

Anaerobic digestate

End of waste criteria for the production and use of quality outputs from anaerobic digestion of source-segregated biodegradable waste



This Quality Protocol was funded by Defra as a business resource efficiency activity. It was developed by the Environment Agency and WRAP (Waste & Resources Action Programme) in consultation with Defra, industry and other regulatory stakeholders. The Quality Protocol is applicable in both England and Wales. It sets out criteria for the production and use of quality outputs from anaerobic digestion of source-segregated biodegradable waste.

Contents

Foreword	03
1. Introduction	04
2. Producing quality digestate from anaerobic digestion of source-segregated biodegradable materials	09
3. Providing evidence that quality digestate has been produced	10
4. Application and use of quality digestate	11
Appendix A Definitions	12
Appendix B Biowaste types acceptable for the production of quality digestate	16
Appendix C Standards and specifications to which this Quality Protocol applies	21
Appendix D Important elements of a standard	21
Appendix E Certification and accreditation diagram	22
Appendix F Records to be kept for certification purposes	23
Appendix G Supply documentation	25
Appendix H Storage, application, testing and record-keeping requirements for the use of quality digestate in agriculture and forestry, excluding horticulture other than soil/field grown horticulture	26

Foreword

Background

The Waste Protocols Project is a joint Environment Agency and WRAP (Waste & Resources Action Programme) initiative in collaboration with industry, funded by the Department for Environment, Food and Rural Affairs (Defra) as a business resource efficiency activity.

Uncertainty over the point at which waste has been fully recovered and ceases to be waste within the meaning of Article 1(1)(a) of the EU Waste Framework Directive (WFD) (2006/12/EC) has inhibited the development and marketing of materials produced from waste which could be used beneficially without damaging human health and the environment. In some cases, this uncertainty has also inhibited the recovery and recycling of waste and its diversion from landfill.

Interpretation of EU legislation is ultimately a matter for the Courts and there is now a substantial body of case law on the interpretation of the definition of waste in Article 1(1)(a) 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. This identification is the purpose of the Waste Protocols Project.

More specifically, depending on the circumstances of the waste stream concerned, the project seeks to achieve the following outcomes:

- to produce a Quality Protocol identifying the point at which waste, having been the subject of a complete recovery operation, may become a non-waste product or material that can be either reused by business or industry, or supplied into other markets, enabling such fully recovered products to be used without the need for waste management controls; and
- to produce a statement that confirms to the business community what legal obligations they must comply with to use the treated waste material.

What is a Quality Protocol?

A Quality Protocol sets out criteria for the production of a product from a specific waste type. Compliance with these criteria is considered sufficient to ensure that the fully recovered product may be used without undermining the effectiveness of the Waste Framework Directive and therefore without the need for waste management controls. In addition, the Quality Protocol indicates how compliance may be demonstrated and points to best practice for the use of the fully recovered product. The Quality Protocol and good practice will ensure that the aims of the Waste Framework Directive are not undermined.

The Quality Protocol further aims to provide increased market confidence in the quality of products made from waste and so encourage greater recovery and recycling.

1. Introduction

1.1 What is this Quality Protocol?

- 1.1.1 This Quality Protocol has been developed by WRAP (Waste & Resources Action Programme) and the Environment Agency in consultation with industry and other regulatory stakeholders. It is applicable in both England and Wales.
- 1.1.2 The Quality Protocol sets out criteria for the production of *quality outputs from anaerobic digestion* of material that is biodegradable waste (*biowaste*). Quality outputs from *anaerobic digestion* include the *whole digestate*, the separated fibre fraction and the separated liquor. If these criteria are met, quality outputs from anaerobic digestion will normally be regarded as having been fully recovered and to have ceased to be waste.
- 1.1.3 *Producers* and *users* are not obliged to comply with the Quality Protocol. If they do not, the quality outputs from anaerobic digestion (hereafter referred to as quality digestate) will be considered to be waste and *waste management controls* will apply to their handling, transport and application.
- 1.1.4 Definitions of terms that appear in *italics* when they are first used in this Quality Protocol are given in Appendix A.

1.2 The purpose of the Quality Protocol

- 1.2.1 This Quality Protocol has three main purposes:
- to clarify the point at which waste management controls are no longer required;
 - to provide users with confidence that the quality digestate they purchase conforms to an *approved standard*; and
 - to protect human health and the environment (including soil) by describing acceptable good practice for the use of quality digestate in *agriculture, forestry, soil/field-grown horticulture* and in *land restoration*.

1.3 Complying with the Quality Protocol

- 1.3.1 Quality digestate will normally be regarded as having ceased to be waste, and therefore no longer subject to waste management controls, provided it:
- has been produced using only those source-segregated *input materials* listed in Appendix B;
 - meets the requirements of an approved standard; and
 - is destined for appropriate use in one of the *designated market sectors*.

Quality digestate must not be used in such a way as to adversely affect human health or the environment.

- 1.3.2 Producers must demonstrate that these criteria have been met. They must do this in the ways set out in Section 3, that is:
- by obtaining *certification* from an *approved certification body*; and
 - by producing and keeping copies of customer supply documentation that includes a declaration that the quality digestate meets both the approved standard and the Quality Protocol.

- 1.3.3 Producers should note that, regardless of whether the criteria set out in 1.3.1 are met, the anaerobic digestion of waste materials (or a mixture containing any waste materials) and the burning of the resulting biogas as a fuel will continue to be covered by an *environmental permit* or exemption.
- 1.3.4 If quality digestate which is compliant with this Quality Protocol is mixed with non-waste materials the blend will not be waste. However, regulatory controls (other than waste management controls) may apply to the blending activity, e.g. where the quality output from anaerobic digestion is transferred to a brownfield site to be mixed with soils to improve their quality.
- 1.3.5 If quality digestate, which is compliant with this Quality Protocol, is mixed with a waste, the resulting blend will all be waste.
- 1.3.6 Digestate (whole digestate, separated fibre or separated liquor) can be used in compost as an input material or process additive. If the compost being produced is to meet the requirements of the Compost Quality Protocol¹ the digestate does not need to be certified as compliant with this Quality Protocol, but must be derived only from input materials specified in Appendix B of this Quality Protocol. If the digestate is produced from other input materials, the compost to which it is added will be considered to be a waste.
- 1.3.7 Unless the digestate meets the requirements of this Quality Protocol, it will be considered to be waste, and should be transported, handled and used in accordance with waste management controls.
- 1.3.8 Figure 1 explains which Quality Protocol you should comply with and how outputs from one can be fed into the other.

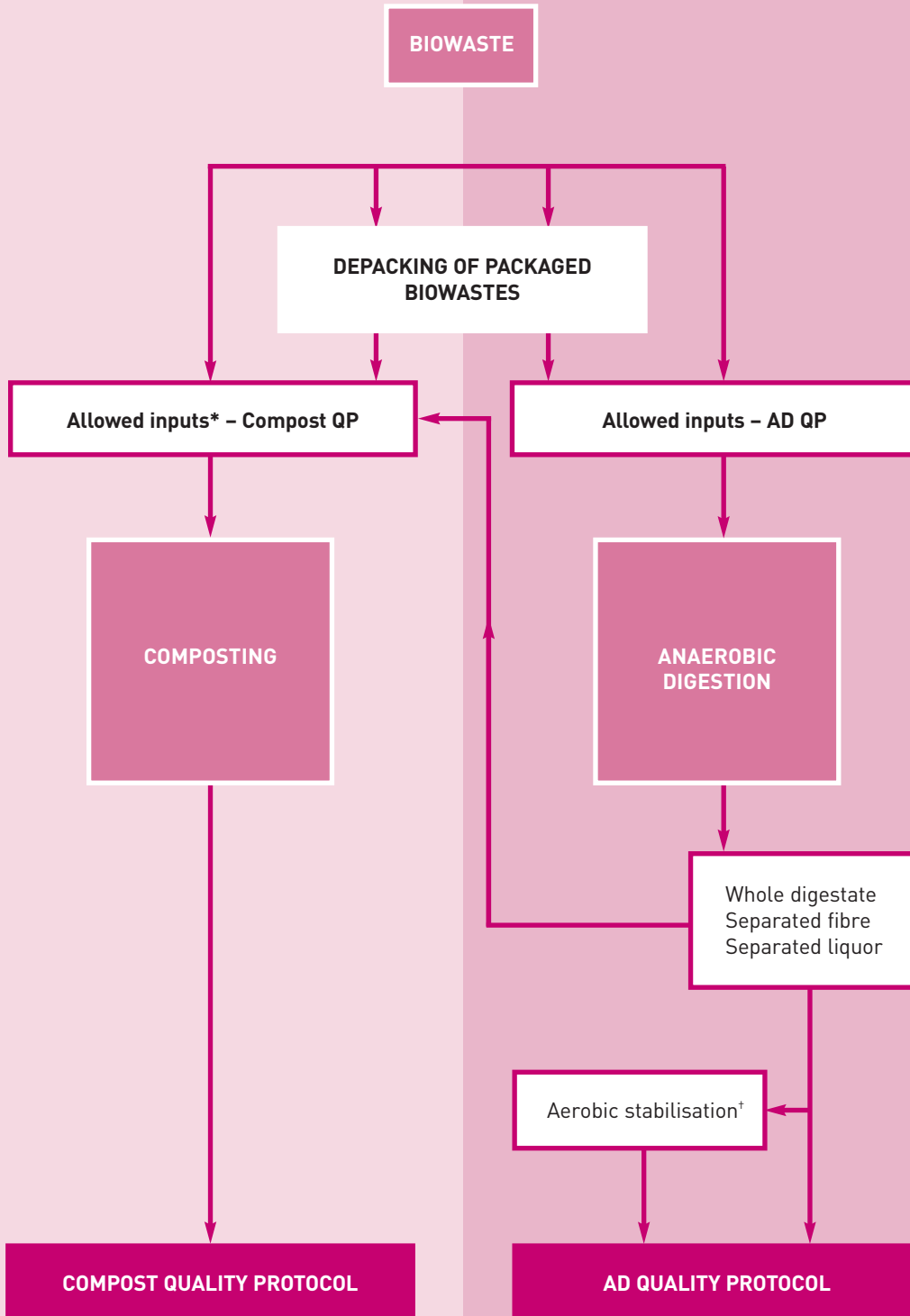
1.4 Failure to comply with the Quality Protocol

- 1.4.1 Where this Quality Protocol is not complied with, for example the digestate does not meet an approved standard or the producer cannot demonstrate evidence of compliance, the digestate produced will be considered to be waste. In such circumstances, the producer/user must comply with the appropriate waste management controls² for the transportation, storage and use of the digestate and will be committing an offence if they do not do so.
- 1.4.2 Detailed guidance on waste management controls can be obtained from the Environment Agency's National Customer Contact Centre on 08708 506 506 or from its website www.environment-agency.gov.uk/subjects/waste
- 1.4.3 It must be demonstrated that the quality digestate will actually be used in one of the designated market sectors. Producers and users of quality digestate should note that, even if the Quality Protocol is complied with, the material will become waste again and subject to waste management controls if the holder discards, intends or is required to discard, for example if at any stage it is:
- disposed of; or
 - stored indefinitely with little or no prospect of being used.

¹The Quality Protocol for the production and use of quality compost from source segregated biodegradable waste, 2009, Environment Agency and WRAP.

²For example, in compliance with Article 11 of the WFD the user might need to register an exemption/apply for a permit with the Environment Agency.

Figure 1 Showing relationships between the two Quality Protocols



*If digestate is used as an input, it must have been produced using Anaerobic Digestion Quality Protocol acceptable inputs.

†Separated fibre with no further material added.

1.5 Updating the Quality Protocol

- 1.5.1 We plan to review and update this document every two years from the date of issue.
- 1.5.2 However, this document may be subject to change before those review dates. Triggers for such a change could include pollution incidents, a change in the market or a change in legislation or case law. For example, the EU Animal By-Products Regulation³ (ABPR) is being revised. The Quality Protocol will be reviewed on adoption of the revised ABPR, and the associated implementing measures, to ensure continuing compliance with that legislation.
- 1.5.3 This Quality Protocol may be withdrawn if it becomes apparent that it is generally being misapplied and/or misused.
- 1.5.4 This Quality Protocol will be adopted as a technical regulation under *Technical Standards and Regulations Directive 98/34/EC* as amended⁴. We recognise that there may be codes of practice or standards which apply in *European Economic Area* (EEA) States other than the UK setting out requirements for the production and use of quality digestate. We accept that quality digestate may cease to be waste provided it has been produced in compliance with:
- a relevant standard or code of practice of a national standards body or equivalent body of any EEA State; or
 - any relevant international standard recognised for use in any EEA State; or
 - any relevant technical regulation with mandatory or de facto mandatory application for marketing or use in any EEA State.
- These must give levels of product performance, protection of human health and the environment equivalent to those required to ensure compliance with this Quality Protocol.
- 1.5.5 An outline of the main stages and control mechanisms of the Quality Protocol is presented in Figure 2. These are described further in Sections 2 and 3.

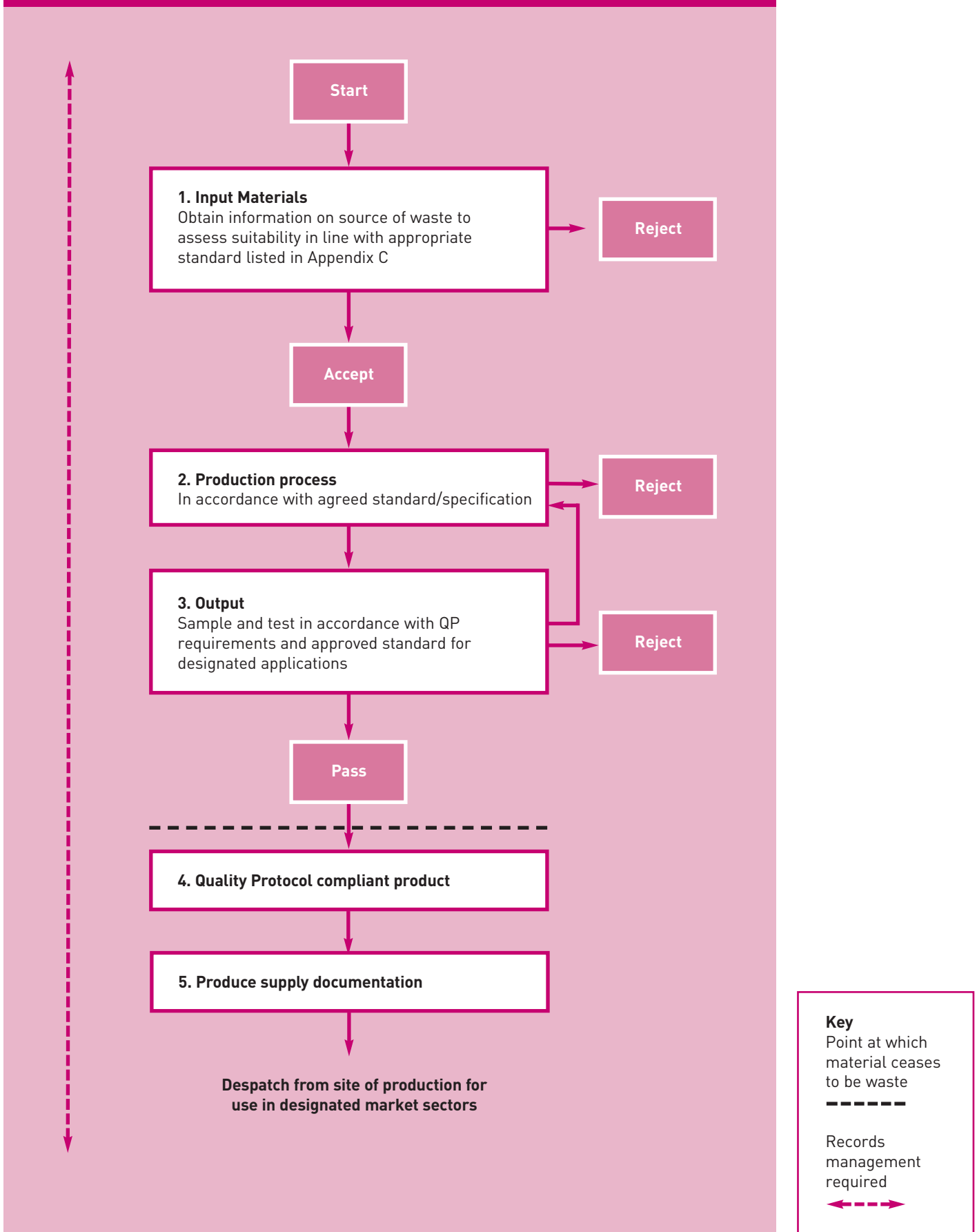
1.6 Importing and exporting Quality Protocol compliant material

- 1.6.1 Producers intending to export material that complies with this Quality Protocol should be aware that, although the material may cease to be waste in England and Wales, the country of destination may take a different view. If the competent authority in the country of destination considers the material to be waste, the shipment will be subject to the controls set out in the Waste Shipment Regulation (EC No. 1013/2006).
- 1.6.2 Those intending to import Quality Protocol compliant material into England and Wales should be aware that, if the country of despatch regards the material as waste, the controls set out in the Waste Shipment Regulation will apply to the shipment. This is the case even though the material may be regarded as having ceased to be waste in England and Wales.
- 1.6.3 Before importing or exporting such material it is prudent to check with the competent authority for the country of despatch or destination. A list of the competent authorities can be found at: http://ec.europa.eu/environment/waste/shipments/pdf/list_competent_authorities.pdf

³Regulation (EC) No 1774/2002 laying down health rules concerning animal by-products not intended for human consumption.

⁴The Technical Standards and Regulations Directive 98/34/EC seeks to ensure the transparency of technical regulations and is intended to help avoid the creation of new technical barriers to trade within the European Community.

Figure 2 Main stages and control mechanisms of the Quality Protocol



2. Producing quality digestate from anaerobic digestion of source-segregated biodegradable materials

2.1 Regulating the anaerobic digestion process

2.1.1 The process of turning waste into quality digestate is classified as a waste recovery operation and is subject to the waste management controls in the WFD. This Quality Protocol does not affect the obligation by producers to comply with all the conditions of the environmental permit that applies to the anaerobic digestion of the waste.

2.2 Criteria for producing quality digestate that has ceased to be waste

2.2.1 The following criteria must be met in order to produce quality digestate.

2.2.2 Input materials:

- i. A digester operator may accept non-waste biodegradable materials. These are not listed separately in this Quality Protocol.
- ii. Where a digester operator accepts waste materials, they may accept only those waste types listed in Appendix B and they must be source-segregated, i.e. they must have been kept separate from any other wastes and non-biodegradable materials. [The conditions of the environmental permit under which the anaerobic digestion (AD) process is carried out, or the approved standard, may further restrict the waste types that can be used.]
- iii. The transformation of any waste types listed in Appendix B that are classified as animal by-products⁵ must be carried out in a biogas plant subject to approval under Article 15 of the EU ABPR⁶ and the UK legislation making provision for the administration and enforcement of the ABPR⁷.

2.2.3 Requirements of the approved standard to be observed:

- i. The producer must also comply with all the requirements of an approved standard. Appendix C lists the only approved standard at the time of publishing this Quality Protocol. Additional standards may be approved by the Environment Agency for inclusion in this Quality Protocol when it is reviewed. Standards will be approved only if they contain the important elements set out in Appendix D.
- ii. Producers should be aware that standards are subject to regular periodic review and must ensure they comply with the latest version.

2.2.4 Designated market sectors:

Quality digestate must be destined for appropriate use within one or more of the following market sectors:

- agriculture, forestry and soil/field-grown horticulture; and
- land restoration (where only separated fibre can be used).

⁵Other than manure and milk.

⁶Regulation (EC) No 1774/2002 laying down health rules concerning animal by-products not intended for human consumption.

⁷Regulations 13 and 14 of the Animal By-Products Regulations (ABPR) 2005 in England and Regulations 13 and 14 of the ABPR (Wales) 2006 No 1293 (W.127) in Wales.

3. Providing evidence that quality digestate has been produced

3.1 Certification

3.1.1 Producers must demonstrate compliance with the requirements of this Quality Protocol and of the approved standard. Compliance can be demonstrated from an approved certification body operating according to scheme rules agreed with the Environment Agency. The approved certification body must also obtain *accreditation* on an annual basis from the United Kingdom Accreditation Service (UKAS) to BS EN 45011: 1998 *General requirements for bodies operating certification systems* (or any subsequent amendments). The certification and accreditation process is illustrated in Appendix E.

3.1.2 As part of the certification process, the producer will normally be expected to:

- keep and retain specified records for a minimum of four years; and
- make them available to the certification body for certification purposes.

Details of the records to be kept are given in Appendix F.

3.1.3 These requirements are additional to any statutory record-keeping requirements under regulatory controls. However, operators should note that some records may be used to fulfil both a regulatory and certification function.

3.1.4 Scheme rules will not be agreed by the Environment Agency unless they make provision to ensure that:

- the method of certification demonstrates that users have met both its requirements and those of the Quality Protocol;
- compliance with both the standard and the Quality Protocol are certified annually by an independent certification body accredited by UKAS to BS EN 45011: 1998 (or any subsequent updates);
- certification verifies source documentation, evidence of site management procedures (including compliance with the *quality management system*) and laboratory test results;
- the certification body or its authorised contractor carries out at least one digestion site inspection per year to verify on site documentation; and
- certification is overseen by an impartial committee, which will adjudicate on matters of non-compliance in line with the requirements of BS EN 45011: 1998.

3.2 Supply documentation

3.2.1 Producers may demonstrate that quality digestate is destined for appropriate use in a designated market sector by providing the customer with supply documentation for each consignment of quality digestate and keeping a copy of this documentation.

3.2.2 A producer is not expected to make or retain supply documentation when quality digestate is intended for the producer's own use. However, each delivery of quality digestate must be recorded and tracked to ensure that all the requirements of this Quality Protocol and the appropriate standard are adhered to, recorded, and subjected to independent audit and certification.

3.2.3 Details of supply documentation are given in Appendix G.

4. Application and use of quality digestate

4.1 Designated market sectors

4.1.1 This section provides further detail on the designated market sectors, that is:

- agriculture, forestry and soil/field-grown horticulture; and
- land restoration.

Details of the records to be kept are given in Appendix F.

4.1.2 If good practice is followed, the Environment Agency considers that quality digestate will not pose a risk to human health or the environment in the quantities and frequencies at which they are likely to be applied in these sectors. Good practice means that anyone who uses the quality digestate takes account of all potential environmental issues such as application rates, impacts on soil function, potential for water pollution, etc (full details are contained in Appendix H).

4.2 Agriculture and forestry

4.2.1 Under this Quality Protocol, quality digestate can be used in agriculture and forestry and soil/field-grown horticulture as a fertiliser or soil improver provided they are used in such a way that:

- they do not pose a risk to the environment; and
- their use does not compromise the future sustainable use of the soil to which they are applied.

4.2.2 The producer or user of the quality digestate must be able to demonstrate that full account has been taken of any environmental impact resulting from its use including the potential for the accumulation of contaminants in soil.

4.2.3 Details of good practice for the testing, record-keeping (including responsibility for record-keeping) and application of quality digestate in this sector are given in Appendices E and H.

4.3 Land restoration

4.3.1 Examples of the ways in which quality separated fibre may be used in this sector are:

- soil manufacture and/or blending operations; and
- *land reclamation*.

Appendix A Definitions

In this Quality Protocol, the words and phrases below have the following meanings:

Term	Description
Accreditation	<p>third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.</p> <p><i>Note: In the context of this Quality Protocol, this means approval from UKAS that a certification body's certification scheme for whole digestates, separated fibre and separated liquor is a thorough, fair and documented evaluation of whether the requirements have been met.</i></p>
Anaerobic digestion (AD)	<p>a process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperatures suitable for naturally occurring mesophilic or thermophilic anaerobe and facultative anaerobe bacteria species, which convert the inputs to a methane-rich biogas and whole digestate.</p> <p><i>Note: Whole digestate can confer benefits to soils to which it is applied and the plants these soils support.</i></p>
Approved certification body	<p>a third party, independent of any producer of digested materials, accredited by the United Kingdom Accreditation Service for operating a product certification scheme aligned to the requirements of this Quality Protocol.</p> <p><i>Note: These requirements include conformance to a standard/specification approved by the Environment Agency for inclusion in this Quality Protocol.</i></p>
Approved standard	<p>any standard or specification included in Appendix C and any other standard approved by the Environment Agency for inclusion in this Quality Protocol.</p>
Agriculture	<p>includes: soil/field grown horticulture and specifically excludes the use of products from anaerobic digestion exclusively as a growing medium (see definition of Horticulture (soil/field grown)); fruit growing; seed growing; livestock farming; the use of land as grazing land, meadowland, osier land, for growing arable crops (e.g. cereals, oil seed rape and some types of vegetables) and biomass grown for non-food purposes; market gardens and nursery grounds; and woodlands where the land use is ancillary to the farming of land for other agricultural purposes.</p>
Assessment/certification code	<p>a unique assessment (before certification) or certification code specific to the type of output from a specific process, awarded by the certification body to the producer of that output.</p> <p><i>Note: The whole digestate from a specific anaerobic digestion process, and any separated fibre or separated liquor fractions derived from that whole digestate, must each have a unique assessment/certification code.</i></p>
Batch	<p>quantity of material processed under similar conditions and assigned a unique code which, when fully processed, has similar characteristics throughout.</p> <p><i>Note: Digestion systems that operate on a continuous basis monitor and assess a series of 'portions of production' rather than batches. Portion size may be defined by the producer.</i></p>
Biowaste	<p>discarded material that is biodegradable.</p> <p><i>Note: In the context of this Quality Protocol, biowastes are those contained within Appendix B.</i></p>

Term	Description
Certification	<p>third-party attestation related to products, processes, systems or persons⁸.</p> <p><i>Note: In the context of this Quality Protocol, the scope of assessment by the certification body must cover a producer's outputs from the anaerobic digestion of source-segregated biowaste, the AD process, the producing organisation's quality management system and training of those persons who affect digestate quality. Certification provides verification that the product meets the approved standard and the requirements of the Quality Protocol.</i></p>
Designated market	<p>a market into which digested material, that complies with all the requirements of this Quality Protocol, can be supplied for storage and use without waste management controls being applied.</p> <p><i>Note: The designated market sectors that apply are listed in paragraph 2.2.4.</i></p>
European Economic Area (EEA)	<p>The EEA States consist of the members of the EU (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the UK) together with Iceland, Liechtenstein, Norway and Switzerland. Although the Channel Islands and the Isle of Man are part of the UK, they are not part of the EU and businesses registered there are subject to different licensing legislation.</p>
Environmental Permitting (England and Wales) Regulations ⁹	<p>a single set of regulations that replaces over 40 statutory Permitting instruments, thus streamlining the waste management licensing and pollution control regimes in England and Wales.</p> <p><i>Note: The Regulations are effective from 6 April 2008. Their implementation comprises the first phase (EPP1) of the Environment Agency, Defra and Welsh Assembly Government's Environmental Permitting Programme. Read more about the Environmental Permitting Programme on the following websites:</i></p> <ul style="list-style-type: none"> ■ Defra www.defra.gov.uk/environment/epp ■ Environment Agency www.environment-agency.gov.uk/business/1745440/1745496/1906135/
Environmental Permit	<p>Environmental permits or exemptions issued under the Environmental Permitting (England and Wales) Regulations 2007, which came into force on 6 April 2008, or a position adopted by the Environment Agency in accordance with its guidance on the regulation of low-risk activities.</p> <p>From 6 April 2008, the following automatically became environmental permits:</p> <ul style="list-style-type: none"> ■ PPC permits issued under the Pollution Prevention and Control (England and Wales) Regulations 2000 (as amended); and ■ Waste Management Licences (WMLs) issued under the Environmental Protection Act 1990 (as amended). <p>Exemptions from the need for a Waste Management Licence, registered under Regulation 18 and Schedule 3 of the Waste Management Licensing Regulations 1994 (as amended) will now come under Schedule 3 of the Environmental Permitting (England and Wales) Regulations 2007.</p>

⁸EN ISO/IEC 17000: 2004 Conformity assessment. Vocabulary and general principles.

⁹SI 2007, No. 3538; www.opsi.gov.uk/si/si2007/uksi_20073538_en_1

Appendix A Definitions

Term	Description
Forestry	the art and science of controlling the establishment, growth, composition, health, and quality of forests. <i>Note: The definition includes plantations and systems other than 'forests' for cultivating trees, timber and biomass crops.</i>
Hazard Analysis and Critical Control Point (HACCP)	a system used for the identification, evaluation and control of hazards that are significant for safety. <i>Note: In this case, the production of whole digestate separated liquor and separated fibre that can be used without harm.</i>
Horticulture	the raising of plants in soil in situ, in a field or under protective cover. <i>Note: This includes the commercial raising of plants referred to in the definition of 'agriculture' and some types of vegetables, fruit, flowers and bulbs, hardy and other nursery stock, and herbs as well as some protected crops grown in soil in situ. This excludes the professional use of digestate as a growing medium and amateur or hobby gardening and similar uses because digestate quality standards may not be suitable for potentially high rate applications in non-professional markets.</i>
Holding	all the land units managed by a farmer/land manager within the UK.
Input material	biodegradable material intended for feeding, or fed, into an anaerobic digestion process. <i>Note: See Appendix B for the List of European Waste Catalogue input material types acceptable under the Quality Protocol.</i>
Land manager	the person responsible for the exploitation of the agricultural land concerned, on his or her account, directly and/or through the use of agents or contractors.
Land reclamation	see land restoration
Land restoration	this includes: land reclamation (the recovery of land from a brownfield or underutilised state to make it suitable for reuse achieved through the stabilisation, contouring, maintenance, conditioning, reconstruction and re-vegetation of the land) and land remediation (the process of making a site fit for purpose through the destruction, removal or containment of contaminants) and soil conditioning (see below).
MCERTS	the monitoring certification scheme established by the Environment Agency to deliver high quality environmental measurements, including a performance standard for the chemical testing of soil samples.
Potentially Toxic Element (PTE)	chemical element that has potential to have toxic effects on humans, flora or fauna. <i>Note: Some PTEs are also known as 'heavy metals' or 'transition metals' (e.g. lead, cadmium, chromium, mercury, copper, zinc and nickel).</i>
Producer	business enterprise, organisation, community initiative or person(s) responsible for the production of digested materials.

Term	Description
Quality outputs from anaerobic digestion (quality digestate)	<p>whole digestate resulting from an anaerobic digestion process, and any subsequently separated fibre or liquor, which conforms to the requirements of the Quality Protocol. Quality digestate is normally regarded as having ceased to be waste when it has met the requirements of the Quality Protocol, which include meeting an approved standard.</p> <p><i>Note: Includes any separated fibre that undergoes a subsequent aerobic stabilisation phase without addition of further materials.</i></p>
Quality control (QC)	<p>part of quality management focused on fulfilling quality requirements.</p> <p><i>Note: Implemented through a series of systems and activities, which are integrated in daily work and which enable frequent or continuous verification of product quality. Examples are checks on process conditions throughout every stage of processing, digestate sample test results and the effects of any corrective actions taken.</i></p>
Quality management system (QMS)	<p>a system used to direct and control an organisation with regard to quality.</p> <p><i>Note: In the context of anaerobic digestion, it is a system for planning, achieving and demonstrating effective control of all operations and associated quality management activities necessary to achieve digested materials that are fit-for-purpose. Where specific controls are applied, they must be monitored and recorded, and their efficacy evaluated both during and after process validation. Corrective actions must be defined.</i></p>
Soil improver/soil conditioner	<p>material added to soil in situ primarily to maintain or improve its physical properties, and which may improve its chemical or biological properties or activity¹⁰.</p>
Technical Standards and Regulations Directive 98/34/EC	<p>seeks to ensure the transparency of technical regulations and is intended to help avoid the creation of new technical barriers to trade within the European Community.</p>
User(s)	<p>individuals or organisations that obtain whole digestate, separated liquor or separated fibre from a producer or third party with the intention of using it.</p>
Validation	<p>obtaining and evaluating evidence that the elements of the HACCP plan and operation of the quality management system are effective for producing digested materials of the quality to which the producer has committed in the Quality Protocol.</p> <p><i>Note: See PAS 110 for validation requirements. It will take time to generate evidence of consistently sufficient digested material quality.</i></p>
Waste management controls	<p>controls under legislation that govern the treatment, handling, containment, transportation and storage of waste.</p>
Whole digestate	<p>material resulting from an anaerobic digestion process that has not undergone a post-digestion separation step to derive liquor or solid fibrous fractions.</p>

¹⁰PD CR 13456: 1999 Soil improvers and growing media. Labelling, specifications and product schedules.

Appendix B Biowaste types acceptable for the production of quality digestate

Input materials shall be biodegradable and may include non-waste biodegradable materials. The latter types are not listed in this Quality Protocol. Waste input materials may only be accepted if they are listed in table B1 below and they have been source-segregated (kept separate from any other wastes).

Biodegradable polymers, bags and packaging or other products made of such material shall be permitted only if they conform to all relevant parts of the quality standard BS EN 13432 or either of the similar standards DIN V 54900 or ASTM D6400. 'Home compostable' plastics and packaging shall be permitted only if they conform to a standard that is accepted by the Environment Agency. Packaging that consists of natural fibres only is not required to meet the requirements stated in this paragraph; examples are plain cardboard and paper packaging items.

Wood and wood-derived wastes impregnated with preservatives, painted, or with any non-biodegradable layer shall not be permitted.

If producers have any doubt over whether an input material is compliant, they should discuss the issue with the certification body.

The Waste Protocols Project are working with the certification body to agree a methodology which will allow additional input materials to be added to this list in the future. *Please check the Environment Agency website for the most up to date list.*

Table B1 lists those waste categories to which this Quality Protocol applies.

Table B1. Types of wastes suitable for anaerobic digestion from EWC categories	
Type	EWC code ¹¹
Wastes from agriculture, horticulture, hunting, fishing and aquaculture primary production, food preparation and processing	02
Primary food production wastes	02 01
Sludges from washing and cleaning	02 01 01
Food processing waste, food washing waste	
Animal tissue waste	02 01 02
Category 3 animal by-products or rendered Category 2 animal by-products digested in accordance with Article 15 of the ABPR at a facility subject to approval under the ABPR and the UK legislation making provision for the administration and enforcement of the ABPR ¹² .	
Plant tissue waste	02 01 03
Husks, cereal dust, waste animal feeds	
Animal faeces, urine, manure including spoiled straw, collected separately¹³	02 01 06
– Poultry droppings	
– Pig and cattle slurry	
– Manure	
– Old Straw	
Quality digestate derived from these wastes are subject to ABPR ¹² requirements.	
Wastes from forestry	02 01 07
Green waste, plant tissue	
Non specified	02 01 99
Residues from commercial mushroom cultivation	

¹¹European Waste Catalogue code

¹²Regulations 13 and 14 of the ABPR 2005 in England and Regulations 13 and 14 of the ABPR (Wales) 2006 No 1293 (W.127) in Wales.

¹³Quality digestate derived from animal by-product wastes of this type is subject to the requirements of Article 5(2)(e) of the ABPR. Regulation 5(3) of the ABPR (S.I. No. 2347) and Regulation 5(3) of the ABPR (Wales) 2006 No. 1293 (W. 127) provide that these animal by-products may be applied to land provided the Secretary of State or the National Assembly for Wales have not imposed any animal health restrictions in relation to them.

Wastes from preparation and processing of meat, fish and other foods of animal origin	02 02
Sludges from washing and cleaning	02 02 01
Process water and food washing waste	
Animal tissue waste	02 02 02
Allowed only if: <ul style="list-style-type: none"> • Category 3 animal by-products, rendered Category 2 animal by-products or catering waste in either of these categories, digested in accordance with Article 15 of the ABPR at a facility subject to approval under the ABPR and the UK legislation making provision for the administration and enforcement of the ABPR¹²; • former foodstuffs (Category 3 animal by-products) produced in accordance with Article 15 of the ABPR at a facility subject to approval under the ABPR and the UK legislation making provision for the administration and enforcement of the ABPR¹²; and • catering waste only, that comprises Category 3 material or rendered Category 2 material, digested in accordance with Article 15 of the EU ABPR at a facility subject to approval under ABPR and the UK legislation making provision for the administration and enforcement of the ABPR¹² 	
EWC code 02 02 02 may include animal blood.	
Materials unsuitable for consumption or processing	02 02 03
– Coffee, food processing waste, jam, kitchen waste, fruit, vegetable oil, tobacco, tea, vegetable waste	
– Waste fat from processing of meat or fish	
Non Specified*	02 02 99
– Sludges from gelatine production	
– Animal gut contents	
Wastes from fruit, vegetables, cereals, edible oils. Cocoa, tea and tobacco preparation and processing; conserve production	02 03
Sludges from washing, cleaning, peeling, centrifuging and separation	02 03 01
Sludge from food processing and animal gut contents	
Sludges from washing, cleaning, peeling, centrifuging and separation	02 03 02
Coffee, mushroom compost, food processing waste, food washing waste, tobacco	
Materials unsuitable for consumption or processing	02 03 04
– Out-of-date foodstuffs	
– Tinning process residues	
– Tobacco dust, veins, sludge	
– Defective cigarette batches	
– Residues from processing coffee, tea, cocoa	
– Oilseed residues	
– Glycerol residue from biodiesel manufacture from non-waste vegetable oils	
Effluent from the processes referred to in sources of waste	02 03 05
– Sludge from production of edible fats and oils	
– Seasoning residues	
– Molasses residues	
– Residues from production of potato, corn or rice starch	
Wastes from sugar processing	02 04
Sludges from on site effluent treatment	02 04 03
Biological sludge	

¹²Regulations 13 and 14 of the ABPR 2005 in England and Regulations 13 and 14 of the ABPR (Wales) 2006 No 1293 (W.127) in Wales.

* 'Non specified' categories are included in some sections above to allow additional categories of input materials.

Appendix B Biowaste types acceptable for the production of quality digestate (continued)

Other biodegradable wastes	02 04 99
Allowed only if no chemical agents added and no toxin residues	
Wastes from dairy products industry	02 05
Materials unsuitable for consumption or processing	02 05 01
<ul style="list-style-type: none"> – Includes raw milk. – May be Category 3 animal by-products or former foodstuffs that are allowed only if digested in accordance with Article 15 of the EU ABPR at a facility subject to approval under ABPR and the UK legislation making provision for the administration and enforcement of the ABPR¹¹ 	
Sludges from on site effluent treatment	02 05 02
As above in sludge form	
Wastes from baking and confectionary industry	02 06
Materials unsuitable for consumption or processing	02 06 01
May be Category 3 animal by-products or former foodstuffs that are allowed only if digested in accordance with Article 15 of the EU ABPR at a facility subject to approval under ABPR and the UK legislation making provision for the administration and enforcement of the ABPR ¹²	
Sludges from on site effluent treatment	02 06 03
As above in sludge form treatment	
Wastes from production of alcoholic and non-alcoholic beverages (except tea and coffee)	02 07
Wastes from washing, cleaning and mechanical reduction of raw materials	02 07 01
– Brewing waste, food processing waste, fermentation waste	
Wastes from spirits distillation	02 07 02
<ul style="list-style-type: none"> – Spent grains, fruit and potato pulp – Sludge from distilleries 	
Materials unsuitable for consumption or processing	02 07 04
– Brewing waste, food processing waste, fermentation waste, beer, alcoholic drinks, fruit juice stored for too long	
Non specified*	02 07 99
<ul style="list-style-type: none"> – Malt husks, malt sprouts, malt dust – Spent and sludge from breweries – Sludge from wine making – Yeast and yeast-like residues – Waste types in this section allowed if biodegradable material only, no chemical agents added 	
Wastes from wood processing and the production of paper, cardboard, pulp, panels and furniture	03
Wastes from pulp, paper and cardboard production and processing	03 03
Green liquor sludge	03 03 02
Paper sludge and green liquor	
Wastes from sorting of paper and cardboard destined for recycling	03 03 08
Cardboard, newspaper, tissues, paper	
Fibre rejects and sludges	03 03 10
Paper pulp (de-inked only), paper fibre	

¹²Regulations 13 and 14 of the ABPR 2005 in England and Regulations 13 and 14 of the ABPR (Wales) 2006 No 1293 (W.127) in Wales.

* 'Non specified' categories are included in some sections above to allow additional categories of input materials.

Wastes from leather, fur and textile industry	04
Wastes from the leather and fur industry	04 01
Wastes from leather industry	04 01 01
Fleshings may also be described as leather shavings. Allowed only if hides and skins, or parts of them, originating from animals that did not show clinical signs of any disease communicable through that product to humans or animals, and are digested in accordance with Article 15 of the EU ABPR at a facility subject to approval under ABPR and the UK legislation making provision for the administration and enforcement of the ABPR ¹²	
Tanning liquor free from chromium	04 01 05
Tanning liquor free from chromium	
Sludges, in particular from on site effluent treatment free of chromium	04 01 07
Sludges not containing chromium	
Wastes from the textiles industry	04 02
Wastes from the textiles industry	04 02 10
<ul style="list-style-type: none"> – Organic matter from natural products, e.g. grease, wax – Allowed only if no chemical agents added and no toxin residues 	
Waste plastic	04 02 13
See second paragraph at start of Appendix B for restrictions	
Wastes packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified	15
Packaging (including separately collected municipal packaging waste)	15 01
Packaging	15 01 01
Paper and cardboard packaging (see second paragraph at start of Appendix B for restrictions)	
Packaging	15 01 02
Plastic (see second paragraph at start of Appendix B for restrictions)	
Packaging	15 01 03
Wooden (see second paragraph at start of Appendix B for restrictions)	
Packaging	15 01 04
Composite (see second paragraph at start of Appendix B for restrictions)	
Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use	19
Wastes from physiochemical treatments of waste	19 02
Combustible wastes other than those mentioned in 19 02 08 and 19 02 09	
Glycerol	
Wastes from the aerobic treatments of wastes (sources separated)	19 05
Wastes from the anaerobic treatment of wastes (source separated)	19 06
Waste types in this section are allowed only if derived from input types allowed by this Quality Protocol. If the input wastes to the anaerobic treatment system include animal by-products, they are allowed only if digested in accordance with Article 15 of the EU ABPR at a facility subject to approval under ABPR and the UK legislation making provision for the administration and enforcement of the ABPR ¹²	

¹²Regulations 13 and 14 of the APBR 2005 in England and Regulations 13 and 14 of the APBR (Wales) 2006 No 1293 (W.127) in Wales.

* 'Non specified' categories are included in some sections above to allow additional categories of input materials.

Appendix B Biowaste types acceptable for the production of quality digestate (continued)

Wastes from waste water treatment plants not otherwise specified	19 08
Grease and oil mixture from oil/water separation containing edible oils and fats	19 08 09
Grease and oil mixture containing only edible oils and fats	
Sludges from biological treatment of industrial waste water other than sludges containing dangerous substances from biological treatment if industrial waste water	
Sludge from industrial biological treatment, allowed only if no chemical agents added and no toxin residues	19 08 12
Municipal wastes and similar commercial, industrial and institutional wastes including separately collected fractions	20
Separately collected fractions	20 01
Paper and cardboard	20 01 01
Cardboard, newspaper, office paper, paper towels, tissues (only soiled materials where recycling is not possible; high gloss papers and toxic dyes excluded). Not allowed if any non-biodegradable coating or preserving substance present	
Biodegradable kitchen and canteen waste	20 01 08
Kitchen waste from canteens, restaurants, dairy products (liquid and solid) canteen waste, beer, biscuits, chocolates, alcoholic and non-alcoholic drinks	
Edible oil and fat	20 01 25
Cooking oil and animal fat	
Wood other than that mentioned in 20 01 37	20 01 38
Not allowed if any non-biodegradable coating or preserving substance present. Allowed only if no chemical agent added and no toxin residues.	
Garden and park wastes (including cemetery waste)	20 02
Biodegradable waste	20 02 01
Animal faeces, manure, garden waste, green waste, horticulture waste, plant tissue, parks and garden waste, hedge and tree trimmings, grass cuttings and leafy materials. Allowed only if no chemical agents added and no toxin residues	
Other municipal wastes	20 03
Mixed municipal waste	20 03 01
<ul style="list-style-type: none"> – Separately collected biowastes from private households. – Separately collected biowastes from commercial, industrial and institutional sources, which because of their nature and composition are similar to separately collected biowastes from households 	
Waste from markets	20 03 02
<ul style="list-style-type: none"> – Allowed only if source segregated biodegradable fractions. Examples are plant material, fruit and vegetables – Former foodstuffs (Category 3 ABP) from a market source are allowed only if digested at a biogas plant subject to approval under Article 15 of the ABPR and the UK legislation making provision for the administration and enforcement of the ABPR¹² – Packaging waste from a market source is allowed only if it complies with the restrictions stated in the second paragraph at the start of Appendix B – Plastic waste from a market source is allowed only if it complies with the restrictions for the corresponding waste (waste category 15 01 02) 	

¹²Regulations 13 and 14 of the ABPR 2005 in England and Regulations 13 and 14 of the ABPR (Wales) 2006 No 1293 (W.127) in Wales.

* 'Non specified' categories are included in some sections above to allow additional categories of input materials.

Appendix C Standards and specifications to which this Quality Protocol applies

At present this Quality Protocol applies only to the proposed British Standards Institution's Publicly Available Specification for whole digestate, separated liquor and separated fibre derived from source-segregated biodegradable materials (BSI PAS 110: 2008).

Copies of BSI PAS 110: 2008 will be available free of charge from:

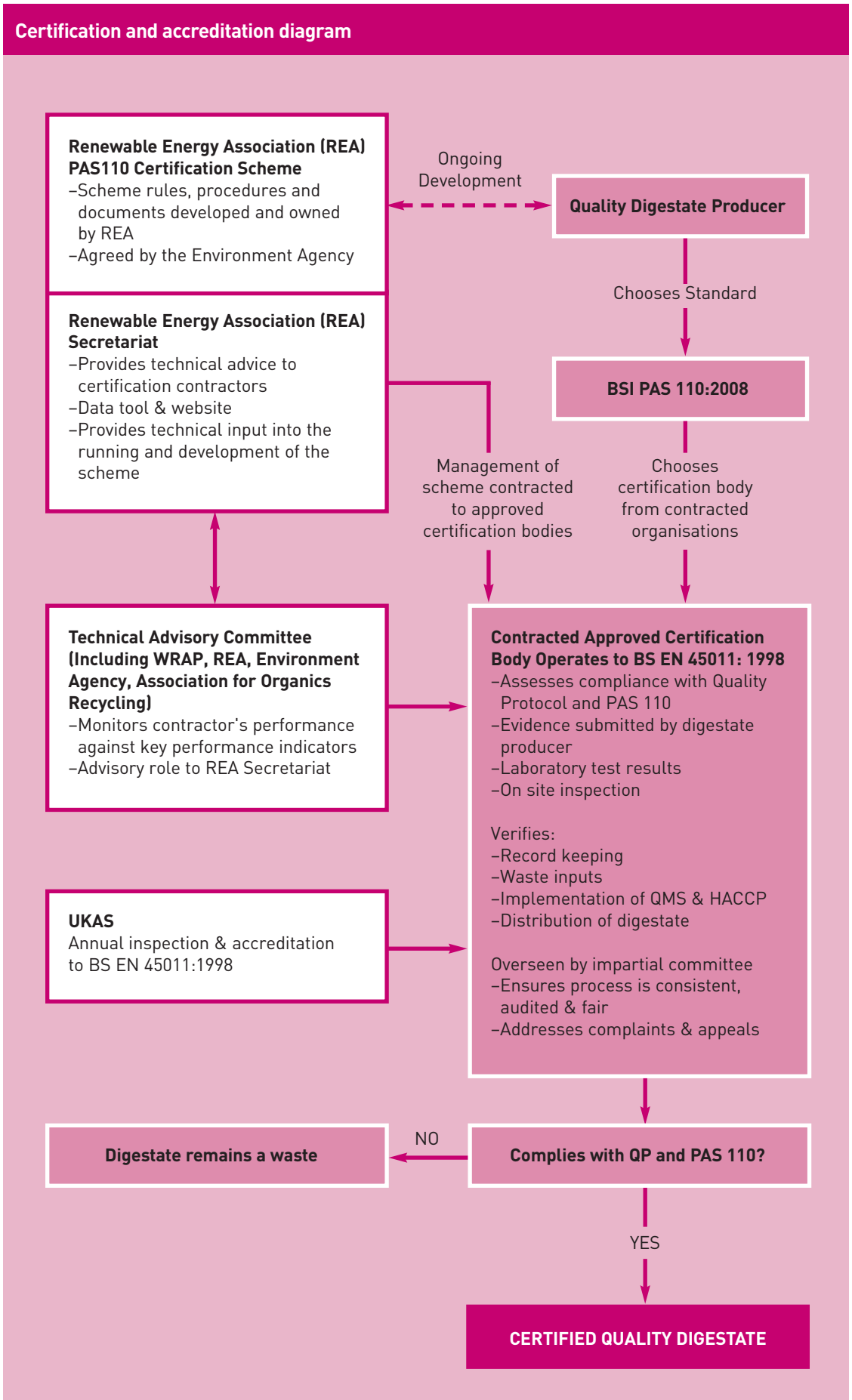
- WRAP – at www.wrap.org.uk or by phoning 0808 100 2040
- Renewable Energy Association (REA) at www.biogasenergy.org.uk

Appendix D Important elements of a standard

The Environment Agency may approve further standards for inclusion in this Quality Protocol when it is reviewed. To be considered for inclusion, a standard must:

- be publicly available (and recognised nationally);
- be subject to independent periodic revision;
- permit only biowaste inputs of types specified in Appendix B of this Quality Protocol;
- contain a methodology detailing the waste recovery process and quality management system (QMS) procedures in place;
- specify that a quality management system be used that incorporates *Hazard Analysis and Critical Control Point* (HACCP) assessment;
- specify that all measurement and testing be carried out using recognised (national or international) test methods;
- include limit levels for a range of contaminants in digestate including *potentially toxic elements* (PTEs); and
- specify that records be kept of the *quality control* procedures implemented at the anaerobic digester site as part of the QMS, including instances of non-compliance and corrective actions undertaken.

Appendix E



Appendix F Records to be kept for certification purposes

Some of the record requirements for certification purposes may also form part of the requirements of an approved standard. Some records may also be a regulatory requirement.

1. Records to be kept by the quality digestate producer

■ Incoming wastes

Records must be kept of all incoming wastes. The following must be recorded for each load delivered to the site:

- date;
- description of the waste type, including the EWC code;
- place of origin (where known);
- quantity by weight/volume;
- carrier;
- supplier; and
- whether the load (or part load) was rejected.

■ Material leaving the site

Records must be kept of all quality digestate produced using the anaerobic digester and also of all waste leaving the facility. For all quality digestate, these records must correspond to the supply documentation issued to the customer (see Appendix G).

The following details of the destination of the quality digestate must be kept:

- date;
- quantity of weight/volume and batch *assessment/certification* code(s);
- name and address of receiving business/establishment; and
- designated market sector.

2. Records to be provided to the quality digestate producer

In the case of agriculture and forestry, the quality digestate producer is usually not responsible for applying the quality digestate. Records must be made available or given to the quality digestate producer or certification body so as to be able to demonstrate that the Quality Protocol has been adhered to.

3. Records to be kept in agriculture or forestry

When quality digestate is to be used in agriculture or forestry and soil/field-grown horticulture, the details listed in Table F1 must be kept by the *land manager* and made available or given to the quality digestate producer or certification body.

4. Responsibility for record-keeping

- To demonstrate that the material is used in the right way and that the environment is protected, the land manager receiving the quality digestate is responsible for ensuring that:
 - the records detailed in Table F1 are made, retained and made available to the certification body.

This applies even if a contractor (e.g. not the quality digestate producer) carries out the application of the quality digestate and/or soil testing for the land manager.

- Where the producer is not responsible for applying the quality digestate, these records should be made available or given to the quality digestate producer or certification body so as to be able to demonstrate that the Quality Protocol has been adhered to.
- In the case of agriculture and forestry, the land manager should also keep the records specified in Table F1 so as to be able to demonstrate that soil resources are being sufficiently protected.
- Records of all applications of quality digestate must be made available or given to the quality digestate producer or certification body within 12 months of receipt of the quality digestate.

Table F1 – Records to be kept by the land manager and made available to the quality digestate producer and certification body (see also Appendix H)

Parameter	Format
Quantity of quality digestate received	tonnes / m ³
Quality digestate assessment / certification code	Numerical
Date of dispatch from the AD plant	dd/mm/yyyy
Typical quality digestate PTE concentrations (provided by the quality digestate producer)	mg/kg
Initial soil PTE analysis	mg/kg dry weight
Calculated soil PTE content (based on all subsequent additions of quality digestate including this years)	mg/kg dry weight
Soil nutrient analysis	mg/kg dry weight
Quality digestate analysis	Typical or actual
Date of application	dd/mm/yyyy
Rate of application	tonne/ha fresh weight
Area over which quality digestate is applied	Ha
Incorporation depth	Cm
Total quantity of quality digestate applied	Tonnes / m ³
Location of application	<ul style="list-style-type: none"> -Eight-figure grid reference (e.g.TM12345678) for the centre of the area(s) to which the digestate is applied -Farm grid reference number (a main building or farm gate)

Appendix G Supply documentation

Supply documentation must include the elements listed below relevant to the end use.

■ **Contacts**

- Producer's contact details, including address of anaerobic digestion site
- Customer's contact details

■ **Information about the product**

- Product types (fertiliser or soil conditioner)
- What the quality digestate has been made from (e.g. digested plant material)
- Quality digestate type (whole digestate, separated fibre or separated liquor) and despatch dates
- Quantity

■ **Certification and declaration**

- Quality digestate assessment / certification code
- Declaration that the quality digestate meets the requirements of the approved standard and the Quality Protocol

■ **Guidelines and conditions for use**

The supply documentation must specify that the product / quality digestate:

- is for use solely in designated market sector applications: 'This product / quality digestate shall not be sold or distributed for use, or used in any markets other than specified.'
- must be used in accordance with good practice guidelines; and
- must not in any circumstances be blended with any waste material. If material is blended with waste, then the mixture becomes a waste and is regulated as such.

The supply documentation must also give guidelines for the use, storage and safe handling of the quality digestate (see Appendix H for agriculture and forestry applications).

Appendix H Storage, application, testing and record-keeping requirements for the use of quality digestate in agriculture, forestry and soil/field grown horticulture

Storage requirements

- 1 Quality digestate containing animal manures must be stored in facilities that meet The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (SI 1991 No. 324), and as amended in 1997 (SI 1997 No. 547). All other quality digestate must be stored in a similar manner. All operators should follow the advice given in *Guidance Notes for Farmers on the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations* published jointly by the then Department of the Environment and the Welsh Office in April 1997.
- 2 All *holdings* storing or spreading quality digestate should prepare an Accident and Emergency Plan detailing the actions to be taken to minimise the effects of accidental spillages or equipment failure. Advice is given in:
 - Codes of Good Agricultural Practice*¹⁵
 - Pollution Prevention and Guidance (PPG) 21. Pollution Incident Response Planning*, Environment Agency, February 2004¹⁶
 - Integrated Pollution Prevention and Control (IPPC) Factsheet No 4. Accident and Emergency Plan*, Environment Agency, 2006.

Application requirements

- 3 Advice on suitable applications for quality digestate should be taken from an advisor qualified under the Fertiliser Advisers Certification and Training Scheme (FACTS)¹⁷.
- 4 In areas designated as Nitrate Vulnerable Zones (NVZs) under legislation to implement the Nitrates Directive, applications of quality digestate must comply with the relevant mandatory Action Programme. These include various requirements for maximum rates of application and permitted application windows for different types of manures and quality digestate. In all other areas these requirements should be followed wherever practical. For more information about NVZs see the Defra website www.defra.gov.uk/environment/water/quality/nitrate/default.htm
- 5 Without prejudice to the above guidance, any application of quality digestate should conform to the principles set out in *Code of Good Agricultural Practice to Protect Water, Soil and Air Quality* (CoGAP)¹⁵ [or subsequent guidance]. In particular, digestate:
 - should be applied in accordance with a Manure Management Plan for the farm (see *Manure Management Plan: a Step-by-step Guide for Farmers*, Defra, June 2003¹⁸);
 - should not be spread on frozen, snow-covered or waterlogged ground; and
 - should not be spread within 10 metres of a watercourse.

Spreading techniques and subsequent soil management that will minimise ammonia emissions should be adopted.
- 6 Quality digestate applications should be matched to crop nutrient requirement, growth stage and prevailing weather conditions. Applications should be made in accordance with a Nutrient Management Plan for the farm; see *Fertiliser Recommendations for Agricultural and Horticultural Crops* (RB209)¹⁹ [or subsequent guidance].
- 7 Quality digestate applications must adhere to the maximum permissible annual rate of PTE addition over a 10-year period as per the *Code of Practice for the Agricultural Use of Sewage Sludge* (the 'Sludge Code')²⁰.

¹⁵See www.defra.gov.uk/farm/environment/cogap/index.htm

¹⁶See www.environment-agency.gov.uk/ppg/

¹⁷See www.factsinfo.org.uk

¹⁸Available from www.defra.gov.uk/corporate/regulat/forms/agri_env/nvz/manureplan.pdf [Accessed 17 March 2008]

¹⁹Available from www.defra.gov.uk/farm/environment/land-manage/nutrient/nmu01.htm [Accessed 17 March 2008]

²⁰Available from www.defra.gov.uk/environment/water/quality/sewage/sludge-report.pdf [Accessed 17 March 2008]

- 8 Where quality digestate that includes animal manures are applied to land on which ready-to-eat crops are to be grown, the Food Standards Agency (FSA) guidance given in *Managing Farm Manures for Food Safety. Guidelines for Growers to Reduce the Risks of Microbiological Contamination of Ready-to-eat Crops*²¹ should be followed. Primary food producers must comply with the Food Hygiene (England) Regulations 2006 (SI 2006 No. 14); while not requiring a formal HACCP assessment, these regulations place an obligation on food producers to prevent contamination of food they produce. Following the FSA guidelines will help them to achieve this.

Quality digestate analysis

- 9 The quality digestate producer must supply the land manager with analytical results that indicate the plant nutrient content of the material supplied. The analysis should include pH, total and available (NH₄) nitrogen, total phosphorus, potassium and sulphur.
- 10 The quality digestate producer must supply the land manager with analytical results relating to the PTE content of the digestate (i.e. lead, cadmium, chromium, mercury, copper, zinc, nickel).

Soil sampling and analysis requirements

- 11 All chemical analysis must be carried out by laboratories using appropriate methods that are accredited by UKAS to ISO/IEC 17025 for the Environment Agency's *MCERTS* performance standard for the chemical testing of soil²².
- 12 Soil sampling for major nutrients should be carried out regularly in accordance with RB209¹⁹. Quality digestate should not be applied unless the soil has been sampled and analysed within the last five years.
- 13 Soil analysis should include pH, extractable phosphorous, potassium, magnesium and total sulphur.
- 14 The soil nitrogen supply should be determined by following RB 209 to assess the Soil Nitrogen Supply Index, or from the results of a recent soil mineral analysis.
- 15 The quality digestate producer must arrange for the digestate to be analysed and the land manager should arrange for the receiving soil to be analysed for PTEs (lead, cadmium, mercury, copper, zinc, nickel) to ensure that the limit values set out in the 'Sludge Code'²⁰ are not exceeded.
- 16 Soil analysis for PTEs must be carried out before the first application of quality digestate and again when the predicted concentrations approach 75 percent of the limit values set out in the 'Sludge Code'.

²⁰Available from www.defra.gov.uk/environment/water/quality/sewage/sludge-report.pdf [Accessed 17 March 2008]

²¹Final draft, January 2005 (www.food.gov.uk/multimedia/pdfs/manguidfinaldraft.pdf) [Accessed 17 March 2008]

²²Available from <http://publications.environment-agency.gov.uk/pdf/GEH00203BKAY-e-e.pdf> [Accessed 17 March 2008]

While steps have been taken to ensure its accuracy, the authors cannot accept responsibility or be held liable to any person for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. It may be reproduced free of charge subject to the material being accurate and not used in a misleading context. The source of the material must be identified and the copyright status acknowledged. This material must not be used to endorse or used to suggest WRAP's endorsement of a commercial product or service. For more detail, please refer to our Terms & Conditions on our website - www.wrap.org.uk

**Waste & Resources
Action Programme**

September 2009

The Old Academy
21 Horse Fair
Banbury, Oxon
OX16 0AH

Tel: 01295 819 900
Fax: 01295 819 911
E-mail: info@wrap.org.uk
www.wrap.org.uk

Helpline freephone
0808 100 2040



**Environment
Agency**

www.environment-agency.gov.uk

Tel: 08708 506 506

E-mail: enquiries@environment-agency.gov.uk

