

**Guidance Document**

# Digestates: Realising the fertiliser benefits for crops and grassland



This short document provides information on the agronomic and financial value of anaerobic digestates ('biofertilisers'), how they should be used and how they are regulated

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**Front cover photography:** Spreading whole digestate on grassland (picture courtesy of Bryan Lewens, AnDigestion)

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# Summary

In addition to biogas, the other product of anaerobic digestion is digestate (also known as 'biofertiliser'). The readily-available nutrients in biofertiliser make them an ideal part or complete replacement for conventional fertilisers. Table 1-1 shows the typical nutrient value of food-based and manure-based digestates when spread at a rate that provides 250kg of total nitrogen (N) per hectare. Table 1-2 shows the £ value of these nutrients.

Table 1-1 Nutrient contents in whole digestates (kg per hectare)

	<b>Food-based digestate</b>	<b>Manure-based digestate</b>
Application rate (m <sup>3</sup> /ha)	34	57
Total N	250	250
Readily Available N	202	145
Total P <sub>2</sub> O <sub>5</sub>	16.3	77.0
Total K <sub>2</sub> O	61.5	199
Total MgO	2.04	42.2
Total SO <sub>3</sub>	15.0	73.0

Table 1-2 Nutrient value in whole digestates (£ per hectare – based on July 2011 fertiliser prices)

	<b>Value (£/ha)</b>	
	<b>Food-based digestate</b>	<b>Manure-based digestate</b>
Readily Available N	196	138
Total P <sub>2</sub> O <sub>5</sub>	15	69
Total K <sub>2</sub> O	34	110
<b>Total</b>	<b>£245</b>	<b>£317</b>

The readily available nitrogen in biofertiliser is almost all present as ammonium-N. This means that biofertiliser should be applied to land using appropriate (low emission) spreading equipment, as this minimises the potential for ammonia loss. Under these conditions, the majority of the available nitrogen is placed in soils exactly where crops can use it.

This document is intended for farmers and farm advisors in Wales, to allow you to maximise the benefits of using digestates, whilst minimising any potential for environmental pollution and odours when spreading. Where appropriate, information is also provided for readers in other UK nations.

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## 1.0 Introduction

Anaerobic digestion is a managed activity that converts suitable biodegradable materials into biogas (used to generate renewable energy) and digestate (used as a partial or total fertiliser replacement). Biofertiliser is a term applied to digestate that has been independently accredited within the Biofertiliser Certification Scheme, providing a guarantee of digestate quality.

### 1.1 Why use digestate?

Digestates are an alternative to manufactured fertilisers, and by using them you can improve the sustainability of your cropping systems, whilst saving money on purchased fertiliser. Preliminary estimates<sup>1</sup> indicate that the fertilising value of digestate can save between 20 and 30kg CO<sub>2</sub> equivalent per cubic metre of digestate used – an increasingly important consideration for retailers, who are seeking to reduce the carbon footprint of their supply chains. Digestate (in particular the separated fibre fraction) can also contribute to soil organic matter, which in turn can improve soil quality, crop health and yields over the longer-term.

The quantity and crop-availability of the nutrients in digestate will depend on the process input materials, the process itself and any post-treatment manipulation of the digestate such as de-watering. While the total quantity of nutrients will be the same in the whole digestate as in the original input materials, the digestion process changes their crop availability – in particular, the majority of organic (slow release) nitrogen is transformed into (crop-available) ammonium nitrogen during digestion.

### 1.2 Different types of AD and digestate

There are three main types of digestate (whole, liquid and fibre), with whole biofertiliser currently being the most commonly available. Some anaerobic digestion plant operators opt to separate the biofertiliser into liquid and fibre fractions for operational reasons. The fibre fraction typically has a dry matter content of between 20 and 40% and the liquid fraction between 1 and 4%, although these proportions will vary depending upon the separation process or processes employed.

Digestates with different dry matter contents may need to be spread with different equipment. Please refer to Section 4.0.

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<sup>1</sup> Keith James, WRAP

## 2.0 What is the fertilising value of digestate?

To allow you to make best advantage of the crop-available nutrients in any kind of digestate or other 'organic manure', you should request a nutrient analysis of the material from the supplier.

As well as Nitrogen, Phosphorus and Potassium (NPK), digestates contain Magnesium (Mg) and Sulphur (S). Digestates can be made from a wide range of input materials and this will influence the nutrients in the final product. Examples are shown in Table 2-1.

Table 2-1 Example analyses for two types of whole digestate

	Units	Food-based digestate	Manure-based digestate
Dry Matter (solids)	%	4.33	8.22
pH		8.41	8.22
Specific Gravity (density)	kg/m <sup>3</sup>	0.99	0.97
Total N	kg/m <sup>3</sup>	7.35	4.40
Readily Available N	kg/m <sup>3</sup>	5.94	2.55
Total Phosphate (P <sub>2</sub> O <sub>5</sub> )	kg/m <sup>3</sup>	0.48	1.35
Total Potash (K <sub>2</sub> O)	kg/m <sup>3</sup>	1.81	3.49
Total Magnesium (MgO)	kg/m <sup>3</sup>	0.06	0.74
Total Sulphur (SO <sub>3</sub> )	kg/m <sup>3</sup>	0.44	1.28

Maximum application rates tend to be based on the total nitrogen content (rather than available nitrogen content) but best practice may not allow you to apply maximum rates at all times (for example, due to soil wetness or where soil phosphate indices are greater than 3). Examples are shown in Table 2-2.

Table 2-2 Nutrients applied (kg/hectare)

	Food-based digestate	Manure-based digestate
Application rate m <sup>3</sup> /ha	34	57
Total N	250	250
Readily Available N	202	145
Total P <sub>2</sub> O <sub>5</sub>	16.3	77.0
Total K <sub>2</sub> O	61.5	199
Total MgO	2.04	42.2
Total SO <sub>3</sub>	15.0	73.0

The effectiveness, or fertiliser replacement value, of the nitrogen in biofertilisers will initially depend on the proportion of the crop-available nitrogen they contain, and you should request a 'Readily Available Nitrogen' or 'ammonium-nitrogen' analysis from your supplier. However, the application method will significantly affect the

amount of ammonium that reaches the soil and hence plant roots, with splash-plate application being particularly wasteful of the nutrient resource. The time of year also affects how much of the applied nitrogen can be utilised by the following crop. More information on application equipment can be found in Section 4.0.

## 2.1 Minimising ammonia losses

The following text is taken from the Fertiliser Manual ([RB209](#))<sup>2</sup>, and highlights the importance of choosing the right application technique to minimise losses of available nitrogen (present in digestate as ammonium) to the air during spreading:

*Around 40% of the readily available nitrogen content of manures is often lost following surface application to land. Ammonia loss and odour nuisance can be reduced by ensuring that manures are rapidly incorporated into soils (within 6 hours of application for slurries and 24 hours for solid manures to tillage land). For slurries, shallow injection and band spreading techniques are effective application methods that reduce ammonia emission (typically by 30- 70%) compared with broadcast application. Also, slurry band spreading (trailing shoe and trailing hose) and shallow injection application techniques increase the number of spreading days, and cause less sward contamination than surface broadcast applications. These practices will also increase the amount of nitrogen available for crop uptake. Ammonia losses are generally smaller from low dry matter slurries because they more rapidly infiltrate into the soil. Higher dry matter slurries remain on the soil/crop surface for longer leading to greater losses. Losses are also higher when slurries are applied to dry soils under warm weather conditions.*

## 3.0 What is the financial value of the nutrients in digestate?

Fertiliser prices (Table 3-1) are very changeable, but have risen markedly in recent years. This has led to an increase in the value of digestates as a replacement for inorganic fertilisers.

Table 3-1 Fertiliser prices<sup>3</sup> (July 2011)

	Nutrient content	£/kg nutrient
Ammonium nitrate	34.5%N	0.95
Phosphate (TSP)	46% P <sub>2</sub> O <sub>5</sub>	0.89
Muriate of Potash	60% K <sub>2</sub> O	0.55

Benefits from the contributions made by magnesium, sulphur and organic matter in digestates are harder to value. However, Defra and WRAP are funding field trials to assess these benefits.

Table 3-2 Whole digestate value (per hectare, when spread at a rate providing 250kg total-N)

	Availability	Value (£/ha)	
		Food-based digestate	Manure-based digestate
Readily Available N	100%	196	138
Total P <sub>2</sub> O <sub>5</sub>	50%	15	69
Total K <sub>2</sub> O	80%	34	110
<b>Total</b>		<b>£245</b>	<b>£317</b>

<sup>2</sup> <http://www.defra.gov.uk/publications/fertiliser-manual-rb209/>

<sup>3</sup> Based on fertiliser prices taken from Farm Brief at the time of writing

The nutrient-availability and value for any digestate that you would like to use should be calculated by your FACTS advisor, but examples of fertiliser values per hectare for two types of whole digestate are provided in Table 3-2. These are based on the fertiliser prices listed in Table 3-1 and the nutrient applications listed in Table 2-2. For the manure-based digestate this equates to £7.21/m<sup>3</sup> for NPK; for the food-based digestate this is equivalent to £5.56/m<sup>3</sup> for NPK.

For up-to-date figures on the fertiliser replacement value of quality compost and digestate, visit [www.wrap.org.uk/farming\\_growing\\_and\\_landscaping/compost\\_calculator.html](http://www.wrap.org.uk/farming_growing_and_landscaping/compost_calculator.html)

## 4.0 Spreading digestate

A FACTS advisor should be used to plan nutrient requirements and application rates, whether the nutrients are provided by digestate (or other 'organic manures') or inorganic fertilisers. Guidance is provided in the Fertiliser Manual (RB209)<sup>4</sup>. There are various sources of help with planning nutrient use such as MANNER-NPK<sup>5</sup>, PLANET<sup>6</sup> and nutrient management information websites<sup>7</sup>. Since digestate is a relatively 'new' material, it is not currently listed within these decision support systems, and current advice is to use pig slurry as a proxy for digestate when using these tools.

To make best use of digestate, 'low emission' application equipment is recommended, namely a bandspreader (trailing hose/trailing shoe, see Plate 1) or shallow injector, see Plate 2, which will reduce ammonia losses (and odour nuisance) compared to surface broadcast application (please refer to Section 2.1 for more information on this).

Bandspreading equipment is now available that allows accurate topdressing across full tramline widths, without causing crop damage and contamination, and increases the number of spreading days.

For further information on application equipment please refer to "Managing Livestock Manures Booklet 3: Spreading Systems for Slurries and Solid Manures"<sup>8</sup>.



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Plate 1. Bandspread application to arable land

Plate 2. Shallow injection application to grassland

Where relevant, digestate applications to agricultural land must also comply with the Animal By-Products Regulations, whereby, land cannot be used for grazing (or cropped for forage) within 3 weeks (or 2 months for pigs) of applying digestate<sup>9</sup>.

<sup>4</sup> <http://www.defra.gov.uk/publications/fertiliser-manual-rb209/>

<sup>5</sup> <http://www.adas.co.uk/MANNER/FurtherInfo/tabid/274/Default.aspx>

<sup>6</sup> <http://www.planet4farmers.co.uk/>

<sup>7</sup> <http://www.nutrientmanagement.org/>

<sup>8</sup> <http://archive.defra.gov.uk/foodfarm/landmanage/land-soil/nutrient/documents/manure/livemanure3pt1.pdf>

<sup>9</sup> For further information see <http://www.environment-agency.gov.uk/netregs/63499.aspx>



To minimise water pollution risks, digestate applications should not be made when:

- the soil is waterlogged; or
- the soil is frozen hard; or
- the field is snow covered; or
- the soil is cracked down to field drains or backfill; or
- the field has been pipe or mole drained or sub-soiled over drains in the last 12 months; or
- heavy rain is forecast within the next 48 hours.

Also, applications should not be made:

- within 10 metres of any ditch, pond or surface water; or
- within 50 metres of any spring, well, borehole or reservoir that supplies water for human consumption or for farm dairies; or
- on very steep slopes where run-off is a high risk throughout the year.

For further information on the management of organic material applications please refer to the “Code of Good Agricultural Practice” in England (Defra, 2009<sup>10</sup>), “The Code of Good Agricultural Practice for Wales” (WAG, 2011<sup>11</sup>) or “Prevention of Environmental Pollution from Agricultural Activity” (Scottish Government, 2005<sup>12</sup>).

#### 4.1 Nitrate Vulnerable Zones

In Nitrate Vulnerable Zones (NVZs), the total quantity of N applied in organic materials (including digestate) must not exceed 250 kg N/ha in any 12 month period (*i.e.* the field-N limit). In some situations, lower application rates may be appropriate, for example, where the amount of crop available N would exceed the crop requirement. Also, digestate (in common with other high RAN organic materials) must not be applied prior to legume crops, as these crops have no N requirement. As the RAN content of digestate exceeds 30% of the total N content, digestate (like cattle and pig slurry) applications are subject to mandatory closed spreading periods during autumn/winter in NVZs.

The following information is taken from Defra’s “Guidance for Farmers in Nitrate Vulnerable Zones: Leaflet 1”<sup>13</sup>:

Table 4-1 Closed spreading periods for organic manures

<b>Grassland</b>		<b>Tillage land</b>	
<i>Sandy or shallow soils</i>	<i>All other soils</i>	<i>Sandy or shallow soils</i>	<i>All other soils</i>
<i>1 Sep – 31 Dec</i>	<i>15 Oct – 15 Jan</i>	<i>1 Aug – 31 Dec*</i>	<i>1 Oct – 15 Jan</i>

\*On tillage land with sandy or shallow soils, application is permitted between 1 August and 15 September inclusive, provided a crop is sown on or before 15 September

Registered organic producers may apply organic manures during the close periods subject to certain conditions. From the end of the closed period until the last day in February, the maximum amount you can apply to land at any one time is 50m<sup>3</sup>/ha of slurry. There must be at least three weeks between each individual application.

Further guidance on NVZ regulations is provided for:

- Wales on the Welsh Government [website](#)<sup>14</sup>
- England, on the Defra [website](#)<sup>15</sup>
- Scotland, on the Scottish Government [website](#)<sup>16</sup>

<sup>10</sup> <http://archive.defra.gov.uk/foodfarm/landmanage/coqap/documents/coqap090202.pdf>

<sup>11</sup> <http://wales.gov.uk/docs/legislation/inforcononsi/environmental/110304code20eng.pdf>

<sup>12</sup> <http://www.scotland.gov.uk/Resource/Doc/37428/0014235.pdf>

<sup>13</sup> <http://archive.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/documents/leaflet1.pdf>

<sup>14</sup> <http://wales.gov.uk/topics/environmentcountryside/epq/waterflooding/nitratezones/>

<sup>15</sup> <http://www.defra.gov.uk/food-farm/land-manage/nitrates-watercourses/nitrates/>

## 4.2 Other controls on application

Farmers who receive payments under the Single Payment Scheme (and certain rural development schemes) must maintain their land in Good Agricultural and Environmental Condition (GAEC). GAEC measures relating to soils, environmental protection and the land application of organic materials are somewhat different in England, Wales and Scotland, but importantly in the context of biofertiliser recycling to land, all highlight the important of managing applications to avoid causing soil compaction. For further information on GAEC rules see the Environment Agency [website](#)<sup>17</sup>.

In Scotland, General Binding Rules (GBRs) place legal restrictions on how and when organic materials can be spread. Further guidance on GBRs and diffuse pollution regulations are available from the Scottish Environmental Protection Agency (SEPA) [website](#)<sup>18</sup>.

## 4.3 Digestate spreading equipment

A range of equipment is readily available for spreading digestates. Fibre digestate can be spread using conventional broadcast spreaders, but more specialised equipment is recommended for spreading whole and liquor digestates (Table 4-2).

Table 4-2 Spreading equipment types

Equipment	Digestate Fraction Application	Typical dry matter tolerance
<b>Irrigator</b>	Liquor – yes if DM% allows Whole digestate unlikely to be suitable due to DM% and particulates	Up to 3%
<b>Dual purpose spreader (or side impeller discharge spreader)</b>	Fibre – yes Whole digestate or liquor – no	
<b>Broadcast Spreader</b>	Fibre – yes Whole digestate or liquor – no	Up to 12%
<b>Band Spreader</b>	Liquor – yes Whole digestate if DM% and particulates allow	Up to 9%
<b>Trailing Hose/Shoe</b>	Liquor - yes Whole digestate if DM% and particulates allow	Up to 6%
<b>Shallow injector</b>	Liquor - yes Whole digestate if DM% and particulates allow	Up to 6%
<b>Deep Injector</b>	Liquor - yes Whole digestate if DM% and particulates allow	Up to 6%

<sup>16</sup> <http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/Environment/NVZintro>

<sup>17</sup> <http://www.environment-agency.gov.uk/netregs/businesses/agriculture/61895.aspx>

<sup>18</sup> [http://www.sepa.org.uk/water/water\\_regulations/regimes/pollution\\_control/diffuse\\_pollution.aspx](http://www.sepa.org.uk/water/water_regulations/regimes/pollution_control/diffuse_pollution.aspx)

#### 4.4 Minimising possible odours during spreading

Odour is usually due to the release of ammonia, sulphurous compounds or volatile fatty acids (VFAs) during spreading, but this can be mitigated by using the right type of equipment and under the right weather conditions. Considerations:

- Check the weather forecast prior to spreading;
- Check the wind direction and try to spread only when wind is blowing away from neighbouring properties;
- Avoid spreading at weekends, bank holidays or evenings;
- Do not spread close to houses;
- Avoid frequent spreading in the same area;
- Avoid very heavy applications;
- Plough in immediately after spreading or use injection to minimise odour.

#### 4.5 Spreading equipment suppliers

Details of companies providing spreading equipment or contract services in Wales (and some from England, France and The Netherlands) are provided below. This list is provided as a guide only, and the presence of a company on this list does not indicate endorsement of its services by WRAP.

Company	Website	Address	Telephone	email	Comments
Allun T Jones	<a href="http://talunjones.co.uk/contact">http://talunjones.co.uk/contact</a>	Danycapel Garage, Dryslwyn, Carmarthenshire, SA32 8SD	01558 668383	<a href="mailto:gwlithyn@talunjones.co.uk">gwlithyn@talunjones.co.uk</a>	Supplier
A M Engineering	<a href="http://www.aandm-engineering.co.uk/">http://www.aandm-engineering.co.uk/</a>	A and M Engineering, Blewgyd, St. Clears, Carmarthen, SA33 4LX	01994 231144	<a href="mailto:markatherton@aandm-engineering.co.uk">markatherton@aandm-engineering.co.uk</a>	Supplier
Beacon Plant	<a href="http://www.beaconplant.co.uk/">http://www.beaconplant.co.uk/</a>	2/3 Login, Trecastle, Brecon, Powys LD3 8UH	01874 636900	<a href="mailto:hello@beaconplant.co.uk">hello@beaconplant.co.uk</a>	Supplier/ hire
J Davies & Son	<a href="http://www.jdaviespencader.co.uk/contact.php">http://www.jdaviespencader.co.uk/contact.php</a>	Gwastod Abbot, New Inn, Pencader. Carmarthenshire, SA39 9AZ	01559 384886	<a href="mailto:info@jdaviespencader.co.uk">info@jdaviespencader.co.uk</a>	Supplier
Emyr Evans	<a href="http://www.emyrevans.co.uk/store/Home.aspx">http://www.emyrevans.co.uk/store/Home.aspx</a>	Unit 9, Colomendy Industrial Estate, Denbigh, Denbighshire, LL16 5TA  Gaerwen Industrial Estate, Gaerwen, Anglesey, LL60 6HR	01745 812333	<a href="mailto:denbigh@emyrevans.co.uk">denbigh@emyrevans.co.uk</a>	Supplier

<b>Company</b>	<b>Website</b>	<b>Address</b>	<b>Telephone</b>	<b>email</b>	<b>Comments</b>
Jackson Pumping Systems Ltd	<a href="http://www.jpssystems.co.uk/contact.aspx">http://www.jpssystems.co.uk/contact.aspx</a> <a href="http://www.slurrysolutions.co.uk/">http://www.slurrysolutions.co.uk/</a>	The Old Airfield, Martin Moor, Metheringham, Lincoln. LN4 3BQ	01526 378005	<a href="mailto:sales@jpssystems.co.uk">sales@jpssystems.co.uk</a>	Supplier/ contractor
J & J Farm Services	<a href="http://www.jjfarmservices.co.uk/">http://www.jjfarmservices.co.uk/</a>	J & J Farm Services, Unit 15, Lion Works, Pool Road, Newtown, Powys, SY16 3AG	0845 013 8049	No generic email contact - use contact form	Supplier
LAS Agric Ltd	<a href="http://www.las.eu.com/">http://www.las.eu.com/</a>	Redstone Road, Narberth, Pembrokeshire, SA67 7ES	01834 860 202	<a href="mailto:info@las.eu.com">info@las.eu.com</a>	Supplier
m-track	<a href="http://www.m-trac.co.uk/">http://www.m-trac.co.uk/</a>	M-Trac Cymru, Bryncir Garage, Bryncir, Garndolbenmaen, Gwynedd, LL51 9LX	01766 530 555	<a href="mailto:post@mtraccymru.co.uk">post@mtraccymru.co.uk</a>	Supplies
Mike Price	<a href="http://www.mikeprycemachinery.com/contact%20us.asp">http://www.mikeprycemachinery.com/contact%20us.asp</a>	Greenfields Farm, Four Crosses, Llanymynech, Powys, SY22 6RF	01691 830308	No generic email contact - use contact form	Suppliers
M.P.Hire Limited	<a href="http://www.mp-hire.com/">http://www.mp-hire.com/</a>	The Elms, Newtown, Nr Wem, Shropshire, SY4 5NU	01939 233244	<a href="mailto:bryan@mp-hire.com">bryan@mp-hire.com</a>	Hire/ contractors

Company	Website	Address	Telephone	email	Comments
Nutritech	<a href="http://nutritech.co.uk/">http://nutritech.co.uk/</a>	Bathafarn Farm Ruthin Denbighshire N.Wales LL15 2YA	01824 709907	<a href="mailto:info@nutritech.co.uk">info@nutritech.co.uk</a>	Suppliers/ contractor
Pichon	<a href="http://www.pichonindustries.com/ex/english/injector.html">http://www.pichonindustries.com/ex/english/injector.html</a>	PICHON S.A. BP 21, ZI de Lavallot F-29490 Guipavas - France	00 33 2 98 34 41 00	<a href="mailto:info@pichonindustries.com">info@pichonindustries.com</a>	Manufacturer/ supplier
Pollution Control (UK) Ltd	<a href="http://www.pollution-control.co.uk/contact.htm">http://www.pollution-control.co.uk/contact.htm</a>	Unit 2 Hecla Works, Brown Street, Bamber Bridge, Preston, PR5 6LW	01772 620066	<a href="mailto:info@pollution-control.co.uk">info@pollution-control.co.uk</a>	Supply and design of slurry systems
Riverlea	<a href="http://www.riverlea.co.uk">http://www.riverlea.co.uk</a>	Contact through website			Supplier
Schuite maker	<a href="http://www.sr-schuitemaker.nl">http://www.sr-schuitemaker.nl</a>	Nearest supplier - TH White, Glos Toddington / Huntley	Andy Daffurn 07860 331023 David Russell 07836 729139 Richard Amphlet 07824 607087 Nick Townsend 07771 389619	<a href="mailto:ard@thwhite.co.uk">ard@thwhite.co.uk</a> <a href="mailto:dhr@thwhite.co.uk">dhr@thwhite.co.uk</a> <a href="mailto:rga@thwhite.co.uk">rga@thwhite.co.uk</a> <a href="mailto:ndt@thwhite.co.uk">ndt@thwhite.co.uk</a>	Manufacturer  TH White is example supplier
Slurrykat	<a href="http://www.slurrykat.co.uk/">http://www.slurrykat.co.uk/</a>	Unit 49, Burnett Business Park, Gypsy Lane, Burnett, Keynsham, Bristol, BS31 2ED	0117 9866163	<a href="mailto:admin@slurrykat.co.uk">admin@slurrykat.co.uk</a>	Supplier/ contractor
Spreadwise	<a href="http://www.spreadwise.com/contactus.html">http://www.spreadwise.com/contactus.html</a>	Dairy House Farm, Worleston, Nantwich, Cheshire, CW5 6DN	01270 623566	<a href="mailto:info@spreadwise.com">info@spreadwise.com</a>	Supply and design for slurry systems

<b>Company</b>	<b>Website</b>	<b>Address</b>	<b>Telephone</b>	<b>email</b>	<b>Comments</b>
Tramspread	<a href="http://www.tramspread.co.uk/applicators.html">http://www.tramspread.co.uk/applicators.html</a>	Stowmarket, Suffolk	01449 766133	<a href="mailto:info@tramspread.co.uk">info@tramspread.co.uk</a>	Manufacturer and dealer eg Joskin
Trimble	<a href="http://www.ascommunications.co.uk/">http://www.ascommunications.co.uk/</a>	AS Communications (UK) Ltd (Agriculture), Agden Green Farm, The Green, Great Staughton, St. Neots PE19 5DQ	01480 861824	No generic email contact - use contact form	GPS and flow systems for applicators

## 5.0 What can digestate be made from and how is it regulated?

### 5.1 Inputs and treatment

Digestate can be made from a range of source-segregated biodegradable materials. Food wastes from households, food processing and retail sources (catering wastes) are treated by many facilities. Livestock slurries and purpose-grown crops are also common inputs. Any feedstocks that have potentially been in contact with, or contain, meat or other types of permitted low risk animal by-products (ABP), are controlled by regulations in addition to environmental permitting and will require that the process includes a pasteurisation step (e.g. 1 hour at 70°C, with a particle size <12 mm). Approval of the process conditions and treatment facilities for ABP is governed by the Animal Health and Veterinary Laboratories Agency (formerly the State Veterinary Service). Pasteurisation is also a key requirement within the BSI PAS110 specification, even for processes that do not accept ABP.

The design of anaerobic digestion systems also varies widely. However, the main types are either continuous wet or dry systems, that are run at either mesophilic (30-40°C) or thermophilic (50-60°C) temperatures. Most UK operators use mesophilic anaerobic digestion (MAD) systems.

### 5.2 Digestate as 'waste' or 'product'

[BSI PAS 110](#)<sup>19</sup> is a baseline voluntary specification that covers process inputs and control, as well as digestate quality. It only applies to source-segregated biodegradable inputs (those that have been collected separately from non-biodegradable inputs), and does not allow the use of sewage sludge or its derivatives. Unless the process is carried out on farm and using only inputs sourced from that farm (and the resulting digestate is spread back on the same farm), the PAS requires that a pasteurisation step be included within the process. It also includes a set of compulsory quality criteria that include limits for digestate stability and heavy metals.

The Anaerobic Digestate Quality Protocol ([ADQP](#)<sup>20</sup>) defines the point at which biofertiliser made from waste materials (such as vegetable processing wastes or household food waste) can be regarded as a product and ceases to be waste. The ADQP restricts the input materials, and certified digestate may only be used in designated markets, which include agriculture and field or soil-grown horticulture. Records of digestate use and soil analysis are required when the digestate is used in agriculture. It should be noted that the ADQP applies across the UK, except in Scotland – where PAS110 is still a requirement, but other conditions of use apply. Further information is available from the Biofertiliser Certification Scheme [website](#)<sup>21</sup>.

Digestates produced solely from manures, slurries and purpose-grown crops may not be subject to the same waste management regulations, and may not need to be certified to BSI PAS 110 and the ADQP to be considered products<sup>22</sup>.

#### The Anaerobic Digestion Quality Protocol (ADQP) and Biofertiliser Certification Scheme<sup>23</sup>

The Biofertiliser Certification Scheme (BCS) provides independent assessment of conformance with BSI PAS 110 plus the ADQP, and awards use of its quality mark for each compliant digestate.



<sup>19</sup> [http://www.wrap.org.uk/downloads/PAS110\\_vis\\_10.bfff4dc9.8536.pdf](http://www.wrap.org.uk/downloads/PAS110_vis_10.bfff4dc9.8536.pdf)

<sup>20</sup> [http://www.environment-agency.gov.uk/static/documents/Business/AD\\_Quality\\_Protocol\\_GEH00610BSVD-E-E.pdf](http://www.environment-agency.gov.uk/static/documents/Business/AD_Quality_Protocol_GEH00610BSVD-E-E.pdf)

<sup>21</sup> <http://www.biofertiliser.org.uk/>

<sup>22</sup> [http://www.environment-agency.gov.uk/static/documents/Research/PS\\_029\\_AD\\_of\\_agricultural\\_manures\\_and\\_slurry\\_final.pdf](http://www.environment-agency.gov.uk/static/documents/Research/PS_029_AD_of_agricultural_manures_and_slurry_final.pdf)

<sup>23</sup> <http://www.biofertiliser.org.uk/>



## 6.0 Where to obtain digestate

A list of [digestate producers](#)<sup>24</sup> can be obtained from the [official UK portal](#)<sup>25</sup> for anaerobic digestion. Information regarding biofertiliser certification is available from the [Biofertiliser Certification Scheme](#)<sup>26</sup> website, which includes a list of those facilities currently accredited to PAS110 and the ADQP.

## 7.0 Further information

For further information about anaerobic digestion, the benefits of digestates and current digestate field experiments visit:

[www.iea-biogas.net](http://www.iea-biogas.net)

*The International Energy Agency (IEA) is an autonomous organisation which works to ensure reliable, affordable and clean energy for its 28 member countries and beyond. Task 37 is a working group which covers the biological treatment of the organic fraction of municipal solid waste (OFMSW) as well as the anaerobic treatment of organic rich industrial waste water. The main interests are the production of biogas and a digestate of a high quality.*

[www.wrap.org.uk/dc-agri](http://www.wrap.org.uk/dc-agri)

*The Digestate & Compost in Agriculture project is a four year research project looking at the use of quality anaerobic digestate (biofertiliser) and compost in agriculture, integrated with an extensive knowledge exchange network. The project is funded jointly by Defra, WRAP (Waste & Resources Action Programme), WRAP Cymru and Zero Waste Scotland.*

[www.biofertiliser.org.uk](http://www.biofertiliser.org.uk)

*The Biofertiliser Certification Scheme provides assurance to consumers, farmers, food producers and retailers that biofertiliser is safe and of good quality. Biofertiliser is the name adopted within the BCS for quality digestate which is the by-product from a biogas plant that uses anaerobic digestion to break down organic material left over from food and farm processes.*

[www.biogas-info.co.uk](http://www.biogas-info.co.uk)

*The Official Information Portal on Anaerobic Digestion. This portal is a gateway to information on anaerobic digestion, biogas and digestate. Information relevant to England and Northern Ireland users is provided where applicable*

<sup>24</sup> <http://biogas-info.co.uk/maps/index2.htm>

<sup>25</sup> <http://biogas-info.co.uk/>

<sup>26</sup> <http://www.biofertiliser.org.uk/>

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