

Conclusions on BAT from the Slaughterhouses and Animal By-product Industries BAT Reference Document

READ ME:

The 'Conclusions on BAT from the Slaughterhouses and Animal By-product Industries BAT Reference Document' is a vertical BREF that addresses activities for the slaughter of animals and activities for the disposal or recycling of animal carcasses and animal waste. These include rendering, fish-meal and fish-oil production, bone processing and blood processing.

For each BAT, in the following table, state whether it is applicable to your installation and describe how each BAT applies or not to your installation and provide information on your compliance with the requirement.

It may be useful to first identify all the '**Not Applicable**' BATs and provide your reasoning in the '**Applicability Assessment**' box as to why you consider this particular BAT is not applicable at/to your entire installation having regard to the scope/ definitions, general considerations and the information on applicability. (You may need to make reference to relevant processes/activities or individual emission points to provide a comprehensive response).

Please use the '**Scope**' box to describe the relevant activities/processes that come within the scope of this BREF.

For each applicable BAT, in the following table, state the status; '**Yes**' or '**Will be**' as appropriate in the '**State whether it is in place or state schedule for implementation**' box. The use of each of these terms is described below.

Information on compliance in the '**Applicability Assessment**' box should include, where applicable, the following:

- (i) Identification of the relevant process/ activity or individual emission points that the BAT requirement applies to at your installation;
- (ii) Where BAT is to use one or a combination of listed techniques, specify the technique(s) implemented/proposed at your installation to achieve the BAT; and
- (iii) A comment on how the requirements are being met or will be met, e.g., a description of the technology/operational controls/management proposed to meet the requirements.

Use of terms: (a) '**Yes**' – To be entered where the installation is currently compliant with this BAT requirement.

(b) '**Will be**' – To be entered where a further technique is required to be installed to achieve compliance with the BAT requirement. In this case you must also specify the date by which the installation will comply with the BAT Conclusion requirement.

Please refer to the EPA BAT Guidance Note relevant to the sector for BAT associated emission levels. EPA BAT Guidance Notes are the reference for setting emission limit values (without prejudice to the requirements of environmental quality standards).

BAT Guidance Notes are available on the EPA website. Some Guidance Notes are hyperlinked below:

[BAT Guidance Note on Best Available Techniques for the Animal Slaughtering Sector](#)

[BAT Guidance Note for Disposal or Recycling of Animal Carcasses & Animal Waste Sector.](#)

[BAT Guidance Note on Best Available Technique for the Manufacturing of Fish Meal and Fish Oil.](#)

Conclusions on BAT from the Slaughterhouses and Animal By-products Industries BAT Reference Document (extracts)

The full and complete Slaughterhouses and Animal By-products Industries BAT reference document (May 2005) is available at the EIPPC Bureau website: <http://eippcb.jrc.ec.europa.eu/reference/>

SCOPE

Identify here the particular processes and activities at the installation that come within the scope of the conclusions on BAT from the Slaughterhouses and Animal By-products Industries BAT reference document (BREF).

Conclusions on BAT	Applicability Assessment (describe how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
5.1 Slaughterhouses and animal by-products installations		
5.1.1 General Processes and operations For all slaughterhouses and animal by-products installations, BAT is to do all of the following:		
BAT 1. BAT is to use an environmental management system (see Section 4.1.1 and 5.1.1.1).		
BAT 2. BAT is to provide training (see Section 4.1.2).		
BAT 3. BAT is to use a planned maintenance programme (see Section 4.1.3).		
BAT 4. BAT is to apply dedicated metering of water consumption (see Section 4.1.4).		
BAT 5. BAT is to separate process and non-process waste water (see Section 4.1.5).		
BAT 6. BAT is to remove all running water hoses and repair dripping taps and toilets (see Section 4.1.7).		

<p>BAT 7. BAT is to fit and use drains with screens and/or traps to prevent solid material from entering the waste water (see Section 4.1.11).</p>		
<p>BAT 8. BAT is to dry clean installations and transport by-products dry (see Section 4.1.12), followed by pressure cleaning (see Section 4.1.10) using hoses fitted with hand-operated triggers (see Section 4.1.9) and where necessary hot water supplied from thermostatically controlled steam and water valves (see Section 4.1.23).</p>		
<p>BAT 9. BAT is to apply overfilling protection on bulk storage tanks (see Section 4.1.13).</p>		
<p>BAT 10. BAT is to provide and use bunds for bulk storage tanks (see Section 4.1.14).</p>		
<p>BAT 11. BAT is to implement energy management systems (see Sections 4.1.16 and 4.1.17).</p>		
<p>BAT 12. BAT is to implement refrigeration management systems (see Section 4.1.18).</p>		
<p>BAT 13. BAT is to operate controls over refrigeration plant running times (see Section 4.1.19).</p>		
<p>BAT 14. BAT is to fit and operate chill room door closing switches (see Section 4.1.21).</p>		
<p>BAT 15. BAT is to recuperate heat from refrigeration plants (see Section 4.1.22).</p>		
<p>BAT 16. BAT is to use thermostatically controlled steam and water blending valves (see Section 4.1.23).</p>		
<p>BAT 17. BAT is to rationalise and insulate steam and water pipework (see Section 4.1.24).</p>		
<p>BAT 18. BAT is to isolate steam and water services (see Section 4.1.25).</p>		
<p>BAT 19. BAT is to implement light management systems (see Section 4.1.26).</p>		

BAT 20. BAT is to store animal by-products for short periods and possibly to refrigerate them (see Section 4.1.27).		
BAT 21. BAT is to audit odour (see Section 4.1.28).		
BAT 22. BAT is to design and construct vehicles, equipment and premises to ensure that they are easy to clean (see Section 4.1.30).		
BAT 23. BAT is to clean materials storage areas frequently (see Section 4.1.31).		
BAT 24. BAT is to implement a noise management system (see Section 4.1.36).		
BAT 25. BAT is to reduce noise at, e.g. roof extract fans, balance lagoon blowers and refrigeration plants (see Sections 4.1.3, 4.1.36, 4.1.37, 4.1.38 and 4.1.39).		
BAT 26. BAT is to replace the use of fuel oil with natural gas, where a natural gas supply is available (see Section 4.1.40).		
BAT 27. BAT is to enclose animal by-products during transport, loading/unloading and storage (see Section 4.1.29).		
BAT 28. BAT is to where it is not possible to treat blood before its decomposition starts to cause odour problems and/or quality problems, refrigerate it as quickly as possible and for as short a time as possible, to minimise decomposition (see Section 4.2.1.8).		
BAT 29. BAT is to export any heat and/or power produced which cannot be used on-site.		
5.1.1.1 BAT for environmental management		
BAT 30. BAT is to implement and adhere to an Environmental Management System (EMS) that incorporates, as appropriate to individual circumstances, the following features: (see Chapter 4)		

<ul style="list-style-type: none"> • definition of an environmental policy for the installation by top management (commitment of the top management is regarded as a precondition for a successful application of other features of the EMS) • planning and establishing the necessary procedures • implementation of the procedures, paying particular attention to <ul style="list-style-type: none"> – structure and responsibility – training, awareness and competence – communication – employee involvement – documentation – efficient process control – maintenance programme – emergency preparedness and response – safeguarding compliance with environmental legislation. • checking performance and taking corrective action, paying particular attention to monitoring and measurement (<i>see also the Reference document on Monitoring of Emissions</i>) <ul style="list-style-type: none"> – corrective and preventive action – maintenance of records – independent (where practicable) internal auditing in order to determine whether or not the environmental management system conforms to planned arrangements and has been properly implemented and maintained. • review by top management. 		
<p>5.1.2 Integration of same site activities</p>		
<p>BAT 31. For slaughterhouses and/or animal by-products installations, operating on the same site, BAT is to do the following: 1 re-use heat and/or power produced in one activity in other activities (see Sections 4.4.1, 4.4.2 and 4.4.3) and 2 share abatement techniques, where these are required, e.g. WWTPs For rendering and incineration on the same site, BAT is to do the following:</p>		

1 burn non-condensable gases produced during rendering in a same site incinerator (see Sections 4.4.2 and 4.4.3).		
5.1.3 Collaboration with upstream and downstream activities		
BAT 32. BAT is to seek collaboration with upstream and downstream partners, to create a chain of environmental responsibility, to minimise pollution and to protect the environment as a whole, (see, e.g. Sections 4.2.2.1.1, 4.2.2.1.2, 4.1.27, 4.3.1.4, 4.3.4.1, 4.3.8.7 and 4.2.2.9.10).		
5.1.4 Installation and equipment cleaning		
BAT 33. For the cleaning of slaughterhouses and animal by-products installations, BAT is to do the following: 1 manage and minimise the quantities of water and detergents consumed (see Section 4.1.42.1) 2 select those detergents which cause minimum impact on the environment (see Section 4.1.42.2), without compromising the efficacy of cleaning 3 avoid, where possible, the use of cleaning and disinfectant agents containing active chlorine (see Section 4.1.42.3) and 4 where the equipment is suitable, operate a cleaning-in-place system (see Section 4.2.4.3).		
5.1.5 Treatment of waste water		
BAT 34. For the treatment of waste water from slaughterhouses and animal by-products installations, BAT is to do the following: 1 prevent waste water stagnation (see Section 4.1.43.3) 2 apply an initial screening of solids using sieves (see Section 4.1.43.4) at the slaughterhouse or animal by-products installation 3 remove fat from waste water, using a fat trap (see Section 4.1.43.9) 4 use a flotation plant, possibly combined with the use of flocculants, to remove additional solids (see Section 4.1.43.10) 5 use a waste water equalisation tank (see Section 4.1.43.11)		

6 provide a waste water holding capacity in excess of routine requirements (see Section 4.1.43.1)

7 prevent liquid seepage and odour emissions from waste water treatment tanks, by sealing their sides and bases and either covering them or aerating them (see Sections 4.1.43.12 and 4.1.43.13)

8 subject the effluent to a biological treatment process. Aerobic and anaerobic treatments which are applied to waste water from slaughterhouses and animal by-products installations are described in Sections 2.3.1.2, 2.3.2.1.3, 4.1.43.14, 4.1.43.15, 4.2.6.2, 4.2.6.3 and 4.3.3.15

9 remove nitrogen and phosphorus. Some information is given in Section 2.3.1.2

10 remove the sludges produced and subject them to further animal by-product uses. These routes and their conditions of application are regulated by ABP Regulation 1774/2002/EC

11 use CH₄ gas produced during anaerobic treatment for the production of heat and/or power

12 subject the resulting effluent to tertiary treatment and

13 regularly conduct laboratory analyses of the effluent composition and maintain records (see Section 4.1.43.2). Further information on monitoring techniques is available in the current "Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector" BREF [341, EC, 2002]. Note the emission levels given in Table 5.1 are generally considered to be appropriate for protecting the water environment and are indicative of the emission levels that would be achieved with those techniques generally considered to represent BAT. They do not necessarily represent levels currently achieved within the industry but are based on the expert judgment of the TWG.

Parameter	COD	BOD ₅	SS	Nitrogen (total)	Phosphorus (total)	FOG
Achievable emission level (mg/l)	25-125	10-40	5-60	15-40	2-5	2.6-15

Table 5.1: Emission levels associated with BAT for minimising waste water emissions from slaughterhouses and animal by-products installations.		
--	--	--

5.2 Additional BAT for slaughterhouses		
<p>BAT 35. In addition to the general measures in Section 5.1, for all slaughterhouses BAT is to do all of the following:</p> <ol style="list-style-type: none"> 1 dry scrape delivery vehicles (see Sections 4.2.1.1) and prior to cleaning with a high-pressure hose (see Section 4.2.1.2) 2 avoid carcase washing and where this is not possible to minimise it, combined with clean slaughter techniques (see Section 4.2.1.4) 3 continuously collect by-products dry and segregated from each other, along the length of the slaughter-line (see Section 4.2.1.6), combined with optimising bleeding and the collection of blood (see Section 4.2.2.1) and segregating the storage and handling of different kinds of by-products (see Section 4.2.5.1) 4 operate a double drain from the bleed hall (see Section 4.2.1.7) 5 collect floor waste dry (see Section 4.2.1.9) 6 remove all unnecessary taps from the slaughter-line (see Section 4.2.1.13) 7 insulate and cover knife sterilisers (see Section 4.2.1.14), combined with sterilising knives using low-pressure steam (see Section 4.2.1.17) 8 operate hand and apron cleaning cubicles, with a “water off” default (see Section 4.2.1.18) 9 manage and monitor compressed air use (see Section 4.2.1.19) 10 manage and monitor ventilation use (see Section 4.2.1.20) 11 use backward bowed centrifugal fans in ventilation and refrigeration systems (see Section 4.2.1.21) 12 manage and monitor the use of hot water (see Section 4.2.1.22) and 13 trim all hide/skin material not destined for tanning immediately after removal from the animal, except if there is no outlet for the use/valorisation of the trimmings (see Section 4.2.2.9.10). 		
5.2.1 Additional BAT for the slaughter of large animals		

BAT 36.

In addition to the general measures in Sections 5.1 and 5.2, for all large animal slaughterhouses, BAT is to do all of the following:

- 1 stop feeding animals 12 hours prior to slaughter (see Section 4.2.2.1.1), combined with minimising the animals' time in the slaughterhouse to reduce manure production (see Section 4.2.2.1.2)
- 2 apply demand-controlled drinking water (see Section 4.2.2.1.4)
- 3 shower pigs using water saving timer controlled nozzles (see Section 4.2.2.1.5)
- 4 dry clean the lairage floor and to periodically clean it with water (see Section 4.2.2.1.6)
- 5 use a squeegee for the initial cleaning of the blood collection trough (see Section 4.2.2.2)
- 6 steam scald pigs (vertical scalding) (see Section 4.2.2.3.1)
- 7 in those existing slaughterhouses, where it is not yet economically viable to change to steam scalding, insulate and cover pig scalding tanks (see Section 4.2.2.3.2) and control the water level in those tanks (see Section 4.2.2.3.3)
- 8 re-use cold water within pig de-hairing machines (see Section 4.2.2.4.1) and replace irrigation pipes with flat jet nozzles (see Section 4.2.2.4.2)
- 9 re-use cooling water from pig singeing kilns (see Section 4.2.2.5.1)
- 10 recover heat from pig singeing exhaust gases, for preheating water (see Section 4.2.2.5.2)
- 11 shower pigs after singeing, using flat jet nozzles (see Section 4.2.2.5.3)
- 12 replace irrigation pipes with flat jet nozzles for rind treatment in pig slaughterhouses (see Section 4.2.2.6.1)
- 13 sterilise chest-opening saws in a cabinet with automated hot water nozzles (see Section 4.2.2.7.1)
- 14 regulate and minimise the water used for moving intestines (see Section 4.2.2.7.2)
- 15 use either water-spray/mist-cooling or blast-chilling/shock-cooling tunnel to cool pigs (see Sections 4.2.2.8.1 and 4.2.2.8.2)
- 16 not shower pigs before they are chilled in a chilling tunnel (see Section 4.2.2.8.3)
- 17 empty stomachs dry (see Section 4.2.2.9.2)
- 18 collect the contents of small intestines dry (see Section 4.2.2.9.3), whether or not they are intended to be used for casings (see Section 4.2.2.9.4)

<p>19 regulate and minimise the water consumption during small and large intestine washing (see Section 4.2.2.9.6)</p> <p>20 regulate and minimise the water consumption during rinsing of tongues and hearts (see Section 4.2.2.9.9)</p> <p>21 use a mechanised fat trap for removing fat from water (see Section 4.2.2.9.7)</p> <p>22 according to the current <i>Reference Document on Best Available Techniques for the Tanning of Hides and Skins</i> [273, EC, 2001] BAT “is to process fresh hides and skins as far as they are available”.</p> <p>23 when it is impossible to process hides and skins before 8 – 12 hours, with the actual range depending on local conditions, to immediately store hides between 10 and 15 °C (see Section 4.2.2.9.11)</p> <p>24 when it is impossible to process hides before a period of between 8 – 12 hours and 5 – 8 days, with the actual ranges depending on local conditions, to immediately refrigerate hides at 2 °C (see Section 4.2.2.9.15) and</p> <p>25 always immediately drum-salt all hides and skins, if they have to be stored for longer than 8 days, e.g. if they have to be transported overseas (see Section 4.2.2.9.12), combined with the dry collection of salt residues (see Section 4.2.2.9.14).</p>		
<p>5.2.2 Additional BAT for the slaughter of poultry</p>		
<p>BAT 37.</p> <p>In addition to the general measures in Sections 5.1 and 5.2, for all poultry slaughterhouses, BAT is to do all of the following:</p> <p>1 apply dust abatement at bird reception, unloading and hanging stations (see Sections 4.2.3.1.2, 4.2.3.1.3 and 4.2.3.1.4)</p> <p>2 stun birds in their modules, using inert gases at new installations and when existing stunning equipment and bird delivery vehicles are due for renewal (see Section 4.2.3.2.1)</p> <p>3 reduce water consumption in poultry slaughter, by removing carcass washing equipment from the line except after de-feathering and evisceration (see Section 4.2.1.11)</p> <p>4 steam scald poultry (see Section 4.2.3.3.1)</p> <p>5 insulate scalding tanks in those existing premises where it is not yet economically viable to change to steam scalding (see Section 4.2.3.3.2)</p>		

<p>6 use nozzles instead of irrigation pipes to shower poultry, during de-feathering (see Section 4.2.3.4.1)</p> <p>7 use recycled water, e.g. from the scalding tank, for the carriage of feathers (see Section 4.2.3.4.2)</p> <p>8 use water efficient shower heads to wash poultry, during evisceration (see Section 4.2.3.5.1) and</p> <p>9 chill poultry by immersion/spin chilling and to control, regulate and minimise the water consumption (see Section 4.2.3.6.2).</p>		
<p>5.3 Additional BAT for animal by-products installations</p>		
<p>Bat 38. In addition to the general measures in Sections 5.1, for all animal by-products installations, BAT is to do all of the following:</p> <p>1 operate continuous, dry and segregated collection of animal by-products throughout animal by-products treatment (see Section 4.3.1.1)</p> <p>2 use sealed, storage, handling and charging facilities for animal by-products (see Section 4.3.1.3)</p> <p>3 where it is not possible to treat animal by-products before their decomposition starts to cause odour problems and/or quality problems, refrigerate them as quickly as possible and for as short a time as possible (see Section 4.3.1.4) and</p> <p>4 where inherently malodorous substances are used or are produced during the treatment of animal by-products, pass the low intensity/high volume gases through a biofilter (see Section 4.1.33).</p>		
<p>5.3.1 Additional BAT for fat melting</p>		
<p>For fat melting no additional BAT have been identified in addition to those in Sections 5.1 and 5.3.</p>		
<p>5.3.2 Additional BAT for rendering</p>		
<p>BAT 39. In addition to the general measures in Sections 5.1 and 5.3, for rendering installations, BAT is to do all of the following:</p> <p>1 totally enclose the rendering line (see Section 4.3.3.1)</p> <p>2 reduce the size of carcasses and parts of animal carcasses before rendering (see Section 4.3.3.2)</p>		

<p>3 remove water from blood, by steam coagulation, prior to rendering (see Section 4.3.3.4)</p> <p>4 for raw material throughputs less than 50000 t/yr, to use a single effect evaporator to remove water from liquid mixtures (see Section 4.3.3.5) and</p> <p>5 for raw material throughputs greater than, or equal to 50000 t/yr, to use a multiple-effect evaporator to remove water from liquid mixtures (see Section 4.3.1.5).</p> <p>When it has been impossible to use fresh raw materials and thereby to minimise the production of malodorous substances, BAT is to do either of the following:</p> <p>1 burn the non-condensable gases in an existing boiler (see Section 4.3.3.11) and to pass the low intensity/high volume odours through a biofilter (see Section 4.1.33) or</p> <p>2 to burn the whole vapour gases in a thermal oxidiser (see Section 4.3.3.10) and to pass the low intensity/high volume odours through a biofilter (see Section 4.1.33).</p>		
<p>5.3.3 Additional BAT for fish-meal and fish-oil production</p>		
<p>BAT 40.</p> <p>In addition to the general measures in Sections 5.1 and 5.3, for fish-meal and fish-oil production installations, BAT is to do all of the following:</p> <p>1 use fresh, (low total volatile nitrogen) feedstock (see Section 4.3.4.1)</p> <p>2 use heat from the vapour evaporated during the drying of fish-meal in a falling film evaporator to concentrate stickwater (see Section 4.3.4.2)</p> <p>3 incinerate malodorous air, with heat recovery (see Section 4.3.4.3) and</p> <p>4 wash air using condensate liquid instead of using clean seawater (see Section 4.3.4.4).</p>		
<p>5.3.4 Additional BAT for blood processing</p>		
<p>BAT 41.</p> <p>In addition to the general measures in Sections 5.1 and 5.3, for blood processing installations BAT is to do one of the following:</p> <p>1 concentrate plasma, prior to spray drying, using reverse osmosis (see Section 4.3.5.1)</p> <p>2 concentrate plasma, prior to spray drying, using vacuum evaporation (see Section 4.3.5.2) or</p> <p>3 remove water from blood, by steam coagulation, prior to spray drying (see Section 4.3.3.4).</p>		

5.3.5 Additional BAT for bone processing		
For bone processing, no additional BAT have been identified in addition to those in Sections 5.1 and 5.3.		
5.3.6 Additional BAT for gelatine manufacture		
BAT 42. In addition to the general measures in Sections 5.1 and 5.3, for gelatine manufacturing installations, BAT is to do the following: 1 insulate bone de-fatting equipment (see Section 4.3.7.1).		
5.3.7 Additional BAT for the incineration of animal by-products		
BAT 43. In addition to the general measures in Sections 5.1 and 5.3, for the incineration of animal by-products, BAT is to do all of the following: 1 enclose buildings used for delivery storage, handling and processing of animal by-products (see Section 4.3.8.1) 2 clean and disinfect delivery vehicles and equipment, after each delivery/use (see Section 4.3.8.2) 3 carry carcasses (not drag them) (see Section 4.3.8.3) 4 reduce in size animal carcasses and parts of animal carcasses, before incineration (see Section 4.3.8.4) 5 restrict feedstock to <u>exactly</u> that tested during trials (see Section 4.3.8.5) 6 agree the fat:moisture:ash content of animal meal, with the renderer (see Section 4.3.8.6) 7 avoid receipt of material for incineration in PVC packaging (see Section 4.3.8.10) 8 either auger feed (see Section 4.3.8.11), or pump (see Section 4.3.8.12) parts of carcasses or animal meal to the incinerator 9 incinerate incineration waste water (see Section 4.3.8.13), if there is no suitable WWTP on the site 10 seal the storage, handling and charging of animal by-products to incinerators (see Section 4.3.8.14) 11 duct air from the installation and the pre-combustion equipment to combustion chambers (see Section 4.3.8.15) 12 alarm and interlock combustion temperatures to charging mechanisms (see Section 4.3.8.16).		

13 operate continuous incineration (see Section 4.3.8.20)
 14 operate an ash burnout chamber (see Section 4.3.8.21), where adequate combustion is not otherwise achievable, e.g. immediately downstream from rotary kilns
 15 operate automated continuous de-ashing (see Section 4.3.8.22)
 16 operate a monitoring regime for emissions, including a protocol for monitoring burnout, including biohazard from TSE prions, in ash (see Section 4.3.8.25)
 17 to achieve emission levels as low as reasonably practicable below those shown in Table 5.2 (see Section 4.3.8.17)

Releases to air	Performance associated with BAT ⁽³⁾	
	Typical	Monitoring
SO ₂ (mg/m ³)	<30 ⁽²⁾	Continuous
HCl (mg/m ³)	<10 ⁽²⁾	Continuous
HF (mg/m ³)	n/a	
NO _x (mg/m ³)	<175 ⁽²⁾	Continuous
CO (mg/m ³)	<25 ⁽²⁾	Continuous
VOCs (mg/m ³)	<10 ⁽²⁾	Periodic
Dust (mg/m ³)	<10 ⁽²⁾	Continuous
Dioxins and furans (ng/m ³)	<0.1 ⁽⁴⁾	Periodic
Heavy metals total (Cd, Tl) (mg/m ³)	<0.05 ⁽⁵⁾	
Heavy metals (Hg) (mg/m ³)	<0.05 ⁽⁵⁾	
Heavy metals total (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V) (mg/m ³)	<0.5 ⁽⁵⁾	
NH ₃ (mg/m ³)	<10	
Residence time >850°C	3.5 s	
Oxygen (minimum after last injection)	9%	Continuous
Pressure, Temperature, Water vapour; Volumetric flow		Continuous
Ash – (total carbon)	<1% ⁽⁶⁾	Periodic
Ash – (total protein) (Aqueous extract) (mg/100g)	0.3 – 0.6	Periodic

⁽²⁾ Releases control – “95 % percentile hourly average over 24 hours”. Measurements at 273 K (temp.),

<p>101.3 kPa (pressure) and 11 % O₂ dry gas ⁽³⁾ Actual performance results operating a dry flue gas-cleaning system with bag filters and injected reagents ⁽⁴⁾ Values measured over a sample period of a minimum of 6 hours and a maximum of 8 hours expressed as toxic equivalent in accordance with Annex 1 of the Waste Incineration Directive ⁽⁵⁾ Values measured over a sample period of a minimum of 6 hours and a maximum of 8 hours ⁽⁶⁾ Total organic carbon Note: Protein analysis is not relevant to the dedicated incineration of poultry by-products</p>		
<p>Table 5.2: Emission levels associated with the dedicated incineration of animal by-products in either bubbling fluidised bed, circulating fluidised bed or rotary kiln incinerators.</p> <p>18 regularly clean and disinfect installations and equipment (see Section 4.3.8.26) 19 operate odour arrestment techniques, when the incinerator is not working (see Section 4.3.8.27), when odour prevention is not reasonably practicable and 20 use a carbon filter for odour abatement, when incinerators are not operating (see Section 4.3.8.29) and where odour prevention is not reasonably practicable.</p> <p>In addition to the general measures in Sections 5.1, 5.3 and those listed above, for the incineration of animal by-products, BAT is to do one of the following:</p> <p>1 incinerate animal carcasses, parts of carcasses and animal meal in bubbling fluidised bed incinerators (see Section 4.3.8.17), with suitable flue gas treatment equipment or 2 incinerate animal carcasses, parts of carcasses and animal meal in circulating fluidised bed incinerators (see Section 4.3.8.18), with suitable flue gas treatment equipment or 3 incinerate animal carcasses, parts of carcasses and animal meal in rotary kiln incinerators (see Section 4.3.8.19), with suitable flue gas treatment equipment.</p>		
<p>5.3.8 Additional BAT for biogas production</p>		
<p>BAT 44. In addition to the general measures in Sections 5.1 and 5.3, for biogas production, BAT is to do the following: 1 re-use heat during biogas production (see Section 4.3.10.3).</p>		
<p>5.3.9 Additional BAT for composting</p>		
<p>BAT 45.</p>		

<p>In addition to the general measures in Sections 5.1 and 5.3, for composting, animal by-products, BAT is to do the following:</p> <p>1 provide sufficient drainage capacity for a windrow on a hard standing (see Section 4.3.11.1) constructed from concrete (see Section 4.3.11.2).</p>		
--	--	--