be subject to waste regulatory controls. In Scotland, where the Compost QP has not been adopted, the regulatory authority requires certification of conformity to PAS 100, amongst the additional conditions the authority has set for biowaste-derived compost to no longer be subject to waste regulatory controls. Those considering transporting, storing and using biowaste-derived composts outside of waste regulatory controls in a UK country should check the position of that country's regulatory authority responsible for protection of the environment.

Whilst compliance with this PAS (and the Compost QP in countries that have adopted it) helps composters demonstrate due diligence in the recovery of biodegradable waste materials, it does not exempt the compost from regulations, measures and good practices that apply to both waste and non-waste materials, such as the Animal By-Products Regulations, groundwater protection controls, and the Action Programme of Measures for Nitrate Vulnerable Zones (see references in the Bibliography).

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Those who use composts on agricultural land in England or Wales should ensure that the relevant parts of the Codes of Good Agricultural Practice for the Protection of Water, Soil & Air, are followed (see [e] for England and [f] for Wales). Similarly, those who use composts on agricultural land in Scotland should ensure that the relevant parts of the Prevention of Environmental Pollution from Agricultural Activity Code of Good Practice [g] are followed. End users of composts on agricultural land in Northern Ireland should ensure that the relevant parts of the Code of Good Agricultural Practice for the Prevention of Pollution of Water, Air and Soil [h] are followed.

This PAS is a non-statutory document so does not set regulatory limit values for the use of composts as "wastes".

0.3 Control of hazards

Compost can have properties that are hazardous when it is handled and used, consequently PAS 100 specifies its minimum quality, such that any risks associated with its handling and general use are limited to acceptable levels, when compost is handled and used as per good practice. In support of this, PAS 100 requires the composter to have a Safety and Quality Control System including Hazard Analysis and Critical Control Point (HACCP) planning, operate a Quality Management System (QMS), and supply clear information to the customer.

0.4 Changes from previous edition

PAS 100:2018 incorporates references to new legislation, guidelines and scientific reports. There have been some definitions updated and a definition of 'customer', 'end user' and 'laboratory' added.

It continues to require the composter's commitment to supply composts that are fit-for-purpose. This is incorporated in a new clause (see **4.2**) regarding the requirement for compost to be fit-for-purpose and the compost producer agreeing (in writing) with the customer any additional or more stringent parameters than in tables 3 and 4.

The HACCP section has be re-written to extend the requirements. This includes having a team approach to developing a Safety and Quality control system with a requirement to consider hazards affecting quality as well as safety relevant to the intended use.

PAS100:2018 introduces a requirement to have an index of Quality Management System documents. It also introduces the requirement for operators to demonstrate ongoing competence (see **4.5.3**).

With regard to input materials, the clause about waste wood (see **5.1.5**) has been re-worded to allow only untreated waste wood as an input material. It requires deliveries of input materials to be inpected and checked against the acceptance criteria defined by the producer.

When using automated monitoring equipment on insulated aerated static piles, PAS100:2018 recommends that the monitoring point should be moved on every monitoring occasion.

PAS100:2018 requires that when compost is stored for a period of six months or longer, that the compost is re-assessed for compliance with the requirements of **4.2** and the re-assessment is recorded.

The minimum frequency for routine compost sampling and testing can either be measured in cubic metres (as in PAS100:2011) or in tonnes.

After validation, no sampled batch of compost shall be dispatched for use until after the test results have been checked for conformance to PAS 100 (see **14.4**).

There has been additional recommendations for soil sampling added to Annex B. A new informative annex (Annex D) has been added, which includes an extract from the renewable fertilizer matrix regarding recommendations for using compost in different applications.

0.5 Supplementary requirements

Those manufacturing or specifying products with technically demanding requirements can require compost with specific characteristics. Their requirements can cover a wider range of parameters or demonstrate higher quality than the minimum specified in this PAS. Examples include composts used as an ingredient in turf dressings and growing media, which are normally enhanced by compost maturation before it is dispatched for use (see Annex C for guidance).

Organic food and farming standards include restrictions on biowaste types from which composts may be made, if they are intended to be used within such organic systems. In the UK, the Department for Environment, Food and Rural Affairs maintains information about standards and certification schemes for organic land management and crop production systems including the use of composts.

NOTE *Further information is available at https://www.gov.uk/guidance/organic-farming-how-to-get-certification-and-apply-for-funding*

The composter is responsible for checking and meeting any supplementary criteria that compost customers require.

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1 Scope

This Publicly Available Specification (PAS) specifies requirements for the process of composting, the selection of input materials, the minimum quality of composted materials and the storage, labelling and traceability of compost products. It specifies requirements for a Quality Management System (QMS) for the production of composts to ensure they are consistently fit for their intended uses. It also requires a Safety and Quality Control System, including Hazard Analysis and Critical Control Point (HACCP) assessment, which the composter takes into account when developing, implementing and reviewing the QMS.

NOTE 1 *HACCP assessment identifies relevant hazards and establishes critical control points and critical limits for ensuring that any risks associated with product use are controlled within acceptable limits.*

This PAS is for composts from a composting system into which only source segregated biowastes (see **3.66** and **3.9**) and/or biodegradable non-waste materials are fed.

Inputs to the composting process are allowed to include digestate (whole digestate, separated fibre or separated liquor) from an anaerobic digestion facility that processes only source-segregated biowastes and/or biodegradable materials as inputs, that is compliant with PAS 110 (see **5.1.6** and its notes).

Digestate (whole digestate, separated fibre or separated liquor) from a non-PAS 110 anaerobic or aerobic digestion process is only allowed to be added to a PAS 100 composting process if the digestate is made only from input materials allowed by PAS 100 (see **5.1.6** and its Notes).

NOTE 2 *See [c] in bibliography, section "References to documents that are not legislation". If in future PAS 110 includes Thermophilic aerobic digestion (TAD) (see **3.74**) within its scope and the digestate from such a process complies with PAS 110, the digestate would be an eligible input material to a PAS 100 composting process.*

NOTE 3 *Attention is drawn to legislation that controls the use of digestates and the digestion process facilities that produce them (see **5.1**). The production quality management and direct use of digestates in soil conditioning and other applications is specified in PAS 110:2014, where they are made using an anaerobic digestion process.*

This PAS allows a composting process to utilize thermophilic aerobic digestion (TAD, see **3.74**) for its sanitization step instead of aerobic composting (see Clause **7** Table 1) and the resulting compost can be claimed compliant with this PAS if all requirements are met. However, any whole digestate or separated liquor output arising from the TAD step that is not utilized in a subsequent aerobic composting step to form compost (see **3.17**) is not allowed to be claimed compliant with this PAS.

NOTE 4 *Requirements for the minimum quality of composts specify upper limits for human and animal pathogen indicator species, potentially toxic elements, microbial respiration rate (stability), physical contaminants, stones, and weed propagules. They also specify minimum plant response in a germination and growth test.*

This PAS does not specify tests for specific or indicator plant pathogens due to a lack of validated methods.

NOTE 5 *Annex B provides recommendations on composting temperature, moisture and duration that indicate a composting environment that can eradicate plant pathogens. It also includes reference to the Food and Environment Research Agency's Code of practice for the management of agricultural and horticultural waste [k] and the European and Mediterranean Plant Protection Organization's Guidelines for the management of plant health risks of biowaste of plant origin [l].*

PAS 100 is applicable to product-oriented composting processes and the composter is responsible for establishing and consistently fulfilling any additional quality needs the customer has.

Vermi-composting is within the scope of this PAS where it follows a sanitization step of thermophilic aerobic composting or TAD (see **6.3**).

PAS 100 does not apply to composting activities that do not require registration with the regulator, such as composting at home.

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