BCS Position on Technical Requirements

The Biofertiliser Certification Scheme interpretation of PAS110, Anaerobic Digestate Quality Protocol and the BCS Scheme Rules requirements

These guidance notes have been written by Renewable Energy Assurance Limited (REAL) in response to queries from users of the BCS and other organisations.

Important Note: The provisions of the Guidance given in this document are subject to approval and possible change by the Environment Agency of England and Wales, Scottish Environment Protection Agency and Northern Ireland Environment Agency and to further guidance from the BCS Oversight Panel. The independent Certifying Bodies appointed by BCS will follow the conditions of the PAS110, ADQP & ASRS whilst also taking into account the BCS Scheme Rules.

This document has been developed to assist you to comply with the BCS requirements. The aim of this note is to provide clarification on some of the technical aspects of PAS110, ADQP and the BCS Scheme Rules (latest version). The interpretation given in this document have been discussed and agreed with the certification bodies and their inspectors.

Please note that this is an open document and we will add new sections when required.

We recommend that you liaise with your certification body if you need any further clarification.

Contents

Changes from previous version

June 2019 – December 2019

- Updates to PAS 110 references in section 1 (Trace elements), section 2 (Change of slurry type), and section 3 (Pathogens)
- Removal of section 6 (Cover for a separated liquor store?)
- Removal of section 7 (Cover material for separated fibre)
- Removal of section 8 (Position where PTE levels are exceeded)
- Removal of section 10 (Seeding the digester using material from sewage sludge)

1 Trace elements

Is it necessary to have a supplier agreement for any trace elements added to the digester or can it be defined as a 'process additive' in the SOPs, including naming of the specific product and supplier?

Purpose of use: optimization of biogas yield.
Rate of use @ The farm: add 600 grams to 50 tonnes / day inputs to digester.

REAL BCS's interpretation

The product can be used as described. Details of the additive, preferably supported by a manufacturer's data sheet, should be recorded and available for inspection.

References:

- Refer to Appendix B of the ADQP Line 1 – Input materials shall be biodegradable and may include non-waste biodegradable materials.
- Refer to the PAS110 Section 6 - Input Materials – this section is intended for biodegradable (definition 3.7) input material so does not address the process additive above. However, it would appear to be covered by the general term in 6.1 that "reasonable care shall be taken to avoid any contaminated wastes, products or materials from becoming included with the input materials."

2 Change of slurry type

The pig slurry currently fed into the digester equates to approx. 3.8 % of total input to the digester each day. The remainder of total input per day is liquidized, de-packaged food waste.

It is proposed to switch from pig to cow slurry during the PAS 110 validation process; this does not appear to represent 'significant change' having considered the slurries' dry matter characteristics and that the proportion mixed with food waste is low on a vol/vol basis. We do not expect any change to how we operate the AD process nor a significant/material impact on the test results of the separated liquor and fibre fractions.

REAL BCS's interpretation

The changes concern inputs of animal slurries with broadly similar generic characteristics, which do not necessitate significant changes to the production process management. Therefore, it is advised that the feedstock changes will not affect the validation process. An

example of a significant change would be where food wastes are introduced for the first time into a plant previously using only animal slurries.

Reference: Clause 4.8.5 of PAS 110.

Significant change is a matter of interpretation, and can relate to input materials, production process management, required quality of digested materials or other factors that affect their quality. If the producer has applied to a certification body for initial or renewal certification, an interpretation of the certification scheme rules may be sought.

3 Pathogens

Pathogen testing according to ABP regulations & PAS 110 requirements - which pathogen indicator species?

LR - Under current arrangements for quarterly ABPR testing the plant analyses pasteurized digestate for Enterobacteriaceae and Salmonella spp. The operator is not currently required to test for E. coli for ABPR approval. As long as these pathogen indicator species continue to be accepted by the Animal Health vets, can the ABPR test results be used for PAS 110 assessment purposes? Note that NRM laboratories offer both alternatives; Enterobacteriaceae and Salmonella spp OR E. coli and Salmonella spp.

REAL BCS's interpretation

It is understood that the term **Enterobacteriaceae** refers to a large family of bacteria, including pathogens such as *Salmonella* and *Escherichia coli*.

Reference:

Note that if pathogen sampling is taken in accordance with ABPR then no further tests are required as long as they comply with PAS 110:2014 sections 10.2, 10.3, 10.4 and 10.5 which state that the materials have to be "*sampled after full treatment……when it is ready for use*". If the plant pasteurises after the digestion process it would fall into this category.

3.1 Timing of sample taking

Our facility and whole digestate has full approval from the Animal Health vets. To date, we have been testing only the whole digestate, before the separation stage. However, this is too early given PAS 110's requirements, and it is the whole digestate that is sampled rather than, individually, the separated fibre and liquor fractions.

To enable us to use the ABPR test results for demonstrating PAS 110 compliance on pathogen tests, we intend to request permission from the vets to test pasteurized digestate after separation, specifically the separated liquor fraction and, separately, the separated fibre fraction. Please confirm that such change would enable the pathogen testing efficiency we seek or let us know an alternative way to proceed.

REAL BCS's interpretation

The above procedure would be acceptable under BCS

References:

- PAS110:2014 Section 10.3 – Separated liquor
- PAS110:2014 Section 10.4 – Separated fibre
- PAS110:2014 Section 7.2 – Pasteurisation

3.2 Laboratory used for pathogen tests

The plant uses a DEFRA approved laboratory (which is not NRM) to carry out pathogen testing. Can the plant continue to use the laboratory for the pathogen tests, as evidence towards PAS 110 compliance (assuming they continue to offer the indicator species required by the vet)?

REAL BCS's interpretation

Where (as above) the ABPR pathogen tests fall within the PAS 110, a Defra approved laboratory would be acceptable. If new tests were required, then only NrM would be acceptable at present.

4 Batch size of separated liquor and sampling point

The plant is currently operating using one pasteurization unit and expect to be operating an additional pasteurization unit (in parallel) early next year. Whole digestate pumped out of the digestion tank will go through the available pasteurization unit (for treatment to EU ABP standard) and afterwards pumped into the pre-separation holding tank.

It is suggested that the batch sample size for separated liquor is 96 tonnes, which equates to 48 tonnes digestate/day processed through each pasteurizer. Each pasteurizer has capacity for 4 tonne batches and can process 12 batches per day.

The representative sample of separated liquor will be taken from the 'short-term storage' tank that receives the liquid output from the separator unit. This tank is located within the AD permitted area. Because it has a small maximum capacity of 50 tonnes at any one time,

we have to frequently pump separated liquor out of this tank and transport it to our on-farm lagoon for medium-term storage before use. We plan to sample a 96 tonne batch of separated liquor by following a repeated cycle of 'pumping then sub-sampling from the discharge point' a number of times during a day selected for sampling; the sub-samples would be combined to form a representative sample of sufficient volume for the laboratory tests. (Our short-term storage tank does not have a mechanism for mixing the contents.)

In the event of a test result failure on the separated liquor, a representative sample of digestate from the lagoon would be taken for re-test, after appropriate treatment/corrective action. (By the time we receive the test results, the batch of separated liquor that we sampled will be in the lagoon rather than in the 'short-term storage' tank.)

Are these plans suitable?

REAL BCS's interpretation

This procedure is acceptable

5 Separated fibre sampling

The quantity of separated fibre is much smaller than the quantity of separated liquor. It is suggested that the separated fibre batch sample size should be 2 % of the whole pasteurized digestate. Each batch of the 3 batches sampled for PAS 110 testing will be isolated in one corner of the storage bunker during the PAS 110 validation process.
Are these plans suitable?

REAL BCS's interpretation

There is guidance within PAS 110 (Section 10) on sampling of the whole digestate and liquor, but not specifically on fibre. NrM advise that a fibre sample should consist of at least 7 Kg.

6 ~~Cover for a separated liquor store?~~ – removed

7 ~~Cover material for separated fibre~~ – removed

8 ~~Position where PTE values are exceeded~~ – removed

9 Position regarding transition from compliance with Paragraph 7 Exemption (Waste for the benefit of land) to a PTE testing regime in accordance with PAS 110 & ADQP requirements

Detail: Under Para 7s plants were not required to test soil for PTEs. Two years before the conditions of the future PAS110 & ADQP were confirmed, the plant decided to run its own tests based on an average PTE value over a 50Ha block of land or alternatively averaged on a ³whole farm² basis. The ADQP states that sampling frequency should be in accordance with the values set out in Code of Practice for Agricultural use of Sewage Sludge (the Sludge Code) which also requires that that for sludge at least one sample should be taken for every 5 Ha of land.

REAL BCS's interpretation

- The Sludge Code is for a high risk material (Sewage Sludge) which, unlike PAS110 and ADQP and ASRS does not have stringent source separation criteria
- The ADQP specifies that the PTE limit values in the Sludge Code are not exceeded but does not mention compliance with the maximum permissable area for soil sampling
- ADQP Section 16 - Covers soil analysis for PTEs - which must be carried out before the first application of digestate and again when predicted concentrations approach 75% of the limit values set out in the Sludge Code
- The operator can use PTE tests carried out in the five years before registering for PAS110 and ADQP or ASRS.
- Operators sampling on a ³whole farm² basis should move to a maximum 50Ha sampling area for PTEs within five years of achieving certification under PAS110 and ADQP/ASRS.

Other key references in the ADQP Appendix H:

- Section 15 - Specifies that soil should be analysed for PTEs to ensure that the limit values set out in the Sludge Code are not exceeded.
- Section 12 - States that Quality digestate should not be applied unless the soil has been sampled and analysed within the last five years.[1]
- Since the ADQP is not applicable in Scotland, further clarification on this point is required from SEPA.

10 ~~Seeding the digester using material from sewage sludge~~ – removed

11 Certification of the fibre element of digestate only

An AD plant is digesting some confectionary feedstocks that include a small gelatine content. This is degraded in the digestion process and is digested with the daily trade effluent stream that is currently going to sewer discharge.

The digestate is very dilute and will be passed though a Huber separator and the liquid fraction discharged to sewer. Only the solid fraction (at about 20% dm is land applied. The liquid fraction is treated by the local water utility. In due course with a COD reduction of over 95% this may be further polished for grey water reuse on site.

Can the fibre alone be certified to PAS110 and ADQP in the case where the liquor is discharged to sewer?

REAL BCS's interpretation

We consider that the material that is produced as digestate fibre is technically suitable for certification under PAS 110, ADQP (Anaerobic Digestion Quality Protocol) & ASRS. However, a significant requirement for compliance with the ADQP is that there should be a market outlet for the disposal of the product to land. At this plant this is obviously the case with the solid fraction, but we have had to seek confirmation from the independent Certifying Bodies that carry out the certification inspections that the fact that the plant is disposing of cleaned liquor to sewer does not affect the conditions of PAS 110 and ADQP.

It is the opinion of the Certifying Bodies that the PAS110, the ADQP & ASRS do not exclude the situation where only the separated solids are submitted for certification and subsequent application to land.

Although it appears that within PAS110 and ADQP & ASRS the certification of fibre alone is allowable, we consider that it is in the spirit of the BCS to maximize the beneficial use of all elements of digestate including liquor. It would therefore be preferable for the plant to at least consider cleaning the liquid fraction that is being discharged to sewer to the state where it can be recycled as grey water.

Please note that even where BCS believes this process is in compliance with ADQP & ASRS, the regulatory authorities are the ultimate arbiters.

12 Food waste soup as an input material

An AD plant intends to apply for certification to PAS 110 and the ADQP through the BCS later in the year. The plant is starting to apply PAS and ADQP controls over their inputs and process. They currently accept food waste soup from a soup supplier and the EWC code is listed in Appendix B of the ADQP but the soup supplier will not disclose the soup ingredients.

The soup supplier describes the soup as 'compliant with ADQP input requirements' but will not list the waste types and proportions in the soup. This makes it difficult for the operator to perform a robust hazard analysis and to check whether the soup ingredients are permissible inputs in the QP.

REAL BCS's interpretation

REAL BCS advises that AD operators should not accept and process food waste soup from a supplier unless they have been provided with the full list of waste inputs and these inputs are ADQP compliant. The feedstock should be rejected if the supplier does not list the inputs.

If the waste inputs are compliant, the supplier should provide a full waste transfer note and a written supply agreement should be agreed and in place with the soup supplier, in accordance with clause 6.2 of PAS 110. The AD operator will then need to perform a hazard analysis in relation to the food waste soup inputs and in accordance with the requirements of PAS 110. If accepting waste soup, it is also important to ensure that the tankers are washed and clean.

13 Input materials

There is a requirement within PAS110:2014 under clause 6.1 to demonstrate that 'reasonable care shall be taken to avoid any contaminated wastes, products or materials from becoming included with the input materials' and that 'The pre-treatment shall use reasonable endeavours to remove non-biodegradable packaging prior to loading those biowastes / biodegradable materials into the digestion system'.

Depackaging equipment must not be designed to reduce contamination to particle size that will bypass the PAS110 physical contaminants test i.e. particles less than 2mm in a single dimension.

14 Sampling point

Clause 10.1 in PAS110:2014 details when samples should be taken depending on the digestated products produced.

Sampling for measurement of digestate stability shall be carried out at the end of the digestion process and prior to dispatch of digestate from the site of production. This means that whole digestate may be sampled for stability, prior to separation into liquor and fibre,

i.e. it is not compulsory to test each digested material output for stability if the whole digestate was sampled and tested before separation.

15 Sample transport and storage requirements

The sample shall be sent to the lab for testing within 1 day after the sample was taken. Samples waiting to be sent to the lab and archive samples should be stored in a dark, dry, cool place (ideally less than 10oC but not below 1oC. Insulated boxes with ice blocks shall be used to ensure the temperature is maintained (particularly relevant in the summer). Digestate samples should not be frozen prior to submission to the laboratory.

Operators should use a service that will deliver the sample to the laboratory within a maximum of 72 hours (24 hours is strongly recommended where possible), particularly if the sample is being tested for pathogen indicators.

16 Co-operatives and the pasteurisation exemption

A co-operative (farming / horticultural / forestry) may be set up to carry out one anaerobic digestion process within the co-operatives holdings. The below sets out the requirements that a co-operative must comply with.

16.1 Requirements for a cooperative

PAS110:2014 sets out criteria for digested materials made only from manure, unprocessed crops, processed crops, crop residues, glycerol, and/or used animal bedding that arise within a single holding or a co-operative and after digestion are returned to and used entirely within the same premises or holding or co-operative.

There must be a clearly identified entity / organisation or individual within the co-operative with the overall responsibility for the QMS. This identified person/organisation will be responsible for gathering the evidence of compliance with the requirements from all members of the co-operative.

Cooperatives must have a signed agreement in place as summarised below.

16.2 Terms of the agreement

There must be an agreement between the operator and a number of local farms (calling it a Co-operative), from which all the inputs for the AD plant would be sourced. If the cooperative are operating under clause 6.3 and 7.2.5 (exemptions for requirements for written supply agreements and pasteurization) then the materials must be used entirely within the same co-operative's premises or holdings and this should be stated in the agreement.

The agreement should be for a minimum of one year to stop farmers joining the cooperative for a short period and leaving immediately after supplying feedstock.

16.3 Signatories to the agreement

The signatories should include the plant operators, the person/organisation identified as responsible for the QMS, the land managers/farmers who are providing the feedstock and managing the digestate spreading and also the owners of any of the land that is managed by the land managers or farmers. It is important that the land owners are made aware ofthe risks as they may take over the management of the land soon after digestates have been applied.

16.4 Pathogen testing

Under circumstances where input materials arising within the co-operatives premises have not been through a pasteurisation step, the signatories to the agreement need to be aware of the risk that they may be exposing themselves to. There is still a requirement to test for Salmonella and E.coli.

16.5 Digested products

On delivery of the digestate, the digestate producer must supply a certificate stating what inputs (and sources) the digestate has been produced from and what the risks may be and highlighting the lack of pasteurisation where relevant. The digestate must be fit for purpose and the certificate must state what purposes the digestate is fit for. The certificate could detail that the AD operator has taken reasonable care to ensure that the digestate is free from named local plant pathogens, alert the end users to the risk from the lack of pasteurisation and naming the farms from which the unpasteurised material is derived. The pathogen testing in 16.2 of these rules may also be provided.

17 Non-conforming batches or portions of production

The operator shall have a clear, written contingency plan to deal with non-conforming batches or portions of production. Providing that the HACCP and quality management system are designed and implemented correctly, non-conforming batches should not be produced.

18 Equivalent pasteurisation stage

Where a plant does not have pasteurisation but accepts input material from a process that has an equivalent pasteurisation stage, (see 7.2.2 of PAS110:2014), the auditor must see satisfactory evidence (such as HACCP and input supply agreements) of the equivalent treatment and may need to be granted access to the site of the input production and associated documentation to verify pasteurisation has taken place. The CB may make additional charges for visiting additional sites.

19 Re-validation

In the event of significant changes, as stated in clause 4.8.5 in PAS110:2014, it may become necessary for some digestion processes to be re-validated. Whether or not a digested product may continue to use the BCS certificate and conformity mark during re-validation will depend on the circumstances in each case, and will be at the discretion of the Certification Body and in accordance with the requirements of the relevant regulatory bodies.

In the event that a member makes any change to their process which may include the QMS, HACCP, personnel, process, feedstock or equipment they must notify their CB. The CB will decide whether or not the change is significant and require revalidation. In the event that the change is not deemed to require re-validation the CB may request evidence from the member that the change has not had an impact on the quality of the digestate being produced. Following a change that requires re-validation the CB may grant the member positive release of batches of material that have been produced by a compliant process with test results to demonstrate the material passes on all relevant parameters.

Where appropriate the CB may carry out a spot check audit at the site, and may make a charge for this. The charge must be reasonable and agreed before the audit takes place

20 Dispatch information

When digestate is dispatched directly to a contractor that spreads digestate on behalf of a farmer/end user (third-party contractor), the operator shall supply a Contract of Supply or a Product Information Sheet to the company which contains clear terms and conditions for product storage and use. This should be accompanied by a Declaration Form.

The Declaration Form should be signed by the company declaring that all the required information has been passed on by the operator and the contractor will commit to minimising any risks associated with spreading. It is advisable that the operator obtains and keeps a copy of the Contract that has been signed by both parties and the Declaration Form that has been signed by the contractor.

REAL BCS recommends that operators use assured / certified contractors that have been independently audited and certified to a quality standard for land-based contractors. (One scheme recognised by REAL BCS is the Assured Land-Based Contractor (ALBC) Scheme run by the National Association of Agricultural Contractors (NAAC).) REAL also recommends that operators provide contractors with Defra's Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions, available here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729646/code-good-agricultural-practice-ammonia.pdf

21 Use of final effluent for feedstock dilution

An AD plant intends to apply for certification to PAS 110, the ADQP, and the BCS Scheme Rules later in the year. The input materials are all compliant with the ADQP, but water is added after de-packaging the feedstock to ensure that the material is of good consistency to be passed into the digesters. The water is sourced from the drinking water main on site. The facility is adjacent to a wastewater treatment works, which discharges final effluent to a local water course. Can this final effluent be used for feedstock dilution under the BCS?

REAL BCS's interpretation

Final effluent that is not discharged as per the Waste Water Treatment Works (WWTW) Environmental Permitting Regulations (EPR) water discharge permit is a 'waste' material with an EWC code that is not listed in Appendix B of the ADQP as a permissible input.

Therefore, this AD operator cannot use this final effluent for feedstock dilution, if they seek certification through the Biofertiliser Certification Scheme.

22 Physical contaminants testing of separated liquor

Table 1 of PAS 110 specifies the test parameters, upper limit values and declaration parameters for validation. The table specifies the upper limit values for physical contaminants in whole digestate (WD), separated liquor (SL), and separated fibre (SF).

NOTE 2 of Table 1 states that '*Separated liquor is exempt from physical contaminants tests only if the separation technology used by the producer results in all particles being < 2 mm in the separated liquor fraction.*'

Table 3 of PAS 110 specifies the minimum digestate testing and quality requirements after validation. The table specifies the upper limit values for physical contaminants in whole digestate (WD), separated liquor (SL), and separated fibre (SF).

NOTE 2 of Table 3 also states that '*Separated liquor is exempt from physical contaminants tests only if the separation technology used by the producer results in all particles being < 2 mm in the separated liquor fraction.*'

REAL BCS's interpretation

Based on the above clauses, our interpretation is that separated liquor can only be exempt from physical contaminants tests if the operator provides sufficient evidence that the separation technology used, results in all particles being < 2 mm in the separated liquor fraction. This also applies to operators using separation technologies with a screen of 1 mm.

Validation

One sample tested for physical contaminants during validation with results showing that all particles are < 2 mm is considered sufficient evidence. However, if the test results show that there are particles > 2mm, further samples are required to be taken and shall be dealt with as a test result failure, in accordance with section 13 of PAS 110. Validation shall only be achieved when test results show that particles are < 2 mm.

If test results for separated liquor do not show that all particles are < 2mm, then liquor will not be exempt from physical contaminants testing. Testing of (routine) samples taken after validation will be required and the upper limits for physical contaminants in Table 3 will apply.

After validation

If process validation is achieved and physical contaminants test results for separated liquor show that all particles are < 2 mm, separated liquor will be exempt from physical contaminants tests for routine sample testing. However, REAL BCS requires that one sample of separated liquor is tested for physical contaminants on an annual basis, as evidence that the separation technology continues to result in all particles being < 2 mm in the liquor fraction. If these test results show particles > 2mm, they shall be dealt with as test failures.

REAL BCS also requires that samples of separated liquor are tested for physical contaminants following any changes in separation or screening technologies, or any major changes to the input of physical contaminants (in source-segregated biodegradable materials and/or biowaste) e.g. new waste bags containing food waste from a commercial source, or new biodegradable packaging containing food waste from a municipal source.