Draft Agency Guidance for licence applicants for IED class 6.1/6.2 Installations, to be read in consultation with BAT Conclusions for Intensive Rearing of Poultry or Pigs

READ ME:

The '*Commission Implementing Decision (EU) 2017/302 of **15 February 2017** establishing best available techniques (BAT) conclusions under Directive 2010/75/EU of the European Parliament and of the Council, for the intensive rearing of Poultry or Pigs'* is published and the BAT Conclusions are finalised and address installations for the intensive rearing of poultry and pigs.

To help identify compliance status, for each BAT, in the following table, please 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 precise reasons 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 CID.

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.

BAT Conclusions for Intensive Rearing of Poultry or Pigs (Feb 2017)

The full and complete final BAT Conclusions Document for Intensive Rearing of Poultry or Pigs (Feb 2017) is available at the EIPPC Bureau website: http://eippcb.jrc.ec.europa.eu/reference/

The following guidance in tabular form, must be read in conjunction with the above referenced document.

SCOPE
Identify here the particular processes and activities at the installation that come within the scope of the BAT conclusions for the Intensive Rearing of Poultry or Pigs CID document. Application of organic fertiliser to land outside the installation boundary will not be controlled by conditions of an IED licence, however the CID document for Intensive Rearing of Poultry or Pigs (2017) includes BAT conclusions on techniques for landspreading of manure.

BAT Conclusions ***Important:*** ***(CID should be read (full text) in conjunction with this table)***	**Applicability Assessment ((1)describe whether or not it applies, stating clearly the precise reasons and (2) how the technique applies or not to your installation)**	**State whether it is in place or state schedule for implementation**
Note: This single document addresses both pig installations and poultry installations. ***BAT 1-29 below apply to both pig and poultry sites (blank font below)*** ***BAT 30 applies to ammonia emissions from an animal house for pigs (olive green font/shading below)*** ***BAT 31-34 applies to ammonia emissions from poultry houses (red font/shading below)***		

Section 1 General BAT Conclusions *(BAT 1-29 below apply to both pig and poultry sites)*	Applicability Assessment ((1)describe whether or not it applies, stating clearly the precise reasons and (2) how the technique applies or not to your installation)	State whether it is in place or state schedule for implementation
BAT 1. BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the features as detailed in (**Section 1.1 Environmental Management System -EMS**) In order to improve the overall environmental performance of farms, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:	Will be implemented in line with license requirements	Will Be
BAT 2. In order to prevent or reduce the environmental impact and improve overall performance, BAT is to use all the techniques provided. (**Section 1.2 Good housekeeping)** In order to prevent or reduce the environmental impact and improve overall performance, BAT is to use all the techniques given below.	The applicant is committed to the education and ongoing training of their staff, including relevant regulations, pig livestock farming, animal health and welfare, manure management, worker safety, manure management, planning of activities, emergency planning and management and repair and maintenance of equipment. The farm manager completes regular checks, repairs and maintenance of structure and equipment.	Yes

	An emergency response plan will be prepared & implemented in line with license requirements.	
BAT 3. In order to reduce total nitrogen excreted and consequently ammonia emissions while meeting the nutritional needs of the animals, BAT is to use a diet formulation and nutritional strategy which includes one or a combination of the techniques given (**Section 1.3 Nutritional Management).** In order to reduce total nitrogen excreted and consequently ammonia emissions while meeting the nutritional needs of the animals, BAT is to use a diet formulation and nutritional strategy which includes one or a combination of the techniques given below Technique (1) / Applicability a. Reduce the crude protein content by using an N-balanced diet based on the energy needs and digestible amino acids. — Generally applicable. b. Multiphase feeding with a diet formulation adapted to the specific requirements of the production period. — Generally applicable. c. Addition of controlled amounts of essential amino acids to a low crude protein diet. — Applicability may be restricted when low-protein feedstuffs are not economically available. Synthetic amino acids are not applicable to organic livestock production. d. Use of authorised feed additives which reduce the total nitrogen excreted. — Generally applicable. (1) A description of the techniques is given in Section 4.10.1. Information on the effectiveness of the techniques for ammonia emission reduction can be taken from recognised European or international guidance e.g. UNECE guidance document on 'Options for ammonia mitigation'.	The applicant employs Vitfoss, a Danish firm who are internationally recognised as leaders in nutrition and pre-mix vitamins and minerals. The applicant have their own mill and prepare all their own pig feed, up to 8 different mix types depending on animal age. All feed compositions have been checked for digestibility in the small intestine or pigs via in vitro laboratory testing. Higher protein digestibility results in lower nitrogen concentration in manure. The protein content and feed mix will be adjusted every 2-3 weeks, and each pig will receive the precise protein quantity required, this avoiding excess protein in the diet. A low protein diet has been shown to significantly reduce generation of odorous emissions at piggery facilities. Further, an odour control agent, 'Active NS' will be added to the onsite manure during pen washing events. This has been proven to reduce ammonia emissions by 20-25% both onsite and subsequently during land-spreading.	Yes

Table 1.1

BAT-associated total nitrogen excreted

Parameter	Animal category	BAT-associated total nitrogen excreted (1) (2) (kg N excreted/animal place/year)
Total nitrogen excreted, expressed as N.	Weaners	1,5-4,0
	Fattening pigs	7,0-13,0
	Sows (including piglets)	17,0-30,0
	Laying hens	0,4-0,8
	Broilers	0,2-0,6
	Ducks	0,4-0,8
	Turkeys	1,0-2,3 (3)

(1) The lower end of the range can be achieved by using a combination of techniques.
(2) The BAT-associated total nitrogen excreted is not applicable to pullets or breeders, for all poultry species.
(3) The upper end of the range is associated with the rearing of male turkeys.

The associated monitoring is in BAT 24. The BAT-associated total nitrogen excreted levels may not be applicable to organic livestock production and to the rearing of poultry species not indicated above.

BAT 4. In order to reduce the total phosphorus excreted, while meeting the nutritional needs of the animals, BAT is to use a diet formulation and a nutritional strategy which includes <u>one or a combination</u> of the techniques given **(Section 1.3 Nutritional Management)**	The applicant employs Vitfoss, a Danish firm who are internationally recognised as leaders in nutrition and pre-mix vitamins and minerals. The applicant have their own mill and prepare all their own pig feed, up to 8	Yes

	Technique (1)	Applicability
a	Multiphase feeding with a diet formulation adapted to the specific requirements of the production period.	Generally applicable.
b	Use of authorised feed additives which reduce the total phosphorus excreted (e.g. phytase).	Phytase may not be applicable in case of organic livestock production.
c	Use of highly digestible inorganic phosphates for the partial replacement of conventional sources of phosphorus in the feed.	Generally applicable within the constraints associated with the availability of highly digestible inorganic phosphates.

(1) A description of the techniques is given in Section 4.10.2.

different mix types depending on animal age. All feed compositions have been checked for digestibility in the small intestine or pigs via in vitro laboratory testing.

Table 1.2

BAT-associated total phosphorus excreted

Parameter	Animal category	BAT-associated total phosphorus excreted (1) (2) (kg P_2O_5 excreted/animal place/year)
Total phosphorus excreted, expressed as P_2O_5.	Weaners	1,2-2,2
	Fattening pigs	3,5-5,4
	Sows (including piglets)	9,0-15,0
	Laying hens	0,10-0,45
	Broilers	0,05-0,25
	Turkeys	0,15-2,0

(1) The lower end of the range can be achieved by using a combination of techniques.
(2) The BAT-associated total phosphorus excreted is not applicable to pullets or breeders, for all poultry species.

The associated monitoring is in BAT 24. The BAT-associated total phosphorus excreted levels may not be applicable to organic livestock production and to the rearing of poultry species not indicated above.

BAT 5. In order to use water efficiently, BAT is to use a combination of the techniques given (**Section 1.4 Efficient Use of Water),** In order to use water efficiently, BAT is to use a combination of the techniques given below.	Water is sourced from an onsite well. Abstracted water will be stored in 1No water storage tanks, with a total storage volume of 8,000L. Water usage will be monitored and recorded onsite. 95% of the animal's water requirements will be met through the water content of the wet feed mix, with the balance met by a	Yes

	Technique	Applicability
a	Keep a record of water use.	Generally applicable.
b	Detect and repair water leakages.	Generally applicable.
c	Use high-pressure cleaners for cleaning animal housing and equipment.	Not applicable to poultry plants using dry cleaning systems.
d	Select and use suitable equipment (e.g. nipple drinkers, round drinkers, water troughs) for the specific animal category while ensuring water availability (*ad libitum*).	Generally applicable.
e	Verify and (if necessary) adjust on a regular basis the calibration of the drinking water equipment.	Generally applicable.
f	Reuse uncontaminated rainwater as cleaning water.	May not be applicable to existing farms, due to high costs. Applicability may be restricted by biosecurity risks.

water dispenser installed in each pen, which the pigs operate themselves. Facility washing will be undertaken using a central power washing system. Each pen will be washed following departure of it occupants. Smooth concrete, steel and plastic will allow for quick cleaning.

	Technique	Applicability
a	Keep a record of water use.	Generally applicable.
b	Detect and repair water leakages.	Generally applicable.
c	Use high-pressure cleaners for cleaning animal housing and equipment.	Not applicable to poultry plants using dry cleaning systems.
d	Select and use suitable equipment (e.g. nipple drinkers, round drinkers, water troughs) for the specific animal category while ensuring water availability (*ad libitum*).	Generally applicable.
e	Verify and (if necessary) adjust on a regular basis the calibration of the drinking water equipment.	Generally applicable.
f	Reuse uncontaminated rainwater as cleaning water.	May not be applicable to existing farms, due to high costs. Applicability may be restricted by biosecurity risks.

BAT 6.
In order to reduce the generation of waste water, BAT is to use a combination of the techniques given (**Section 1.5 Emissions from Wastewater**).
In order to reduce the generation of waste water, BAT is to use a combination of the techniques given below

There are 2 sources of waste water onsite; staff facilities and facility washing.

Yes

	Technique (1)	Applicability
a	Keep the fouled yard areas as small as possible.	Generally applicable.
b	Minimise use of water.	Generally applicable.
c	Segregate uncontaminated rainwater from waste water streams that require treatment.	May not be applicable to existing farms.

(1) A description of the technique is given in Section 4.1.

BAT 7. In order to reduce emissions to water from waste water, BAT is to use one or a combination of the techniques given (**Section 1.5 Emissions from Wastewater**). Technique (1) / Applicability a — Drain waste water to a dedicated container or to a slurry store. — Generally applicable. b — Treat waste water. — Generally applicable. c — Landspreading of waste water e.g. by using an irrigation system such as sprinkler, travelling irrigator, tanker, umbilical injector. — Applicability may be restricted due to the limited availability of suitable land adjacent to the farm. Applicable only for waste water with a proven low level of contamination.	There are 2 sources of waste water onsite; staff facilities and facility washing. Waste water from staff facilities will be treated onsite.	Yes
BAT 8. In order to use energy efficiently in a farm, BAT is to use a combination of the techniques given. (**Section 1.6 Efficient use of Energy)**.	Air quality will be controlled through mechanical ventilation over each pen zone of the piggery houses. Heating will not be required for several reasons:	Yes

	Technique (1)	Applicability
a	High efficiency heating/cooling and ventilation systems.	May not be applicable to existing plants.
b	Optimisation of heating/cooling and ventilation systems and management, especially where air cleaning systems are used.	Generally applicable.
c	Insulation of the walls, floors and/or ceilings of animal housing.	May not be applicable to plants using natural ventilation. Insulation may not be applicable to existing plants due to structural restrictions.
d	Use of energy-efficient lighting.	Generally applicable.

1) heating generally not required, only in situations where young piglets are housed
2) The unit uses natural lighting, this is expected to reduce lighting power consumption. Supplementary artificial lighting required during
winter months will be provided using energy efficient LED bulbs.
3)Reduced energy consumption will be further facilitated through the use of a air to water heat pumps in
the farrowing and wearer house.
4) The on-farm Anaerobic Digester will be optimised to provide hot-water to the farm and also offset up to 40% of the electrical use.

e	Use of heat exchangers. One of the following systems may be used: 1. air-air; 2. air-water; 3. air-ground.	Air-ground heat exchangers are only applicable when there is available space due to the need for a large soil surface.		
f	Use of heat pumps for heat recovery.	The applicability of heat pumps based on geothermal heat recovery is limited when using horizontal pipes due to the need for space availability.		
g	Heat recovery with heated and cooled littered floor (combideck system).	Not applicable to pig plants. Applicability depends on the possibility to install closed underground storage for the circulating water.		
h	Apply natural ventilation.	Not applicable to plants with a centralised ventilation system. In pig plants, this may not be applicable to: — housing systems with littered floors in warm climates; — housing systems without littered floors or without covered, insulated boxes (e.g. kennels) in cold climates. In poultry plants, this may not be applicable: — during the initial stage of rearing, apart from duck production; — due to extreme climate conditions.		
BAT 9. In order to prevent or, where that is not practicable, to reduce noise emissions, BAT is to set up and implement a noise management plan, as part of the environmental management system (see BAT 1), that includes specified elements (**Section 1.7 Noise emissions)**. Note: BAT 9 is only applicable to cases where a noise nuisance at sensitive receptors is expected and/or has been substantiated.			The site benefits from good separation distances to the nearest sensitive receptors and noise impacts are expected to be minimal	Not Applicable

<table>
<tr>
<td>BAT 10.
In order to prevent, or where that is not practicable, to reduce noise emissions, BAT is to use <u>one or a combination</u> of the techniques given. (Section 1.7 Noise emissions).</td>
<td>BAT 10 a, b, c and d will be implemented in line with license requirements</td>
<td>Will Be</td>
</tr>
<tr>
<td>BAT 11.
In order to reduce dust emissions from each animal house, BAT is to use <u>one or a combination</u> of the techniques given (Section 1.8 Dust emissions).
<table>
<tr><th></th><th>Technique (1)</th><th>Applicability</th></tr>
<tr><td>a</td><td>Reduce dust generation inside livestock buildings. For this purpose, a combination of the following techniques may be used:</td><td></td></tr>
<tr><td>1.</td><td>1. Use coarser litter material (e.g. long straw or wood shavings rather than chopped straw);</td><td>Long straw is not applicable to slurry-based systems.</td></tr>
<tr><td></td><td>2. Apply fresh litter using a low-dust littering technique (e.g. by hand);</td><td>Generally applicable.</td></tr>
<tr><td></td><td>3. Apply ad libitum feeding;</td><td>Generally applicable.</td></tr>
<tr><td></td><td>4. Use moist feed, pelleted feed or add oily raw materials or binders in dry feed systems;</td><td>Generally applicable.</td></tr>
<tr><td></td><td>5. Equip dry feed stores which are filled pneumatically with dust separators;</td><td>Generally applicable.</td></tr>
<tr><td></td><td>6. Design and operate the ventilation system with low air speed within the house.</td><td>Applicability may be limited by animal welfare considerations.</td></tr>
</table>
</td>
<td>Minimal levels of dust will be generated by the operation of the piggery unit. However, BAT 11 a3, a4 and a6 will be implemented to reduce dust generation inside livestock buildings.</td>
<td>Yes</td>
</tr>
</table>

b	Reduce dust concentration inside housing by applying one of the following techniques:			
	1. Water fogging;	Applicability may be restricted by the animal sensation of thermal decrease during fogging, in particular at sensitive stages of the animal's life, and/or for cold and humid climates. Applicability may be also restricted for solid manure systems at the end of the rearing period due to high ammonia emissions.		
	2. Oil spraying;	Only applicable to poultry plants with birds older than around 21 days. The applicability to plants for laying hens may be limited due to the risk of contamination of the equipment present in the shed.		
	3. Ionisation.	May not be applicable to pig plants or to existing poultry plants due to technical and/or economic reasons.		

c	Treatment of exhaust air by an air cleaning system, such as:			
	1. Water trap;	Only applicable to plants with a tunnel ventilation system.		
	2. Dry filter;	Only applicable to poultry plants with a tunnel ventilation system.		
	3. Water scrubber;	This technique may not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used.		
	4. Wet acid scrubber;			
	5. Bioscrubber (or biotrickling filter);			
	6. Two-stage or three-stage air cleaning system;			
	7. Biofilter.	Only applicable to slurry-based plants. A sufficient area outside the animal house is needed to accommodate the filter packages. This technique may not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used.		

BAT 12. In order to prevent, or where that is not practicable, to reduce odour emissions from a farm, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system (see BAT 1), that includes specified elements (**Section 1.9 Odour emissions)**. Note: BAT 12 is only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.	Ashleigh Farms Ltd have implemented a site specific odour management plan for the site including BAT 12 i - v, in line and will be inline with licensing requirements.	Yes

BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions and/or odour impact from a farm, BAT is to use a combination of the techniques given (**Section 1.9 Odour emissions)**.	BAT 13a, 13b, 13c,13e, 13f, 13g Further to these measures an active compounds 'Active NS' will be added to manure and is expected to reduce ammonia emissions. A low protein diet has been shown to significantly reduce odorous emissions at piggery facilities. The on-farm anaerobic digester can process up to 50% of on-farm produced slurries.(13f3)	Yes

	Technique (1)	Applicability
a	Ensure adequate distances between the farm/plant and the sensitive receptors.	May not be generally applicable to existing farms/ plants.
b	Use a housing system which implements one or a combination of the following principles: — keeping the animals and the surfaces dry and clean (e.g. avoid feed spillages, avoid dung in lying areas of partly slatted floors); — reducing the emitting surface of manure (e.g. use metal or plastic slats, channels with a reduced exposed manure surface); — removing manure frequently to an external (covered) manure store; — reducing the temperature of the manure (e.g. by slurry cooling) and of the indoor environment; — decreasing the air flow and velocity over the manure surface; — keeping the litter dry and under aerobic conditions in litter-based systems.	Decreasing the temperature of the indoor environment, the air flow and the velocity may not be applicable due to animal welfare considerations. Slurry removal by flushing is not applicable to pig farms located close to sensitive receptors due to odour peaks. See applicability for animal housing in BAT 30, BAT 31, BAT 32, BAT 33 and BAT 34.

c	Optimise the discharge conditions of exhaust air from the animal house by using one or a combination of the following techniques: — increasing the outlet height (e.g. exhaust air above roof level, stacks, divert air exhaust through the ridge instead of through the low part of the walls); — increasing the vertical outlet ventilation velocity; — effective placement of external barriers to create turbulence in the outgoing air flow (e.g. vegetation); — adding deflector covers in exhaust apertures located in low parts of walls in order to divert exhaust air towards the ground; — dispersing the exhaust air at the housing side which faces away from the sensitive receptor; — aligning the ridge axis of a naturally ventilated building transversally to the prevailing wind direction.	Alignment of the ridge axis is not applicable to existing plants.		

d	Use an air cleaning system, such as: 1. Bioscrubber (or biotrickling filter); 2. Biofilter; 3. Two-stage or three-stage air cleaning system.	This technique may not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used. A biofilter is only applicable to slurry-based plants. For a biofilter, a sufficient area outside the animal house is needed to accommodate the filter packages.		
e	Use one or a combination of the following techniques for storage of manure:			
	1. Cover slurry or solid manure during storage;	See applicability of BAT 16.b for slurry. See applicability of BAT 14.b for solid manure.		
	2. Locate the store taking into account the general wind direction and/or adopt measures to reduce wind speed around and above the store (e.g. trees, natural barriers);	Generally applicable.		
	3. Minimise stirring of slurry.	Generally applicable.		

f	Process manure with one of the following techniques in order to minimise odour emissions during (or prior to) landspreading:	
	1. Aerobic digestion (aeration) of slurry;	See applicability of BAT 19.d.
	2. Compost solid manure;	See applicability of BAT 19.f.
	3. Anaerobic digestion.	See applicability of BAT 19.b.
g	Use one or a combination of the following techniques for manure landspreading:	
	1. Band spreader, shallow injector or deep injector for slurry landspreading;	See applicability of BAT 21.b, BAT 21.c or BAT 21.d.
	2. Incorporate manure as soon as possible.	See applicability of BAT 22.

<table>
<tr>
<td>BAT 14
In order to reduce ammonia emissions to air from the storage of solid manure, BAT is to use <u>one or a combination</u> of the techniques given (Section 1.10 Emissions from solid manure storage).
<table><tr><th></th><th>Technique (1)</th><th>Applicability</th></tr><tr><td>a</td><td>Reduce the ratio between the emitting surface area and the volume of the solid manure heap.</td><td>Generally applicable.</td></tr><tr><td>b</td><td>Cover solid manure heaps.</td><td>Generally applicable when solid manure is dried or pre-dried in animal housing. May not be applicable to not dried solid manure in case of frequent addition to the heap.</td></tr><tr><td>c</td><td>Store dried solid manure in a barn.</td><td>Generally applicable.</td></tr></table></td>
<td>No solid manure to be stored onsite</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>BAT 15
In order to prevent, or where that is not practicable, to reduce emissions to soil and water from the storage of solid manure, BAT is to use <u>a combination of</u> the techniques given (Section 1.10 Emissions from solid manure storage).</td>
<td>No solid manure to be stored onsite</td>
<td>Not Applicable</td>
</tr>
</table>

	Technique (1)	Applicability
a	Store dried solid manure in a barn.	Generally applicable
b	Use a concrete silo for storage of solid manure.	Generally applicable.
c	Store solid manure on solid impermeable floor equipped with a drainage system and a collection tank for the run-off.	Generally applicable.
d	Select a storage facility with a sufficient capacity to hold the solid manure during periods in which landspreading is not possible.	Generally applicable.
e	Store solid manure in field heaps placed away from surface and/or underground watercourses which liquid run-off might enter.	Only applicable to temporary field heaps which change location each year.

BAT 16.
In order to reduce ammonia emissions to air from a slurry store, BAT is to use a combination of the techniques given. (**Section 1.11 Emissions from slurry storage)**.

	Technique (1)	Applicability
a	Appropriate design and management of the slurry store by using a combination of the following techniques:	

BAT A1, A2, A3 and will be implemented onsite. The slurry store is designed to reduce the emitting surface area and by minimising the stirring of slurry.
BAT C, The farm are working with researchers to develop a new odour, methane and ammonia abatement technique. Trials to commence in late 2021.

Yes

	1. Reduce the ratio between the emitting surface area and the volume of the slurry store;	May not be generally applicable to existing stores. Excessively high slurry stores may not be applicable due to increased costs and safety risks.		
	2. Reduce wind velocity and air exchange on the slurry surface by operating the store at a lower level of fill;	May not be generally applicable to existing stores.		
	3. Minimise stirring of slurry.	Generally applicable.		
b	Cover the slurry store. For this purpose, one of the following techniques may be used:			
	1. Rigid cover;	May not be applicable to existing plants due to economic considerations and structural limitations to withstand the extra load.		
	2. Flexible covers;	Flexible covers are not applicable to areas where prevailing weather conditions can compromise their structure.		

	3. Floating covers such as: — plastic pellets; — light bulk materials; — floating flexible covers; — geometrical plastic tiles; — air-inflated cover; — natural crust; — straw.	The use of plastic pellets, light bulk materials and geometrical plastic tiles is not applicable to naturally crusting slurries. Agitation of the slurry during stirring, filling and emptying may preclude the use of some floating materials which may cause sedimentation or blockages in the pumps. Natural crust formation may not be applicable to cold climates and/or to slurry with low dry matter content. Natural crust is not applicable to stores where stirring, filling and/or discharging of slurry renders the natural crust unstable.		
c	Slurry acidification.	Generally applicable.		
BAT 17. In order to reduce ammonia emissions to air from an earth-banked slurry store (lagoon), BAT is to use a combination of the techniques given (**Section 1.11 Emissions from slurry storage)**.			No earth banked slurry store (lagoon) onsite	Not Applicable

	Technique (1)	Applicability		
a	Minimise stirring of the slurry.	Generally applicable.		
b	Cover the earth-banked slurry store (lagoon) with a flexible and/or floating cover such as: — flexible plastic sheets; — light bulk materials; — natural crust; — straw.	Plastic sheets may not be applicable to large existing lagoons due to structural reasons. Straw and light bulk materials may not be applicable to large lagoons where wind drift does not permit the lagoon surface to be kept fully covered. The use of light bulk materials is not applicable to naturally crusting slurries. Agitation of the slurry during stirring, filling and emptying may preclude the use of some floating materials which may cause sedimentation or blockages in the pumps. Natural crust formation may not be applicable to cold climates and/or to slurry with low dry matter content. Natural crust is not applicable to lagoons where stirring, filling and/or discharging of slurry renders the natural crust unstable.		

BAT 18. In order to prevent emissions to soil and water from slurry collection, piping, and from a store and/or an earth-banked storage (lagoon), BAT is to use a combination of the techniques given (**Section 1.11 Emissions from slurry storage)**.	BAT 18 a-c, e-f are in place onsite. Buildings established post 2006 have leak detection incorporated into their slurry storage facilities. Alarm systems are in place at all external slurry collection tanks to prevent overfilling All tanks are designed to be leak proof, withstand mechanical, chemical and thermal influences. All storage tanks are checked regularly for structural integrity.	Yes

	Technique (1)	Applicability
a	Use stores that are able to withstand mechanical, chemical and thermal influences.	Generally applicable.
b	Select a storage facility with a sufficient capacity to hold the slurry during periods in which land-spreading is not possible.	Generally applicable.
c	Construct leak-proof facilities and equipment for collection and transfer of slurry (e.g. pits, channels, drains, pump stations).	Generally applicable.
d	Store slurry in earth-banked stores (lagoons) with an impermeable base and walls e.g. with clay or plastic lining (or double-lined).	Generally applicable to lagoons.
e	Install a leakage detection system, e.g. consisting of a geomembrane, a drainage layer and a drainage pipe system.	Only applicable to new plants.
f	Check structural integrity of stores at least once every year.	Generally applicable.

BAT 19. If on-farm processing of manure is used, in order to reduce emissions of nitrogen, phosphorus, odour and microbial pathogens to air and water and facilitate manure	Bat 19b Anaerobic digestion of slurry in practice onsite.	Yes

storage and/or landspreading, BAT is to process the manure by applying one or a combination of the techniques (**Section 1.12 On Farm processing of manure)**

	Technique (1)	Applicability
a	Mechanical separation of slurry. This includes e.g.: Screw press separator; — Decanter-centrifuge separator; — Coagulation-Flocculation; — Separation by sieves; — Filter pressing.	Only applicable when: — a reduction of nitrogen and phosphorus content is needed due to limited available land for manure application; — manure cannot be transported for landspreading at a reasonable cost. The use of polyacrylamide as a flocculant may not be applicable due to the risk of acrylamide formation.
b	Anaerobic digestion of manure in a biogas installation.	This technique may not be generally applicable due to the high implementation cost.
c	Use of an external tunnel for manure drying.	Only applicable to manure from plants for laying hens. Not applicable to existing plants without manure belts.
d	Aerobic digestion (aeration) of slurry.	Only applicable when pathogen and odour reduction is important prior to landspreading. In cold climates, it may be difficult to maintain the required level of aeration during winter.
e	Nitrification-denitrification of slurry.	Not applicable to new plants/farms. Only applicable to existing plants/farms when the removal of nitrogen is necessary due to limited available land for manure application.
f	Composting of solid manure.	Only applicable when: — manure cannot be transported for landspreading at a reasonable cost; — pathogen and odour reduction is important prior to landspreading; — there is enough space in the farm for windrows to be established.

BAT 20.	No land spreading onsite	Not Applicable

In order to prevent or, where that is not practicable, to reduce emissions of nitrogen, phosphorus and microbial pathogens to soil and water from manure landspreading, BAT is to use all the techniques given (**Section 1.13 Manure landspreading**).

	Technique
a	Assess the manure receiving land to identify risks of run-off, taking into account: — soil type, conditions and slope of the field; — climatic conditions; — field drainage and irrigation; — crop rotations; — water resources and water protected zones.
b	Keep sufficient distance between manure spreading fields (leaving an untreated strip of land) and: 1. areas where there is a risk of run-off to water such as watercourses, springs, boreholes, etc.; 2. neighbouring properties (including hedges).
c	Avoid manure spreading when the risk of run-off can be significant. In particular, manure is not applied when: 1. the field is flooded, frozen or snow-covered; 2. soil conditions (e.g. water saturation or compaction) in combination with the slope of the field and/or field drainage are such that the risk of run-off or drainage is high; 3. run-off can be anticipated according to expected rainfall events.
d	Adapt the manure landspreading rate taking into account the nitrogen and phosphorus content of the manure and taking into account the characteristics of the soil (e.g. nutrient content), the seasonal crop requirements and weather or field conditions that could cause run-off.
e	Synchronize manure landspreading with the nutrient demand of crops.

f	Check the spreading fields at regular intervals to identify any sign of run-off and properly respond when necessary.		
g	Ensure adequate access to the manure store and that loading of manure can be done effectively without spillage.		
h	Check that machinery for manure landspreading is in good working order and set at the proper application rate.		

BAT 21.

In order to reduce ammonia emissions to air from slurry landspreading, BAT is to use one or a combination of the techniques given (**Section 1.13 Manure landspreading**)

	Technique (1)	Applicability
a	Slurry dilution, followed by techniques such as low-pressure water irrigation system.	Not applicable to crops grown to be eaten raw due to the risk of contamination. Not applicable when the soil type does not allow rapid infiltration of dilute slurry into the soil. Not applicable when crops do not require irrigation. Applicable to fields easily connected to the farm by pipework.
b	Band spreader, by applying one of the following techniques: 1. Trailing hose; 2. Trailing shoe.	Applicability may be limited when the straw content of the slurry is too high or when the dry matter content of the slurry is higher than 10 %. Trailing shoe is not applicable to growing solid-seeded arable crops.

No land spreading onsite

Not Applicable

	c	Shallow injector (open slot).	Not applicable on stony, shallow or compacted soil where it is difficult to achieve a uniform penetration. Applicability may be limited where crops may be damaged by machinery.	
	d	Deep injector (closed slot).	Not applicable on stony, shallow or compacted soil where it is difficult to achieve a uniform penetration and an effective slit closure. Not applicable during the vegetation of the crops. Not applicable on grassland, unless changing to arable land or when reseeding.	
	e	Slurry acidification.	Generally applicable.	
BAT 22. In order to reduce ammonia emissions to air from manure landspreading, BAT is to incorporate the manure into the soil as soon as possible (**Section 1.13 Manure landspreading**). See also Table 1.3 of CID *Table 1.3* **BAT-associated time delay between manure landspreading and incorporation into the soil** Parameter: Time — BAT-associated time delay between manure landspreading and incorporation into the soil (hours): 0 (1)-4 (2) (1) The lower end of the range corresponds to immediate incorporation. (2) The upper end of the range can be up to 12 hours when conditions are not favourable for a faster incorporation, e.g. when human and machinery resources are not economically available. Note Applicability factors.			No land spreading onsite	Not Applicable
BAT 23. In order to reduce ammonia emissions from the whole production process for the rearing of pigs (including sows) or poultry, BAT is to estimate or calculate the			Will be implemented in line with licensing requirements	Will Be

<table>
<tr><td>reduction of ammonia emissions from the whole production process using the BAT implemented on the farm (Section 1.14 Emissions from the whole production process).</td><td>The farm are working with researchers to develop a new odour, methane and ammonia abatement technique. Trials to commence in late 2021.</td><td></td></tr>
<tr><td>BAT 24.
BAT is to monitor the total nitrogen and total phosphorus excreted in manure using <u>one</u> of the specified techniques with at least the frequency given (Section 1.15 Monitoring of emissions and process parameters).
<table><tr><th></th><th>Technique (1)</th><th>Frequency</th><th>Applicability</th></tr><tr><td>a</td><td>Calculation by using a mass balance of nitrogen and phosphorus based on the feed intake, crude protein content of the diet, total phosphorus and animal performance.</td><td>Once every year for each animal category.</td><td>Generally applicable.</td></tr><tr><td>b</td><td>Estimation by using manure analysis for total nitrogen and total phosphorus content.</td><td></td><td></td></tr></table>See also Tables 1.1 & 1.2 of CID</td><td>BAT 24 a + b in place</td><td>Yes</td></tr>
<tr><td>BAT 25
BAT is to monitor ammonia emissions to air using <u>one</u> of the specified techniques with at least the frequency given (Section 1.15 Monitoring of emissions and process parameters).</td><td>BAT 25 A will be completed on an annual basis</td><td>Yes</td></tr>
</table>

	Technique (1)	Frequency	Applicability
a	Estimation by using a mass balance based on the excretion and the total (or total ammoniacal) nitrogen present at each manure management stage.	Once every year for each animal category.	Generally applicable.
b	Calculation by measuring the ammonia concentration and the ventilation rate using ISO, national or international standard methods or other methods ensuring data of an equivalent scientific quality.	Every time there are significant changes to at least one of the following parameters: (a) the type of livestock reared at the farm; (b) the housing system.	Only applicable to emissions from each animal house. Not applicable to plants with an air cleaning system installed. In this case, BAT 28 applies. Due to the cost of measurements, this technique may not be generally applicable.
c	Estimation by using emission factors.	Once every year for each animal category.	Generally applicable.

See also Table 2.1 of CID

Table 2.1

BAT-AEL for ammonia emissions to air from each pig house

Parameter	Animal category	BAT-AEL (1) (kg NH_3/animal place/year)
Ammonia expressed as NH_3	Mating and gestating sows	0,2-2,7 (2) (3)
	Farrowing sows (including piglets) in crates	0,4-5,6 (4)
	Weaners	0,03-0,53 (5) (6)
	Fattening pigs	0,1-2,6 (7) (8)

(1) The lower end of the range is associated with the use of an air cleaning system.
(2) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 4,0 kg NH_3/animal place/year.
(3) For plants using BAT 30.a6, 30.a7 or 30.a11, the upper end of the BAT-AEL is 5,2 kg NH_3/animal place/year.
(4) For existing plants using BAT 30.a0 in combination with nutritional management techniques, the upper end of the BAT-AEL is 7,5 kg NH_3/animal place/year.
(5) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 0,7 kg NH_3/animal place/year.
(6) For plants using BAT 30.a6, 30.a7 or 30.a8, the upper end of the BAT-AEL is 0,7 kg NH_3/animal place/year.
(7) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 3,6 kg NH_3/animal place/year.
(8) For plants using BAT 30.a6, 30.a7, 30.a8 or 30.a16, the upper end of the BAT-AEL is 5,65 kg NH_3/animal place/year.

The BAT-AELs may not be applicable to organic livestock production. The associated monitoring is in BAT 25.

BAT 26. BAT is to periodically monitor odour emissions to air (**Section 1.15 Monitoring of emissions and process parameters**).	A programme for routine Odour Monitoring in place as part of Odour Management Plan	Yes

Odour emissions can be monitored by using: — EN standards (e.g. by using dynamic olfactometry according to EN 13725 in order to determine odour concentration). — When applying alternative methods for which no EN standards are available (e.g. measurement/estimation of odour exposure, estimation of odour impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality can be used. Note: BAT 26 is only applicable to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.		
BAT 27. BAT is to monitor dust emissions from each animal house using <u>one</u> of the specified techniques with at least the frequency given (**Section 1.15 Monitoring of emissions and process parameters**). [1]	Not applicable	
BAT 28. **BAT 28** is to monitor ammonia, dust and/or odour emissions from each animal house equipped with an air cleaning system by using <u>all of</u> the specified techniques with at least the frequency given. (**Section 1.15 Monitoring of emissions and process parameters**).	Not applicable	

	Technique (1)	Frequency	Applicability
a	Calculation by measuring the dust concentration and the ventilation rate using EN standard methods or other methods (ISO, national or international) ensuring data of an equivalent scientific quality.	Once every year.	Only applicable to dust emissions from each animal house. Not applicable to plants with an air cleaning system installed. In this case, BAT 28 applies. Due to the cost of measurements, this technique may not be generally applicable.
b	Estimation by using emission factors.	Once every year.	Due to the cost of establishing emissions factors, this technique may not be generally applicable.

	Technique (1)	Frequency	Applicability		
a	Verification of the air cleaning system performance by measuring ammonia, odour and/or dust under practical farm conditions and according to a prescribed measurement protocol and using EN standard methods or other methods (ISO, national or international) ensuring data of an equivalent scientific quality.	Once	Not applicable if the air cleaning system has been verified in combination with a similar housing system and operating conditions.		
b	Control of the effective function of the air cleaning system (e.g. by continuously recording operational parameters or using alarm systems).	Daily	Generally applicable.		

BAT 29.

BAT is to monitor the specified process parameters at least once every year. (**Section 1.15 Monitoring of emissions and process parameters**).

	Parameter	Description	Applicability
a	Water consumption.	Recording using e.g. suitable meters or invoices. The main water-consuming processes in animal houses (cleaning, feeding, etc.) can be monitored separately.	Monitoring the main water-consuming processes separately may not be applicable to existing farms, depending on the configuration of the water supply network.

BAT 29 A - F all monitored routinely as part of overall environmental management of the facility

Yes

b	Electric energy consumption.	Recording using e.g. suitable meters or invoices. Electricity consumption of animal houses is monitored separately from other plants in the farm. The main energy-consuming processes in animal houses (heating, ventilation, lighting, etc.) can be monitored separately.	Monitoring the main energy-consuming processes separately may not be applicable to existing farms, depending on the configuration of the energy supply network.		
c	Fuel consumption.	Recording using e.g. suitable meters or invoices.	Generally applicable.		
d	Number of incoming and outgoing animals, including births and deaths when relevant.	Recording using e.g. existing registers.			
e	Feed consumption.	Recording using e.g. invoices or existing registers.			
f	Manure generation.	Recording using e.g. existing registers.			

Section 2. BAT Conclusions for Intensive Rearing of Pigs *(BAT 30 below applies to pig sites only)*		
BAT 30. In order to reduce ammonia emissions to air from each pig house, BAT is to use one or a combination of the techniques given. (**Section 2.1 Ammonia emissions from pig houses**). See table below	BAT 30 will be implemented by: A0) Low protein diet for pig, proven to reduce ammonia production A1 Vacuum system for frequent slurry removal A4) Frequent slurry removal by flushing to external slurry stores A14) Each pen will be cleaned between batches to avoid build up of manure A15) Pen floors and manure channels are designed to avoid manure build up A16) Low protein diet for pig, proven to reduce ammonia production A17) 8 different feed mixes, allowing for more efficient protein/diet and emission management A18) an odour control agent will be added to manure to reduce ammonia emissions A19) Manure will be tankered off site in sealed tankers	Yes

	Technique (1)	Animal category	Applicability
a	One of the following techniques, which apply one or a combination of the following principles: (i) reduce the ammonia emitting surface; (ii) increase the frequency of slurry (manure) removal to external storage; (iii) separate urine from faeces; (iv) keep litter clean and dry..		
	0. A deep pit (in case of a fully or partly slatted floor) only if used in combination with an additional mitigation measure, e.g.: — a combination of nutritional management techniques; — air cleaning system; — pH reduction of the slurry; — slurry cooling.	All pigs	Not applicable to new plants, unless a deep pit is combined with an air cleaning system, slurry cooling and/or pH reduction of the slurry.

	Technique (1)	Animal category	Applicability
	1. A vacuum system for frequent slurry removal (in case of a fully or partly slatted floor).	All pigs	May not be generally applicable to existing plants due to technical and/or economic considerations.
	2. Slanted walls in the manure channel (in case of a fully or partly slatted floor).	All pigs	
	3. A scraper for frequent slurry removal (in case of a fully or partly slatted floor).	All pigs	
	4. Frequent slurry removal by flushing (in case of a fully or partly slatted floor).	All pigs	May not be generally applicable to existing plants due to technical and/or economic considerations. When the liquid fraction of the slurry is used for flushing, this technique may not be applicable to farms located close to sensitive receptors due to odour peaks during flushing.
	5. Reduced manure pit (in case of a partly slatted floor).	Mating and gestating sows	May not be generally applicable to existing plants due to technical and/or economic considerations.
		Fattening pigs	

A20) No agitation at above ground tank
D - slurry amendments (which include acidification) applied onsite

6. Full litter system (in case of a solid concrete floor).	Mating and gestating sows	Solid manure systems are not applicable to new plants unless it can be justified for animal welfare reasons. May not be applicable to naturally ventilated plants located in warm climates and to existing plants with forced ventilation for weaners and fattening pigs. BAT 30.a7 may require large space availability.		
	Weaners			
	Fattening pigs			
7. Kennel/hut housing (in case of a partly slatted floor).	Mating and gestating sows			
	Weaners			
	Fattening pigs			
8. Straw flow system (in case of a solid concrete floor).	Weaners			
	Fattening pigs			
9. Convex floor and separated manure and water channels (in case of partly slatted pens).	Weaners	May not be generally applicable to existing plants due to technical and/or economic considerations.		
	Fattening pigs			

Technique (1)	Animal category	Applicability
10. Littered pens with combined manure generation (slurry and solid manure).	Farrowing sows	Not applicable to existing plants without solid concrete floors.
11. Feeding/lying boxes on solid floor (in case of litter-based pens).	Mating and gestating sows	
12. Manure pan (in case of a fully or partly slatted floor).	Farrowing sows	Generally applicable.
13. Manure collection in water.	Weaners	May not be generally applicable to existing plants due to technical and/or economic considerations.
	Fattening pigs	
14. V-shaped manure belts (in case of partly slatted floor).	Fattening pigs	
15. A combination of water and manure channels (in case of a fully slatted floor).	Farrowing sows	

	16. Littered external alley (in case of a solid concrete floor).	Fattening pigs	Not applicable to cold climates. May not be generally applicable to existing plants due to technical and/or economic considerations.
b	Slurry cooling.	All pigs	Not applicable when: — heat reuse is not possible; — litter is used.
c	Use of an air cleaning system, such as: 1. Wet acid scrubber; 2. Two-stage or three-stage air cleaning system; 3. Bioscrubber (or biotrickling filter).	All pigs	May not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used.
d	Slurry acidification.	All pigs	Generally applicable.
e	Use of floating balls in the manure channel.	Fattening pigs	Not applicable to plants equipped with pits that have slanted walls and to plants that apply slurry removal by flushing.

(1) A description of the techniques is given in Sections 4.11 and 4.12.

See also Table 2.1 of CID

Table 2.1

BAT-AEL for ammonia emissions to air from each pig house

Parameter	Animal category	BAT-AEL (1) (kg NH_3/animal place/year)
Ammonia expressed as NH_3	Mating and gestating sows	0,2-2,7 (2) (3)
	Farrowing sows (including piglets) in crates	0,4-5,6 (4)
	Weaners	0,03-0,53 (5) (6)
	Fattening pigs	0,1-2,6 (7) (8)

(1) The lower end of the range is associated with the use of an air cleaning system.
(2) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 4,0 kg NH_3/animal place/year.
(3) For plants using BAT 30.a6, 30.a7 or 30.a11, the upper end of the BAT-AEL is 5,2 kg NH_3/animal place/year.
(4) For existing plants using BAT 30.a0 in combination with nutritional management techniques, the upper end of the BAT-AEL is 7,5 kg NH_3/animal place/year.
(5) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 0,7 kg NH_3/animal place/year.
(6) For plants using BAT 30.a6, 30.a7 or 30.a8, the upper end of the BAT-AEL is 0,7 kg NH_3/animal place/year.
(7) For existing plants using a deep pit in combination with nutritional management techniques, the upper end of the BAT-AEL is 3,6 kg NH_3/animal place/year.
(8) For plants using BAT 30.a6, 30.a7, 30.a8 or 30.a16, the upper end of the BAT-AEL is 5,65 kg NH_3/animal place/year.

The BAT-AELs may not be applicable to organic livestock production. The associated monitoring is in BAT 25.

Section 3. BAT Conclusions for Intensive Rearing of Poultry

BAT 31-34 applies to ammonia emissions from poultry houses

(Section 3.1 Ammonia emissions from poultry houses).

BAT 31.

In order to reduce ammonia emissions to air from each house for laying hens, broiler breeders or pullets, BAT is to use one or a combination of the techniques given **(Section 3.1.1 Ammonia emissions from houses for laying hens, broiler breeders or pullets).**

	Technique (1)	Applicability
a	Manure removal by belts (in case of enriched or unenriched cage systems) with at least: — one removal per week with air drying; or — two removals per week without air drying.	Enriched cage systems are not applicable to pullets and broiler breeders. Unenriched cage systems are not applicable to laying hens.
b	In case of non-cage systems:	
	0. Forced ventilation system and infrequent manure removal (in case of deep litter with a manure pit) only if used in combination with an additional mitigation measure, e.g.: — achieving a high dry matter content of the manure; — an air cleaning system.	Not applicable to new plants unless combined with an air cleaning system.

	Technique (1)	Applicability
	1. Manure belt or scraper (in case of deep litter with a manure pit).	Applicability to existing plants may be limited by the requirement for a complete revision of the housing system.
	2. Forced air drying of manure via tubes (in case of deep litter with a manure pit)	The technique can be applied only to plants with sufficient space underneath the slats.
	3. Forced air drying of manure using perforated floor (in case of deep litter with a manure pit).	Due to high implementation costs, applicability to existing plants may be limited.
	4. Manure belts (in case of aviary).	Applicability to existing plants depends on the width of the shed.
	5. Forced drying of litter using indoor air (in case of solid floor with deep litter).	Generally applicable.
c	Use of an air cleaning system, such as: 1. Wet acid scrubber; 2. Two-stage or three-stage air cleaning system; 3. Bioscrubber (or biotrickling filter).	May not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used.

See also Table 3.1 of CID

Table 3.1

BAT-AELs for ammonia emissions to air from each house for laying hens

Parameter	Type of housing	BAT-AEL (kg NH_3/animal place/year)
Ammonia expressed as NH_3	Cage system	0,02-0,08
	Non-cage system	0,02-0,13 (1)

(1) For existing plants using a forced ventilation system and an infrequent manure removal (in case of deep litter with a manure pit), in combination with a measure achieving a high dry matter content of the manure, the upper end of the BAT-AEL is 0,25 kg NH_3/animal place/year.

The associated monitoring is in BAT 25. The BAT-AEL may not be applicable to organic livestock production.

BAT 32.

In order to reduce ammonia emissions to air from each house for broilers, BAT is to use one or a combination of the techniques given (**Section 3.1.2 Ammonia emissions from houses for broilers**).

	Technique (1)	Applicability
a	Forced ventilation and a non-leaking drinking system (in case of solid floor with deep litter).	Generally applicable.

b	Forced drying system of litter using indoor air (in case of solid floor with deep litter).	For existing plants, the applicability of forced air drying systems depends on the height of the ceiling. Forced air drying systems may not be applicable to warm climates, depending on the indoor temperature.		
c	Natural ventilation, equipped with a non-leaking drinking system (in case of solid floor with deep litter).	Natural ventilation is not applicable to plants with a centralised ventilation system. Natural ventilation may not be applicable during the initial stage of rearing of broilers and due to extreme climate conditions.		
d	Litter on manure belt and forced air drying (in case of tiered floor systems).	For existing plants, the applicability depends on the height of the side walls.		
e	Heated and cooled littered floor (in case of combi-deck systems).	For existing plants, the applicability depends on the possibility to install closed underground storage for the circulating water.		
f	Use of an air cleaning system, such as: 1. Wet acid scrubber; 2. Two-stage or three-stage air cleaning system; 3. Bioscrubber (or biotrickling filter).	May not be generally applicable due to the high implementation cost. Applicable to existing plants only where a centralised ventilation system is used.		

See also Table 3.2 of CID

Table 3.2

BAT-AEL for ammonia emissions to air from each house for broilers with a final weight of up to 2,5 kg

Parameter	BAT-AEL (1) (2) (kg NH_3/animal place/year)
Ammonia expressed as NH_3	0,01-0,08

(1) The BAT-AEL may not be applicable to the following types of farming: extensive indoor, free-range, traditional free-range and free-range — total freedom, as defined in Commission Regulation (EC) No 543/2008 of 16 June 2008 laying down detailed rules for the application of Council Regulation (EC) No 1234/2007 as regards the marketing standards for poultrymeat (OJ L 157, 17.6.2008, p. 46).
(2) The lower end of the range is associated with the use of an air cleaning system.

The associated monitoring is in BAT 25. The BAT-AEL may not be applicable to organic livestock production.

BAT 33.
In order to reduce ammonia emissions to air from each animal house for ducks, BAT is to use one or a combination of the techniques given (**Section 3.1.3 Ammonia emissions from houses for ducks).**

BAT 34.
In order to reduce ammonia emissions to air from each animal house for turkeys, BAT is to use one or a combination of the techniques given (**Section 3.1.4 Ammonia emissions from houses for turkeys).**

Section 4. Description of Techniques (refer to CID for full text)		
4.1 Techniques for reducing emissions from wastewater		
4.2. Techniques for efficient use of energy		
4.3. Techniques for reducing dust emissions		
4.4. Techniques for reducing odour emissions		
4.5. Techniques for reducing emissions from the storage of solid manure		
4.6. Techniques for reducing emissions from slurry storage		
4.7. Techniques for on farm manure processing		
4.8. Techniques for manure landspreading		
4.9. Techniques for monitoring		
4.10. Nutritional management		
4.11. Techniques to treat emissions to air from animal housing		
4.12. Techniques for pig houses		
4.13. Techniques for poultry housing		
4.13.1. Techniques for reducing ammonia emissions from houses for laying hens, broiler breeders or pullets		
4.13.2. Techniques for reducing ammonia emissions from broiler houses		

March 2017