

Emissions Inventory Reporting for intensive farming

Reference number: GN25a

Document Owner: Industry Technical Group

What is this document about?

This guidance explains how to calculate the emissions from intensive farming activities in order to be able to complete the annual Emissions Inventory reporting requirement. It provides information that is specific to Intensive Farming operations in Wales and should be used in conjunction with GN25, the general guidance on reporting to the Emissions Inventory.

The Emissions Inventory is used to provide information to the public and to policy makers, so that they can make informed decisions about how we manage our environment for future generations. It also helps Government meet its national and international environmental reporting commitments, the National Atmospheric Emissions Inventory ([NAEI](#)) and the European & UK Pollutant Release and Transfer Registers ([E-PRTR](#) and [UK-PRTR](#)).

Who is this document for?

The guidance is for operators of intensive farming activities who have received a notice requiring them to complete the annual on-line Emissions Inventory report.

Contact for queries and feedback

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Version History

Document Version	Date Published	Summary of Changes
1.0	2016	Document published
2.0	January 2019	Clarification on use of emission factors
Review Date: December 2020		

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1. Introduction

This guidance tells you what you need to report and how to calculate the amounts of emissions from intensive farming activities using emission factors.

Operators of intensive farms will have received a Regulation 61 Notice of request for information with an attached Schedule 1 detailing the information required for the Pollution Release and Transfer Register (PRTR) and the National Atmospheric Emissions Inventory (NAEI). The Notice was sent to all existing permit holders in 2016, and since then it has been sent to all new permit holders when their permit was issued.

You must make your annual return online via the PRTR online reporting system <http://prtr.defra.gov.uk/data-entry-system/>. It is not possible to submit a paper return.

If you have any problems using or gaining access to this system, please contact the NRW PRTR site administrator by email PRTR.national.manager@cyfoethnaturiolcymru.gov.uk, or by phoning our general enquiries number 0300 065 3000.

The online reporting system will be available to operators from the second week of February of each year for reporting emissions data for the previous calendar year, and the deadline for submitting data will be **31 March** each year.

2. Substances to report

You need to report releases to air, releases to controlled waters, wastewater transfers and off-site transfers of waste. The online system contains a list of all the substances in the inventory, but you only need to report those relevant to your activities.

You need to report the amount of each pollutant released in the previous calendar year. The online reporting system asks for the amount in kilograms (kg) for releases to air and water, and in tonnes for off-site waste transfers.

Where the only listed activity on your permit is Intensive Farming you will only need to report release of ammonia, and where applicable, particulate matter (PM₁₀), methane and nitrogen oxides. If you have other activities listed on your permit you will need to look at the general guidance (GN25 Emissions Inventory Reporting) for information about reporting emissions from those activities.

3. How to calculate your releases to air using emission factors

The amount is calculated using emission factors. These are figures that have been determined from monitoring actual emissions from different types of housing and working out an average emission per animal place per year.

If you have emissions abatement plant (eg a scrubber) treating the emissions of ammonia from your livestock housing, then you should calculate the amount of emissions using the emission factor given in your permit for calculating the emissions you report to us.

The standard emission factors are listed at the end of this guidance.

To calculate your releases, you will need to know the number of animal places used. This is the number of animals housed at any time, not the total annual throughput. It may be less than your permit allows.

- **Broilers** - assume that each growing cycle has the same number of birds. You do not have to adjust your calculation for the time that the sheds are empty for cleaning and disinfection as this is accounted for in the emission factor.
- **Other poultry or pigs** – assume that the housing is occupied all year. The emission factor accounts for the usual breaks between flocks, but if there are extended periods when the housing is empty, you will need to adjust the calculation to account for this.
- If your livestock numbers changed during the year, for example if your permit was varied to increase the numbers, you should work out what the emissions were per month based on the number of livestock reared and the relevant emission factor for each substance. We suggest you use the following method as this takes account of changes in emission factor if the type of animal reared changed.

$$\left((N \times F) \times \frac{M}{12} \right) + \left((n \times F) \times \frac{M}{12} \right) = \text{emissions in kg}$$

Where:

N = number of livestock

n = new number of livestock

F = relevant emission factor

M = months applicable

Example:

A broiler farm has 50,000 birds for the first five months of the year and 100,000 birds for the remaining seven months. The ammonia emission factor for broilers is 0.034. The ammonia calculation would be:

$$\left((50,000 \times 0.034) \times \frac{5}{12} \right) + \left((100,000 \times 0.034) \times \frac{7}{12} \right) = 2692\text{kg}$$

3.1. Ammonia

Multiply the number of animal places used by the appropriate emission factor from the list at the end of this guidance. Note that for enriched cages you should use the emission factor that best matches the manure handling system.

Example 1 - Poultry broilers

50,000 broiler places x emission factor of 0.034 = release of 1,700kg

Example 2 – Poultry layers (manure removal twice a week by manure belt)

$$20,000 \text{ layer places} \times \text{emission factor of } 0.035 = 700\text{kg}$$

If manure is stored on site after removal from the housing, ammonia releases from this must also be reported

So, if 17 tonnes of manure are removed on a belt system,

$$17 \times \text{emission factor of } 2.38 = 40.5\text{kg}$$

The total release in this example would be $700 + 40.5 = 740.5\text{kg}$

Example 3 – Pig housing

A farm which used places for 800 sows and 1500 finishers on straw in the calendar year

$$(800 \times \text{emission factor of } 4.57) + (1500 \times \text{emission factor of } 2.97) \\ = \text{total release of } 8111\text{kg}$$

If manure or slurry is stored within the boundary of the installation, releases from this need to be added to the housing releases.

So, for a 43m^2 slurry lagoon without a cover add $(43 \times \text{emission factor of } 1.4) = 60.2 \text{ kg}$

Total emission from housing and manure storage = $8111 + 60.2 = 8171.2\text{kg}$

3.2. Methane

Poultry

You only need to report methane emissions for poultry if you store manure outside the housing and within the installation boundary.

Example

50,000 broilers x emission factor for poultry manure management of 0.078 = 3900kg

Pigs

For pigs you will need to report methane from the pigs themselves (enteric fermentation), and from manure storage.

Example

An installation with 800 sows

$$(800 \times \text{emission factor for enteric fermentation of } 1.5) = 1200\text{kg}$$

Plus

$$(800 \times \text{emission factor for manure management of } 3) = 2400\text{kg}$$

$$\text{Total emission} = 3600\text{kg}$$

3.3. Nitrogen oxides – NO and NO₂ as NO₂

Leave this blank unless you have information to the contrary. This is only likely to be relevant to certain types of pig rearing installations.

3.4. Particulate matter – PM₁₀

This only applies to poultry.

To calculate the PM₁₀ release, multiply the number of bird places used by the relevant emission factor, then divide by 3.

Example: An installation with 50,000 layers in cages

$$(50,000 \times \text{emission factor of } 0.05) \div 3 = 833\text{kg}$$

4. Releases to controlled waters

This refers to substances specified in your permit. If you have conditions in your permit allowing the discharge of specified substances to groundwater, a river or the sea, complete the relevant part of the on-line return. The amount is calculated from actual concentration and measured flow data and further information about this is contained in the general guidance note (GN25).

5. Off-site transfers in waste water

This refers to substances that you are permitted to discharge from the installation to a sewer as specified in a water company trade effluent consent. If this applies to your installation you will need to report the amount of each specified substance.

6. Off-site waste transfers

You need to report the total amount of hazardous and non-hazardous waste that you sent off site for disposal or recovery during the year. This includes any manure or slurry sent for disposal or recovery such as to a power station, but **excludes** manure or slurry sent off site for land-spreading. Other wastes that should be reported are things like plastic wrapping, cardboard, light bulbs, wooden pallets and protective clothing.

You do not need to report whole animal carcasses, but should include other animal tissue waste.

The waste transfer notes you receive from the carrier removing the waste should allow you to keep a running total of the hazardous and non-hazardous waste removed during the year, and whether it has gone for disposal or recovery.

Waste quantities need to be reported in tonnes.

You need to make separate entries into the reporting system for non-hazardous waste sent for disposal and for recovery. If the total tonnage of non-hazardous waste is less than 2000 tonnes you do not need to report the non-hazardous waste transfer.

Similarly, for hazardous waste you need to report the amounts sent for disposal and recovery if the total amount is more than 2 tonnes.

Example

A broiler farm sent 2,100 tonnes of litter to a power station for incineration and the remainder to another farm for land spreading. The litter sent for incineration will need reporting (as it's a reportable waste and exceeds 2000 tonnes), but the litter sent for land spreading doesn't.

Appendix 1: Poultry ammonia, dust and methane emission factors

Ammonia – poultry housing

Housing type	Ammonia Emission Factor (kg NH ₃ /animal place/year)
Layers	
Cage with deep pit manure storage beneath	0.29
Ventilated deep pit	0.20
Manure removal twice a week by manure belt	0.035
Vertical tiered cages with forced air drying once a week removal	0.035
Vertical tiered cages with whisk forced air drying once a week removal	0.09
Vertical tiered cages with manure belt with drying tunnel over cage 24-36 hour removal	0.035
Barn and free range	
Perchery with deep litter	0.29
Litter system with forced air drying	0.12
Litter system with perforated floor and forced air drying	0.10
Aviary system	0.08
Broilers	
Naturally ventilated, fully littered floor, non-leaking drinkers	0.034
Fan ventilated, fully littered floor, non-leaking drinkers	0.034
Pullets	
Naturally ventilated, fully littered floor, non-leaking drinkers	0.06
Fan ventilated, fully littered floor, non-leaking drinkers	0.06
Turkeys	
Male	0.45
Female	0.23
Ducks	
	0.11

Ammonia – poultry manure storage

Manure storage	Kg NH ₃ /tonne fresh manure
Manure - belts	2.38
Manure – deep pit	2.38
Other	1.74

Poultry – dust emission factors

Poultry type	kg dust/animal place/year
Layers, perchery or aviary	0.1
Layers, cage	0.05
Broilers	0.1
Turkeys (male)	0.9
Turkeys (female)	0.5
Ducks	0.2
Pullets	0.1

Methane emissions factors

Description	Enteric fermentation (kg CH ₄ /animal place/year)	Manure management (kg CH ₄ /animal place/year)
Poultry	Not estimated	0.078

Appendix 2: pig ammonia and methane emission factors

Ammonia – pig housing

Housing type	Ammonia Emission Factor (kg NH ₃ /animal place/year)
Sows	
Fully Slatted Floor (FSF)	3.01
Solid Floor – straw system	4.57
Part-slatted floor (PSF) with reduced manure pit	2.41
FSF with vacuum system for frequent slurry removal	2.26
Farrowers	
Fully Slatted Floor (FSF)	5.84
Solid Floor – straw system	8.88
FSF/PSF with combination of water and manure channel	2.80
FSF/PSF with flushing system with manure gutters	2.34
FSF/PSF with manure pan underneath	2.04
Weaners	
Fully Slatted Floor (FSF)	0.29
Solid Floor – straw system	0.21
Pen/flatdeck with FSF/PSF with vacuum system for frequent slurry removal	0.22
Pen/flatdeck with FSF beneath where there is concrete sloped floor to separate faeces or urine	0.20
Pen with PSF (2-climate system)	0.19
Pen with PSF and sloped or convex solid floor	0.17
Pen with PSF with triangular slats and manure channel with sloped side-walls	0.08
Growers	
Fully Slatted Floor (FSF)	1.59
Solid Floor – straw system	1.14
FSF with vacuum system for frequent slurry removal	1.19
PSF with reduced manure pit including slanted walls and vacuum system	0.64
PSF with central convex solid floor at front and manure gutters with slanted sidewalls and sloped manure pit	0.64
Finishers	
Fully Slatted Floor (FSF)	4.14
Solid Floor – straw system	2.97
FSF with vacuum system for frequent slurry removal	3.11
PSF with reduced manure pit including slanted walls and vacuum system	1.66
PSF with central convex solid floor at front and manure gutters with slanted sidewalls and sloped manure pit	1.66

Ammonia – pig manure/slurry storage

Manure storage	Kg NH ₃ / tonne fresh manure
Manure heap	1.49
Slurry storage	Kg NH ₃ / m ²
Circular store - no cover	1.4
Circular store - rigid cover	0.28
Circular store - floating cover	0.7
Circular store - low tech cover	1.05
Lagoon - no cover	1.4
Lagoon - rigid cover	0.28
Lagoon - floating cover	0.56
Lagoon - low tech cover	0.84

Methane emission factors

Description	Enteric fermentation (kg CH ₄ /animal place/year)	Manure management (kg CH ₄ /animal place/year)
Pigs	1.5	3