

Guidance for Farmers in Nitrate Vulnerable Zones

Storage of organic manure

October 2008

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Website: www.defra.gov.uk/environment/water/quality/nitrate

Published by the Department for Environment, Food and Rural Affairs

The guidance in this series of leaflets is designed to help farmers be compliant with The Nitrate Pollution Prevention Regulations 2008 (SI2349 September 2008). The guidance has been produced in association with the Environment Agency, who is responsible for assessing farmers' compliance with these Regulations.

PB12736d

Storage of organic manure

Part 7 of the Regulations establishes a number of rules about how you must store organic manures on your farm.

If you keep livestock on your farm, and they deposit excreta whilst on a yard or in a building, you will probably need to collect and store the manure before it can be spread or transported off your farm. The type of manure you collect will be handled as either liquid (e.g. slurry) or solid (e.g. farmyard manure, poultry manure).

You may also produce other types of organic manure (e.g. composts, solids mechanically separated from slurry) or import organic manure (e.g. livestock manure from another farm, biosolids from a water company). This may also need to be stored before it can be spread or exported.

A summary of the rules is given below.

YOU MUST:

- **Provide, by 1 January 2012, at least six months' storage capacity for poultry manures and pig slurry, and at least five months for slurry from other types of livestock**
- **Follow a defined process when calculating how much storage you need**
- **Ensure your manure storage facilities meet legal standards of construction**
- **Store poultry manure and other types of solid manure on an impermeable base, in a roofed building, or in an appropriately located, temporary field heap**
- **Identify suitable field sites for temporary storage of solid manure if you wish to use this storage method**
- **Record your calculation showing existing storage capacity and whether you need to provide extra storage capacity. There are also some annual record keeping requirements that you must meet**

The boxes below set out the rules in more detail and the following paragraphs provide further explanation. A step-by-step guide is provided at the back of this Leaflet to help you calculate how much storage you need.

Storage of organic manure

1. Storage capacity

There are times of the year when the Regulations prohibit the spreading of organic manure to land (see Leaflet 8). For example, organic manures with high readily available N must not be spread during the 'closed periods'.

Storage facilities of sufficient capacity are needed to cover these closed periods and to provide you with flexibility to continue storing manure outside the closed periods when conditions may be unsuitable for field applications (e.g. waterlogged soil).

The Regulations therefore establish rules which set a minimum storage capacity for slurry and poultry manure. (Note – there is no minimum storage capacity requirement for other types of livestock manure although some storage may be necessary for practical reasons.)

YOU MUST provide, by 1 January 2012, sufficient facilities for the storage of slurry and poultry manure produced by livestock, whilst in a yard or building, during the following 'storage periods':

- 1st October to 1st April (six months) in the case of pigs and poultry.
- 1st October to 1st March (five months) in the case of other livestock.

Although storage facilities of sufficient capacity do not need to be in place until January 2012, you may need to take action much earlier than this to make sure you meet this deadline. For example, you will need to calculate how much storage you need to comply with the above rule, and if you need to construct additional facilities you will need to organise contractors, seek advice from your local authority about the need for planning permission, and contact the Environment Agency to check that your designs for the storage facilities meet legal construction standards (see Section 3).

If you already have sufficient capacity on your farm you must comply with the 'closed periods' immediately (see Leaflet 8).

2. Calculating how much storage you need

The Regulations set out the factors you must take into account when calculating how much storage is needed.

When determining the volume of manure produced by the livestock kept on your farm during the storage period YOU MUST use the standard values provided in Tables 1 – 4 of Leaflet 3.

Slurry stores MUST have the capacity to store, in addition to the slurry:

- average rainfall expected to enter the store during the storage period; and
- any wash water that enters the store during that period.

You do not need to provide storage facilities for the volume of poultry manure or slurry:

- exported from the farm during the storage period; or
- applied to land with a low risk of run-off following the end of a closed period provided:
 - you comply with certain restrictions on the rate and frequency of these applications (see Leaflet 8);
 - you mark the low run-off risk land on a map for inspection purposes; and
 - you provide, as a contingency measure, additional storage capacity equivalent to one week's production of manure.

If you are in an NVZ originally designated in 1996 or 2002, you will need to complete and record this calculation by 30 April 2009. If, however, you are in an NVZ newly designated in 2008, you have until 30 April 2010.

To help with your calculations, you can use the step-by-step guide provided at the back of this Leaflet (see Annex 1 for slurry storage and Annex 2 for poultry manure storage) or the PLANET software. You may also wish to seek professional advice.

Important points to note when undertaking the calculation:

- You may decide that you need more storage than is required by the Regulations to cope with your local situation, crop rotation or for other operational reasons.
- You should future-proof your calculation. For example, if you intend to increase the number of livestock you keep on your farm within the next few years, you should base your calculation on the increased number of livestock.
- You can reduce the capacity you need by taking some cost-effective actions such as:
 - Diverting clean and dirty water that would otherwise enter the store;
 - Constructing a roof over the store to keep out rainfall; or
 - Mechanically separating the liquid and solid fractions of slurry.
- If part of your farm is outside an NVZ, you should make your calculation pro rata. For example, if most of your farm (i.e. 90%) is within an NVZ you may need 90% of the storage capacity required by the Regulations.

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- Low run-off risk land is that which has an average slope less than 3 degrees, does not have land drains, and is at least 50m from a watercourse or any conduit leading to a watercourse. It must be marked on your risk map (see Leaflet 8 for guidance on how to draw up a risk map for your farm).
- Not all types of livestock manure count towards the capacity requirement. For example:
 - the amount of excreta not collected as slurry (i.e. it is collected as farmyard manure or deposited in a field by grazing livestock) is excluded;
 - the amount of solids separated from slurry is excluded;
 - very dilute run-off from lightly fouled yards or from the dairy/parlour (i.e. dirty water) that is collected separately from slurry is excluded as long as it does not contain liquids from weeping-wall stores, slurry strainer boxes, slurry separators or silage effluent (these are rich in nitrogen and so are regarded as slurries which are subject to the closed periods);
 - duck manure is excluded if it can be demonstrated, via sampling and analysis (see Leaflet 3), that it has a readily available nitrogen content of 30% total N or below; and
 - the amount of manure exported or spread to low run-off risk land during the storage period are both excluded.
- Average monthly rainfall for 1971 to 2000 is available from your nearest rainfall station. Contact details for the Meteorological Office are:
 - <http://www.metoffice.gov.uk/climate/uk/averages/19712000/index.html>
 - Telephone 0870 900 0100
 - E-mail enquiries@metoffice.gov.uk

3. Construction standards for manure stores

The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations¹ (usually referred to as the “SSAFO Regulations”) set down construction standards for manure storage facilities.

YOU MUST:

- ensure that any new, substantially reconstructed, or substantially enlarged facilities for the storage of organic manure (i.e. slurry vessels, or impermeable bases for solid manure) comply with standards set down in the SSAFO Regulations.
- notify the Environment Agency in writing about a new, substantially enlarged, or substantially reconstructed installation at least 14 days before you use it.

When you are considering options for improving your storage facilities on your farm you should seek advice from the Environment Agency (EA) at an early stage in the process to ensure you comply with the SSAFO Regulations. The EA have powers under these Regulations to require changes to facilities if they pose a significant risk of causing pollution.

See Section 7 for details of guidance regarding the construction, maintenance and repair of manure stores.

4. Types of storage facilities

Slurry will need to be kept in a store suitable for holding liquid (e.g. tank, lagoon) – see Sections 1 – 3 for information on the rules that relate to the capacity and construction standards for slurry stores. Solid manure can be heaped and therefore stored in a wider variety of locations. The Regulations establish the following rules which set out the options available for storing solid manure.

YOU MUST store poultry manure and other types of solid manure either:

- in a vessel;
- on an impermeable base, with appropriate collection and containment of run-off;
- in a roofed building; or
- in an appropriately located temporary field heap.

There are further conditions which must be met if you wish to store solid manure in a temporary field heap (see Section 5).

There are also legal construction standards that must be met if you store solid manure on an impermeable base (e.g. concrete) without a roof or cover (see Section 3).

5. Temporary storage of solid manures in field heaps

The Regulations allow certain types of solid manure to be stored temporarily in field heaps, provided they are located and constructed in accordance with the following rules.

YOU MUST:

- only store poultry manures and other organic manures in field heaps if they are solid enough to be stacked in a free-standing heap and do not give rise to free drainage from within the stacked material.
- cover any poultry manure without bedding/litter which is stored in a field heap with an impermeable sheet.
- NOT locate field heaps:
 - within 10m of a surface water or land drain;
 - within 50m of a spring, well or borehole;
 - on land likely to become waterlogged;
 - on land likely to flood; or
 - in any single position for more than 12 successive months.
- leave a two year gap before returning to the same site.
- identify the location of field sites on your risk map.

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You will need to make alternative arrangements for storing organic manures that are too wet to be stored in a field heap (e.g. storage in a building or on an impermeable base). However, it may be possible to transfer these materials to a temporary field heap once sufficient drainage has occurred and they have become more solid. Note, any drainage is classed as slurry and must be collected and stored.

The distances described above are the legal minimum but greater distances may be required depending on slope and the risk of causing water pollution. You should use your risk map to help you identify safe areas of your farm for locating field heaps. Leaflet 8 provides guidance on the production of a risk map for your farm.

Resting the sites used for field heaps will reduce the risk of creating pathways for nutrients to get into groundwater or surface water. Growing a crop on the site whilst it is being rested will encourage nutrient uptake and further reduce this risk.

6. Record keeping

The Environment Agency will check your compliance with the rules described in this Leaflet by checking that you have correctly calculated how much storage you need and by physically inspecting the storage facilities in place on your farm (e.g. the location of any field heaps, the size and condition of any impermeable bases or storage vessels).

The Regulations require that you keep the following records.

(a) Records of calculations

YOU MUST keep a record of:

- the actual capacity of the storage facilities present on your farm. Any changes to the recorded capacity MUST be updated within one week.
- your calculation of the volume of manure that will be produced by the anticipated number of livestock kept in a yard or building during the five/six month storage period.
- your calculation of the amount of storage you need on your farm to comply with the five/six month storage capacity requirement.

If you introduce livestock onto your farm for the first time, YOU MUST complete the two calculations above within one month.

If you are in an NVZ designated in 1996 or 2002, you will need to complete these calculations by 30 April 2009. If, however, you are in an NVZ newly designated in 2008, you will have until 30 April 2010.

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You may only need to do these calculations once, although they will need updating if circumstances change on your farm (e.g. if you increase the number or change the type of livestock kept on your farm then you may need to check that you still have sufficient storage and re-do the calculation within one month of the change).

If you complete the step-by-step guide provided at the back of this Leaflet, or use the PLANET software, the Environment Agency will accept this as a valid record of your calculations.

(b) Annual records

Before 30 April each year (from 2010) YOU MUST keep a record of:

- the numbers of livestock kept on your farm during the storage period.
- any imports or exports of poultry manure or slurry during the storage period.
- the dates and location of any field sites used for storing solid manure.

Note – A full description of the annual records required by the Regulations is provided in the paragraphs below.

From 2010, you will need to keep the following records and make sure they are available for inspection before 30 April each year. This means that you must start recording the information during 2009.

1. Records of livestock numbers kept on your farm during the previous storage period

Your records must identify which of the livestock categories (listed in Leaflet 3) the animals kept on your farm fall within. Therefore you will probably need to keep details of either their gender, age and/or weight. You will also need to know:

- how long these animals were kept on your farm during the previous storage period; and
- how long they were kept in a building or on a yard;

You only need to keep records of animals kept on your farm which fall within any of the livestock categories listed in Leaflet 3. It is not necessary to keep records of other types of animals.

2. Records of imports/exports of slurry or poultry manure during the previous storage period

If you bring slurry or poultry manure on to your farm (imports), or transport it off (exports), you will need to keep the following records:

- the type and amount of livestock manure;
- the date it was brought on to / sent off your farm; and
- the name and address of the supplier / recipient.

You will also need to keep details of a contingency plan to be used if an agreement to send manure off your farm fails.

3. The dates and location of any field sites used for storing solid manure

This should be recorded on your risk map (see Leaflet 8).

As with all records required by the Regulations, you must keep the above for a minimum of five years.

Notes:

The records described at points 1 and 2 above are almost identical to those required in relation to the livestock manure N farm limit (Leaflet 5), although they relate to a different period of the year. You should be able to keep similar records to meet the record keeping requirements of both sets of rules.

The annual records of livestock numbers, and of imports and exports, can be kept using any existing record-keeping system that you may have in place on your farm provided it is adapted to contain the relevant information required by the Regulations.

7. Further information

- PLANET software – a free copy is available by visiting www.planet4farmers.co.uk or telephone **08456 023864**
- The following guidance is available by visiting www.defra.gov.uk:
 - Code of Good Agricultural Practice – (revised; available late 2008)
 - Guidance Notes for Farmers: The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (as amended)
 - Guidance on Construction Repair and Maintenance leaflets:
 - Above-ground circular concrete and weeping-wall slurry stores CGN 001
 - Earth-banked slurry stores CGN 002
 - In-situ concrete slurry stores CGN 003
 - Above-ground circular steel slurry stores CGN 004
 - Separation of clean and dirty water; dirty water storage; and yard area construction CGN 008
 - Sluice valves on steel and concrete above-ground slurry stores CGN 010
 - The use of covers on circular steel and concrete slurry stores CGN 011
- A Farmer's Guide to the Planning System

Step-by-Step Guide for Calculating your Slurry Storage Requirement

This step-by-step guide will help you calculate how much storage you need on your farm to comply with the legal requirements of **6 months storage capacity for pig slurry and 5 months storage capacity for slurry from other livestock** (e.g. cattle).

The eight steps you will need to follow are:

- Step 1** Collect your information
- Step 2** Calculate the volume of slurry produced per month
- Step 3** Calculate the average volume of rainfall that enters your slurry store(s) each month
- Step 4** Calculate the volume of wash water that enters your slurry store(s) each month
- Step 5** Calculate the total volume of slurry (including any dilution by rainfall / wash water) that needs to be stored
- Step 6** Calculate the capacity of your existing slurry store(s)
- Step 7** Compare existing slurry storage capacity with the capacity needed to meet the legal requirements
- Step 8** Consider actions that can reduce the volume of slurry (plus dilution) that needs to be stored

Step 1 Collect your information

Before assessing your requirements, you will need to have available the following basic information:

- a. Leaflet 3 – the “volume per livestock type” figures from Tables 1 – 4;
- b. estimates of the livestock types and numbers likely to be kept on your farm during the storage period. You should future proof your calculation by using estimates of livestock numbers likely to be kept on your farm in the future (if this is greater than the number currently kept);
- c. the dimensions of existing slurry store(s) (metres);
- d. the surface area (square metres) of any unroofed/uncovered existing slurry store(s);
- e. the area of open yards, silage clamps, roofs etc. that drain into the slurry store(s) (in square metres); include all fouled concrete areas and dungsteeds if the run-off drains to the slurry store(s); exclude clean yard areas and roof areas if rain falling on these is collected and discharged to a clean drain, but include such yard and roof water if it drains to the slurry store(s); and
- f. the long-term monthly rainfall for October to February/March.

Note:

Average monthly rainfall for 1971 to 2000 is available from your nearest rainfall station, see <http://www.metoffice.gov.uk/climate/uk/averages/19712000/index.html> or telephone Meteorological Office Customer Care on 0870 900 0100 or e-mail enquiries@metoffice.gov.uk

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Step 2 Calculate the volume of slurry produced per month

Complete **Table 1** using standard figures for “volume per livestock type” (see Leaflet 3).

- Column 1** Enter the type of livestock kept on your farm during the storage period (see Leaflet 3) and units (usually 1).
- Column 2** From your estimates (Step 1b), insert the number of livestock on slurry or part-slurry based systems during the storage period (normally stocked).
- Column 3** Estimate the proportion of excreta collected as slurry. For example, set the figure to 1 for all collected as slurry, 0.5 for half collected as slurry etc.
- Column 4** Insert the “volume per livestock type” figures from Leaflet 3 for each livestock type.
- Column 5** Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 5 and enter into Box **A**.

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Table 1: Slurry production per month (based on undiluted slurry)

Column 1	2	3	4	5
Livestock type on slurry or part-slurry based system	Number of livestock units on slurry or part-slurry based system	Proportion of excreta collected as slurry e.g. Half = 0.5, All = 1.0	Volume per livestock unit (or place) per month (m ³)	Volume produced each month (m ³)
<i>Example: 1 dairy cow (more than 9,000 litres milk yield)</i>	150	X 1.0	X 1.92	= 288
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
Total volume of slurry produced per month (m³)			A	=

Note:

If the monthly production varies, you may wish to photocopy Table 1 and complete it for each separate month October to February or October to March, and then calculate the average monthly production **A**.

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Step 3 Calculate the average volume of rainfall that enters your slurry store(s) each month

You only need to complete this step if you identified, in Steps 1d and 1e, that rain falls directly onto uncovered or unroofed existing slurry store(s), or onto concrete areas draining into these slurry store(s).

1. Enter monthly rainfall information (from Step 1f) in the relevant boxes below and add together to give total rainfall.

Month	Oct	Nov	Dec	Jan	Feb	Mar (pig farms only)	Total
Rainfall (mm)		+	+	+	+	+	=

2. Divide total rainfall by the relevant number of months i.e. 6 (for pig farms) or 5 (for other livestock farms), to get the average monthly rainfall and enter into Box **B** below.

B	mm
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3. Insert the total area of uncovered slurry store(s) and concrete areas (from Steps 1d and 1e) and average monthly rainfall (from Box B) into the boxes below to establish the volume of rainfall entering the slurry store(s) each month.

Area of slurry store(s) plus concrete surface area		Average monthly rainfall		Average volume of rainfall entering slurry store(s) per month
m ²	X	mm	÷ 1000 =	C m ³

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Step 4 Calculate the volume of wash water that enters your slurry store(s) each month

You only need to complete this step if wash water drains into your slurry store(s).

For dairy farms

Typical wash water use from high volume hoses is 0.9 m³ per cow per month (30 litres per cow per day); or from low volume hoses is 0.6 m³ per cow per month (20 litres per cow per day)

- Using the boxes below, enter the total number of dairy cows normally kept on your farm during the storage period and multiply by the figure that best represents your wash water use (0.9 or 0.6). Record the result in box **D**.

Or,

- If you know the total amount (in cubic metres) used per month then enter your information directly into box **D**.

Number of dairy cows		Wash water used per month (m³)		Monthly wash water Production (m³)
	X	mm	=	D m ³

For pig farms

Typical wash water use is provided in Table 2 below.

- Enter the number of pig places on your unit and multiply the numbers across each row. Add the numbers in the final column to give the total volume **E**.

Or,

- if you know the amount (in cubic metres) used per month for the whole pig unit, you can enter your information directly into box **E**.

Table 2: Wash water use for pig units

Pig type	Wash water (litres per pig place per week)		Number of pig places	Factor to convert into volume per month	Monthly wash water production (m ³)
Sows with litter up to 7 kg	10.0	X		X 0.0043	
Maiden gilts and breeding boars	0.6	X		X 0.0043	
Weaners (7 - 12 kg)	2.0	X		X 0.0043	
Weaners (13 - 30 kg)	2.6	X		X 0.0043	
Growers (31 – 65 kg)	1.9	X		X 0.0043	
Finishers (66 kg and over)	1.6	X		X 0.0043	
Total volume =				E	m³

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Step 5 Calculate the total volume of slurry (including any dilution by rainfall/wash water) that needs to be stored.

1. Enter the values for A, C, D or E into the boxes below, and add them together to give the monthly slurry volume (F).

A	C	D or E		Monthly slurry plus dilution	
+	+		=	F	m³

2. Transfer the value (F) into the relevant box below (1st column), and multiply by 5 or 6 months to give the total volume of slurry plus dilution (G) that potentially needs to be stored.

Monthly slurry plus dilution (F)	Slurry storage period Enter 6 for pigs or 5 for other livestock		Total volume of slurry plus dilution to be stored	
m³	X	=	G	m³

Step 6 Calculate the capacity of your existing slurry store(s)

1. Enter the dimensions of your slurry store(s), and their capacities in Table 3 below.

For square or rectangular stores

Multiply length (metres) by width (metres) by height (metres). Make sure you reduce the actual height by 0.3 metres to allow for freeboard as a safety margin.

For circular stores

Calculate the diameter (D) of the store by dividing its circumference (metres) by 3.142. Then calculate the floor area (square metres) from $D \times D \times 0.785$. Finally multiply the floor area (square metres) by the height (metres). Make sure you reduce the actual height by 0.3 metres to allow for freeboard as a safety margin.

For earth banked stores

Estimate its length (metres), width (metres) and average depth (metres) from the top of the bank to the base of the store. Make sure you reduce the estimated depth by 0.75 metres to allow for freeboard and to provide a working depth. You will need to reduce the length and width measured from the inside of the bank top to allow for the sloping sides. Multiply your estimates of length, width and working depth to obtain storage capacity (cubic metres). Safety note: Do not attempt to measure the depth of such a store while it contains any liquid.

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2. Add up the figures in the right hand column of Table 3 to give total capacity (H).

Table 3: Capacity of existing slurry storage facilities

	Length (m)	Width (m)	Circumference (circular stores only) (m)	Working Height or Depth (m)	Capacity (m ³)
Store 1					
Store 2					
Store 3					
Store 4					
Store 5					
Store 6					
Total existing capacity =				H	m³

Step 7 Compare existing slurry storage capacity with the capacity needed to comply with the Regulations

1. If your existing storage capacity at **(H)** is greater than the capacity at **(G)**, you will not need to do any further calculations as you are compliant with the Regulations.
2. However, if **(G)** is greater than **(H)**, you may need to consider providing extra storage capacity to make up the difference. But first, you should consider if you currently take action (or could take action) which reduces the volume of slurry (or dilution) that needs to be stored (i.e. can you reduce G?).

Step 8 Consider actions that reduce the volume of slurry (plus dilution) that needs to be stored

You may be able to reduce the volume of slurry (plus dilution) at (G) to be stored if any of the following apply:

- i. If you **always** export some of your slurry during the storage period to another farm for land spreading (for agricultural benefit) or to another environmentally acceptable destination, you may deduct the volume exported from the volume at (G).
- ii. If you **always** use a mechanical separator to remove solids from the slurry, you may reduce the volume at (G) by 15 to 20% (cattle slurry) and by 5 to 10% (pig slurry).
- iii. If you **always** apply some slurry to land with a low risk of run-off following the end of a closed period, you may deduct the volume applied from the volume at (G), but you must ADD as a contingency an extra one week's slurry production to the volume at (G).
- iv. If you are able to reorganise clean and foul yard areas, alter roof drainage, roof over fouled yard areas, or cover slurry stores, you may be able to reduce the volume of rainwater entering your existing slurry store(s) and thereby reduce the volume at (G).

If you do use (or intend to use) any of the options at (i) to (iv) above to reduce the amount of slurry (plus dilution) stored at (G), you must record your calculation and justification in the boxes below/overleaf (if necessary, attach your calculation on a separate sheet).

Record of calculation and justification for reducing volume of slurry (plus dilution) to be stored

(i) Exported slurry

(ii) Mechanically separated slurry

(iii) Slurry spread on low run-off risk land

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(iv) Diverted rainfall

Total rainfall collection area that could be excluded		Monthly rainfall (insert B)		Storage period (months) Enter 6 for pigs and 5 for other livestock		Potential volume excluded from slurry store
m ²	X	mm	÷ 1000	X	=	m ³

Record your revised potential volume to be stored below:

G rev	
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If **G rev** is greater than **H** you will need to consider providing extra storage capacity to make up the difference.

Step-by-step guide for calculating your storage requirement for poultry manure and other types of solid manure

This step-by-step guide will help you calculate how much storage you need on your farm to comply with the legal requirements of 6 months storage capacity for poultry manure.

Although there is no requirement to provide a minimum storage capacity for other types of solid manure, information is provided at the end of this step-by-step guide to enable you to estimate how much storage you may need on your farm for practical reasons.

The six steps you will need to follow are:

- Step 1** Collect your information
- Step 2** Calculate the volume of poultry manure produced per month
- Step 3** Calculate the total volume of poultry manure that needs to be stored
- Step 4** Calculate the capacity of any existing store(s)
- Step 5** Compare existing storage capacity with the capacity needed to meet the legal requirements
- Step 6** Consider actions that can reduce the volume of poultry manure that needs to be stored on an impermeable base / in a roofed building

Step 1 Collect your information

Before assessing your storage requirements, you will need to have available the following basic information:

- a. Leaflet 3 – specifically the “weight per livestock type” figures from Table 3;
- b. estimates of the livestock types and numbers likely to be kept on your farm during the storage period. You should future proof your calculation by inserting numbers of birds likely to be kept on your farm in the future (if this is greater than the number currently kept); and
- c. the dimensions (metres) of any existing poultry manure store(s).

Step 2 Calculate the weight of poultry manure produced per month

Fill in **Table 1** using standard figures for “weight per livestock type” (see Leaflet 3).

- Column 1** Enter the type of poultry kept on your farm during the storage period (see Leaflet 3) and units (thousands except for ostrich).
- Column 2** From your estimates (Step 1b), enter the number of poultry units kept during the storage period. Units are recorded in thousands of birds e.g. enter 3.5 for 3,500 birds.
- Column 3** Estimate the proportion collected as solid manure. For example, set the figure to 1 if everything is collected, or where poultry have access to fields it might be 0.8.
- Column 4** Insert the “weight per livestock type” figures from Leaflet 3 for each livestock type.
- Column 5** Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 5 and enter into the appropriate Boxes **A** and **B**.

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Step 3 Calculate the total volume of poultry manure that potentially needs to be stored

1. Insert the monthly production values from **A** and/or **B** where indicated in the boxes below. Multiply the monthly production by 6, and divide the total by the density of excreta (0.9 for laying hen excreta and 0.5 for poultry litter) to give the store volume required.
2. Add together the totals for the two rows and record in **C**.

Monthly production from A or B (tonnes)		6 months		Density		Store volume (m ³)
A	X	6	÷	0.9	=	
B	X	6	÷	0.5	=	
					C	

Note:

If you import poultry manure onto your farm during the storage period, and it needs to be stored, you will need to add the volume imported to figure **C** above.

Step 4 Calculate the capacity of any existing store(s)

You may already store poultry manure on an impermeable base or in a roofed building.

1. Enter the dimensions (in metres) of any existing poultry manure store(s) into Table 2 below. Use one row per store.
2. Multiply length by width by working height, and then enter the capacity of the store in the final column.
3. Add up the figures in the final column to give total existing capacity (**D**).

Table 2: Capacity of existing stores

	Length (m)	Width (m)	Working Height (m)	Capacity (m ³)
Store 1				
Store 2				
Store 3				
Store 4				
Store 5				
Store 6				
Total existing capacity =				D m ³

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Step 5 Compare existing storage capacity with the capacity needed to meet the legal requirements

3. If your existing storage capacity at (D) is greater than the capacity required at (C), you will not need to do any further calculations as you are compliant with the Regulations.
2. However, if (C) is greater than (D), you may need to consider providing extra storage capacity to make up the difference. But first, you should consider if you currently take action (or could take action) which reduces the volume of poultry manure that needs to be stored (i.e. can you reduce C?) or if there are suitable field sites at which the poultry manure could be stored.

Step 6 Consider actions that can reduce the volume of poultry manure that needs to be stored on an impermeable base / in a roofed building

You may be able to reduce the volume of poultry manure at (C) to be stored if any of the following actions apply:

- i. If you **always** export some of your poultry manure during the storage period each year, for example to another farm for land spreading (for agricultural benefit) or to another environmentally acceptable destination (e.g. a power station), you may deduct the volume exported from the volume at (C).
- ii. If you are **always** able to store some poultry manure on suitable field sites, you may deduct the volume stored at the field sites from the volume at (C). Remember that layer manure must be covered.
- iii. If you **always** apply some poultry manure to land with a low risk of run-off following the end of a closed period, you may deduct the volume applied from the volume at (C), but you must ADD as a contingency an extra one week's poultry manure production to the volume at (C).

If you do use (or intend to use) any of the options at (i) to (iii) above to reduce the amount of poultry manure stored at (C), you must record your calculation and justification in the boxes below (if necessary, attach your calculation on a separate sheet).

1. Exported poultry manure

2. Storage on field sites

Storage of organic manure – Annex 2

3. Poultry manure spread on low run-off risk land

Insert your revised minimum volume to be stored:

C rev		m³
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If (**C rev**) is greater than (**D**) you will need to consider providing extra storage capacity to make up the difference.

Calculating the volume of storage needed for other solid manures

While there is no requirement to calculate the volume of storage needed for solid manures other than poultry, you may need to estimate your requirement for practical reasons.

1. You should fill in Table 3 below if you want to calculate the monthly volume of solid manure (e.g. farmyard manure) produced by dairy cows, cattle, sheep and pigs.

Column 1 The type of livestock (see Leaflet 3) and units (usually 1).

Column 2 The number of livestock on solid manure or part-solid manure based systems during the housing period (normally stocked).

Column 3 The proportion collected as solid manure (and not slurry). For example, set the figure to 1 for all collected as solid manure, 0.5 for half collected as solid manure etc. If you have completed estimates for cattle slurry or pig slurry (Annex 1, Table 1) – the proportions used here will be the balance. For example if you used 0.4 as the proportion of excreta collected as dairy cow slurry – then 0.6 would be used here for the proportion of excreta collected as solid manure (all adding to 1.0 i.e.100%).

Column 4 Insert the “volume per livestock type” figures (from Leaflet 3)

Column 5 Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 4 and enter into the appropriate Boxes E, and G. Multiply the value in Box E by the ‘straw addition’ factor 1.3 and enter into Box F. Multiply the value in Box G by the ‘straw addition factor’ 1.15 and enter into Box H.

2. Multiply the monthly production F and H by the number of months of storage you need to provide, and divide the total by 0.7 to give an estimated store volume. Note: 0.7 allows for the density of farmyard manure.
3. Compare the estimated store volume needed to your existing solid manure storage capacity. You may be able to use field storage to satisfy some or all of your requirements. Consider whether to provide more storage on a constructed impermeable (e.g. concrete) base. Any liquid drainage from concrete pads containing solid manure (e.g. farmyard manure) is classed as slurry and must be collected and stored.

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Table 3: Cattle, sheep or pig solid manure production per month

Column 1	2	3	4	5
Livestock type on solid manure or part-solid manure based system	Number of stock on solid manure or part-solid manure based system	Proportion of excreta collected as solid manure e.g. Half = 0.5, All = 1.0	Volume per livestock type (or place) per month (m ³)	Volume produced each month (m ³ and tonnes)
Laying hens				
Example 1 dairy cow (more than 9,000 litres annual milk yield)	100	X 0.6	X 1.92	= 115.2
		X	X	=
		X	X	=
		X	X	=
Total monthly volume of excreta from dairy cows E				=
Multiply E by 1.3 to give solid manure production (tonnes)				F =
Cattle				
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
Sheep			X	=
		X	X	=
		X	X	=
		X	X	=
Pigs				
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
		X	X	=
Total monthly volume of excreta from cattle, sheep and pigs G				=
Total monthly production of poultry litter (tonnes)				H =

Note:

*if the monthly production varies, you may wish to photocopy this table and complete it for each separate month October to February or October to March, and then calculate the average monthly production **F** and **H**.*

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for uncoated paper and 75% recycled fibre for coated paper.

Nobel House, 17 Smith Square
London SW1P 3JR

www.defra.gov.uk

PB12736d October 2008