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PAS 110:2014

Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials



Working together for
a world without waste



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Foreword

This PAS was sponsored by WRAP (Waste & Resources Action Programme). Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 July 2014.

Acknowledgement is given to the following organizations that were involved in the development of this PAS as members of the steering group:

- Anaerobic Digestion Operators Working Group (ADOWG);
- Anaerobic Digestion & Biogas Association (ADBA);
- Andigestion Ltd
- Biofertiliser Certification Scheme (BCS);
- Chartered Institution of Wastes Management (CIWM);
- Earthcare Technical Ltd;
- Environment Agency;
- Environmental Services Association (ESA);
- Natural Resources Wales;
- NRM Laboratories (a division of Cawood Scientific Ltd);
- Red Tractor Assurance;
- Renewable Energy Association (REA);
- Scottish Environment Protection Agency (SEPA);
- SFQC;
- Welsh Government;
- WRc plc; and
- WRAP.

Acknowledgement is also given to the members of a wider review panel who were consulted in the development of this PAS.

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This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

The PAS process enables a specification to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further

development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

Supersession

This PAS supercedes PAS 110:2010, which is withdrawn.

Information about this document

Marking "PAS 110:2014" on or in relation to whole digestate, separated liquor or separated fibre represents a producer's declaration of conformity, i.e. a claim by, or on behalf of, the producer 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.

Producers who use this PAS are advised to apply for, and obtain, third-party certification of product conformity with this PAS.

Producers and users seeking the relevant certification body, or bodies, may ask BSI to forward their enquiries to the relevant organizations.

Use of this document

It has been assumed in the preparation of this PAS that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this PAS are presented in roman (i.e. upright) 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 italic type, and does not constitute a normative element (requirement). Much of this appears as Notes in this PAS, each beginning with "NOTE".

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Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a PAS cannot confer immunity from legal obligations.

In addition to the requirements of this PAS, attention is drawn to the following statutory requirements, the *Codes of Good Agricultural Practice* and the Anaerobic Digestate Quality Protocol (ADQP), some of which are also referred to in the Introduction:

- Environmental Protection Act 1990 (as amended) [1];
- The Waste (England and Wales) Regulations 2011 [2];
- Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation) [3];
- Commission Regulation (EU) No 142/2011 of 25 February 2011 implementing Regulation (EC) No 1069/2009 of the European Parliament and of the Council laying down health rules as regards animal by-products and derived products not intended for human consumption and implementing Council Directive 97/78/EC as regards certain samples and items exempt from veterinary checks at the border under that Directive, and subsidiary UK legislation [4];
- *Protecting our Water, Soil and Air – A Code of Good Agricultural Practice for farmers, growers and land managers*, Department for the Environment (England), 2009 [5];
- *The Code of Good Agricultural Practice For the Protection of Water, Soil and Air for Wales*, Welsh Assembly Government (2011 No.20) [6];
- *Prevention of Environmental Pollution from Agricultural Activity, A Code of Good Practice* (PEPFAA Code), Scottish Executive (only applicable in Scotland) [7];
- The Environmental Permitting (England and Wales) Regulations 2010 (and as amended) [8];
- The Pollution Prevention and Control (Scotland) Regulations 2012 [9];
- The Waste Management Licensing (Scotland) Regulations 2011 [10];
- The Waste Management Licensing Regulations (Northern Ireland) 2003 [11];
- The Pollution Prevention and Control Regulations (Northern Ireland) 2003 [12];
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives [13];
- *Quality Protocol. Anaerobic digestate. End of waste criteria for the production and use of quality outputs from anaerobic digestion of source-segregated biodegradable waste*, (Environment Agency) [14];
- General requirements (food hygiene). *Codex Alimentarius Principles of the HACCP System*, FAO, 2003 [15].



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0 Introduction

0.1 What is anaerobic digestion?

Well-managed anaerobic digestion (AD) systems are capable of conferring multiple environmental and socio-economic benefits. This type of biological treatment technology has become well established in some countries of the European Union but is currently under-utilized in the UK. AD is an important technology for the local recovery of source-segregated biowastes, especially those that arise as liquids and the more putrescible fractions of solid biowastes. The biogas they produce can be converted into energy for the use of the AD system itself, for local use, for supply as electricity to the national grid or for processing into biofuel for vehicles.

The whole digestate, separated liquor and separated fibre outputs that AD systems can produce have significant fertilizer value and can return useful amounts of organic matter to soils. Such digested materials are particularly suitable for maintaining and improving soil fertility and function. Benefits of these kinds can effect particular value in agriculture, soil-grown horticulture (field and some covered crops grown in soil), forestry, land restoration, land reclamation and land remediation applications.

NOTE See *Clause 3* for definitions of the terms “whole digestate”, “separated liquor” and “separated fibre”.

The whole process of AD and the controlled application of digestates reduces the environmental impact of manures and biowaste streams by lowering methane emissions and controlling odours. Such applications have the potential to reduce nitrogen losses to groundwater, surface water and the atmosphere.

The volume of digestates is increasing significantly as industry responds to the latest strategies in the nations of the UK for diverting biowastes from landfill [2], and to other policy initiatives and measures geared to developing the supply of renewable energy, tackling climate change and protecting soils.

0.2 What is PAS 110?

The purpose of this PAS is to remove a major barrier to the development of AD, namely, by encouraging markets for digestates. It is an industry specification against which producers can check that the digestates are of consistent quality and fit for purpose. This PAS, together with other supply and demand market development measures, should encourage more sustainable practices in the management of biowastes and biodegradable materials.

This PAS is a fast-track precursor to a potential future British Standard. This voluntary, industry-led specification sets out the minimum quality required for whole digestate, separated liquor and separated fibre that might be used as fertilizer or soil improver/conditioner. Meeting its quality and other criteria enables the producer to demonstrate compliance with this PAS.

0.3 Obligations under relevant regulations

This PAS is a non-statutory document and does not set regulatory limit values for the quality and use of digestates (whole digestate, separated liquor and separated fibre). All producers are required to comply with all applicable legislation, irrespective of whether or not the whole digestate, and any separated liquor and fibre, conforms to this PAS.

Whilst compliance with this PAS helps producers to demonstrate due diligence in the recovery of controlled, source-segregated biowastes, it does not exempt the digestion facility or its digestates from environmental or health protection regulations (see references in the Foreword). The production and use of digestates derived from controlled biowastes is subject to environmental permitting or waste management licensing regulations, according to the country in which the AD process is located and the digestate is used.

In England and Wales, processes that digest controlled, source-segregated biowastes must have an authorization to operate, or an exemption. An example of an authorization is an environmental permit [8] (permits include waste management licences

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and exemptions issued prior to 6 April 2008 when the environmental permitting regulations came into effect). In Scotland, processes that treat biowastes must have a Waste Management Licence (WML) or an exemption from licensing.

In some circumstances, pollution prevention and control regulations ([9] and [12]) also apply; facilities treating more than a threshold amount of Category 3 animal by-products are to have a Pollution Prevention and Control Permit (PPC).

The use of digestates made from controlled, source-segregated biowastes is subject to environmental permitting (in England and Wales) [8] or waste management licensing regulations (in Scotland) [10]. However, in countries that have adopted the Anaerobic Digestate Quality Protocol (ADQP) [14], there might be a case for digestates to be exempted from the environmental permitting/waste management regulations that control their use, if the ADQP requirements are met. Those requirements include independent certification of conformance to this PAS. In such circumstances, restrictions on digestate end-use markets apply.

Enquiries about ADQP applicability in a specific country should be addressed to its agency responsible for protecting the environment. Whatever the circumstances, land managers should follow the relevant parts of the *Codes of Good Agricultural Practice* for the protection of air, water and soils [5 if in England, 6, if in Wales, or 7, if in Scotland], or any superseding publications.

0.4 How does PAS 110 work?

PAS 110's Clause 1 states which digested materials are within or outside its scope. This PAS's requirements begin at Clause 4 on the topic of quality management systems and continue in Clause 5 on the topic of hazard analysis and critical control point (HACCP) planning. The subsequent clauses follow a digestate production sequence, beginning with requirements for the input materials, progressing to process management controls and monitoring, and then to digestate sampling, testing, validation checks and information for end users. Such information enables appropriate use of digestates, minimizing the risks of environment pollution or adverse effects on humans, animals or plants.



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1 Scope

This PAS covers whole digestate from an anaerobic digestion (AD) system that accepts only source-segregated biowastes (see 3.68 and 3.8) and/or biodegradable non-waste materials (see 3.7). It also covers liquor and fibre fractions that might be produced by separating whole digestate, after the AD process.

NOTE 1 *Digestates that conform to this PAS should be suitable for use as soil improvers/conditioners, without causing harm or nuisance. They should confer beneficial effects when used, as a result of their combined physical, chemical and microbial properties (see Clause 12). Clause 12.1.1 d) requires that the digestate placed on the market is fit for purpose.*

NOTE 2 *The addition of further biowaste/ biodegradable material to separated fibre at the start of, or during, maturation is outside the scope of this PAS. In this scenario, the PAS 100, Specification for composted materials derived from source-segregated biodegradable materials might be applicable. If digestate, composted material or a blended mixture of treated, source-segregated biowastes, soil or soil-like material is placed on the market for use as a "product", it will have to meet all requirements of the relevant Quality Protocol in any country in which it applies.*

This PAS specifies:

- a) controls on input materials and the management system for the process of AD and associated technologies;
- b) that the AD system is allowed to accept packaged biowastes/biodegradable non-waste materials that are depackaged prior to AD, subject to 6.1;
- c) the minimum quality of whole digestate (see 3.83), separated liquor (see 3.65) and separated fibre (see 3.64);
- d) information that is required to be supplied to digestate (see 3.21) customers (see Clause 14).

This PAS includes a reduced range of test parameters for digestates made from specific input materials that arise within a single [or co-operative's (see 3.16)] premises or holding and that are returned for use entirely within the same premises or holding (see 11.2.4). The producers using such materials are exempt from carrying out a pasteurization step during AD (see 7.2 and 3.53). These provisions have been extended in this edition to include farming/ horticultural/forestry co-operatives (as defined in 3.16).

Exemption from the pasteurization step has also been allowed for specific input materials that arise within a single (or co-operative's) premises or holding, which are co-digested with pasteurized biodegradable materials/ wastes from outside the producer's premises or holding, provided that the digestate is returned to, and used entirely within, the originating single or co-operative's premises or holding in a way consistent with the relevant premises' or holding's animal health plan (see 7.2.5).

NOTE 3 *See 11.2.4 regarding whether the digestate can be tested according to a reduced range of parameters.*

NOTE 4 *Check the regulator's relevant position statement or briefing note regarding the circumstances in which waste regulatory controls do not apply to agricultural manures and slurries, and crops grown specifically for AD.*

This PAS requires the producer to undertake hazard analysis and critical control point (HACCP) planning (see 3.36 and Clause 5) and to implement and maintain a quality management system (QMS) (see 3.59 and Clause 4) that ensures digestates meet the minimum quality requirements set out in this PAS, and are fit for purpose.