5 MANURE PLANNING PART-2: LIVESTOCK MANURE STORAGE

The NVZ Action Programme contains specific rules relating to the storage of different manure types and silage effluent. These rules relate to:

- minimum storage capacity required for livestock slurries;
- minimum storage capacity required for poultry manure;
- storage options for poultry manure and other solid manures e.g. FYM;
- minimum standards of construction for permanent storage facilities;
- the maintenance of storage facilities for livestock manure and silage effluent;

(you must ensure that storage facilities for livestock manure and silage effluent are maintained free from structural defect and of sufficient standard to prevent run-off or the seepage of the contents to groundwater).

- the location of field sites for temporary storage of solid manures.

You must:

- complete a calculation showing existing slurry storage capacity and whether you need to provide extra slurry storage;
- keep a record of your calculations;
- provide sufficient storage capacity for livestock slurries and poultry manures (with high available N content).

You must use standard values for the production of excreta by different livestock types (see Table A in this booklet) in your calculations. You must also use values for the long-term average monthly rainfall at the farm as a minimum requirement. This information is available from the Meteorological Office. You may use your own figures if you collect and record rainfall data for your location.

In completing the storage requirement calculations, you may deduct:

- the amount of excreta not collected as slurry;
- the amount of solids removed by mechanical separation;
- the amount of slurry regularly exported from the farm during the storage period.

You must keep a record of your storage calculation, and if you export slurry you must provide details (see Booklet 7 – Record Keeping). You must update the storage calculation if circumstances on the farm change.

Minimum storage capacity for livestock slurry

- Pig slurry: you must provide 26 weeks storage capacity
- All other livestock slurry: you must provide 22 weeks storage capacity
- You must use the standard values for the production of excreta by different livestock types to calculate how much storage you need
- You must also take account of any rainfall that enters the store (directly or indirectly) and any wash water that enters the store during the storage period

These are minimum storage capacity requirements to comply with the **Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 (as amended)**. The storage facilities must have sufficient capacity to collect all of the slurry produced plus any dilution such as wash water and rainfall that is collected in the slurry store during the storage period. You may need to provide extra storage to cope with your local situation, crop rotation or for other operational reasons.

A minimum storage capacity is needed during the closed spreading periods and to provide flexibility so that these manures can continue to be stored when conditions may be unsuitable for field applications due to the risk of causing water pollution.

All new, substantially reconstructed, or substantially enlarged installations for the containment of slurry and silage must comply with the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003 as amended (SSAFO).

You must notify SEPA in writing about a new or substantially enlarged, or substantially reconstructed, installation at least 28 days before you use it. However, you should seek advice from SEPA at an early stage in the process while you are considering improvement options. Alternatively you may wish to discuss the requirements with the SSAFO co-ordinator at your SGRPID Area Office.

Dirty water: i.e. very dilute (lightly contaminated) run-off from fouled concrete yards or from the dairy/ parlour that is collected and stored separately from slurry can be excluded from the calculation of storage requirement. Dirty water can only be excluded if it does not contain liquids from weeping-wall stores, slurry strainer boxes, slurry separators or silage effluent. These liquids are rich in nitrogen and are regarded as slurries under NVZ rules.

Constructed Farm Wetlands: The SSAFO regulations have been amended to allow some types of lightly contaminated water to be directed to a constructed farm wetland for treatment. You should note that there is a general presumption against treating dairy/parlour wash water through such systems, especially where disinfectant and milk may be present. You should consult SEPA or your SGRPID area office SSAFO co-ordinator for advice on the suitability, planning and construction of such wetlands.

What slurry storage capacity do I require on my farm?

- if you are a pig farmer you must have 26 weeks' storage capacity,
- if your farm is a cattle or mixed livestock enterprise you must have 22 weeks' storage capacity.

Calculating your slurry storage requirements is a 7 step process (note that all of the steps may not be applicable to your farm):

Step 1: calculate the volume of excreta produced by animals kept on a slurry based system;
Step 2: adjust the volume to take account of slurry that is moved off the farm during the storage period, or where solids are removed with a slurry separator;
Step 3: calculate the volume of rainwater falling directly on the slurry store or draining to it from yards and buildings;
Step 4: calculate the volume of wash-water collected in the slurry store;
Step 5: calculate the total volume of slurry to be stored;
Step 6: calculate your existing slurry storage capacity;
Step 7: compare your existing slurry storage capacity with your calculated storage requirement.

Step 1: Complete Table A below for each class of livestock that is housed on slurry based system on your farm

- Enter the number of animals for each livestock type in column 1
- Multiply column 1 by column 2 to calculate the total weekly contribution from each livestock category
- Multiply the calculated value in column 2 by the appropriate number of weeks in column 3
- Add up all of the calculated values in column 3 to calculate the total volume of excreta produced by all categories of livestock kept on a slurry based system.

Table A – Weekly volumes of excreta collected as slurry

Livestock type	Number of animals on slurry based system 1	Volume of excreta per livestock type per week (m^3) 2	Total volume of excreta to be stored as slurry during the required storage period 3
1 Dairy cow, over 2 years (over 9000 litre milk yield)	x	0.45 =	X 22 =
1 Dairy cow, over 2 years (6000 to 9000 litre milk yield)	x	0.37 =	X 22 =
1 Dairy cow, over 2 years (up to 6000 litre milk yield)	x	0.29 =	X 22 =
1 Dairy heifer replacement, 13 to first calf	x	0.28 =	X 22 =
1 Dairy heifer replacement, 3 to 13 months	x	0.14 =	X 22 =
1 Beef suckler cow (over 500 kg)	x	0.32 =	X 22 =
1 Beef suckler cow (up to 500 kg)	x	0.22 =	X 22 =
1 Steer/Heifer for slaughter	x	0.22 =	X 22 =
1 Steer/Heifer, over 25 months	x	0.22 =	X 22 =
1 Steer/Heifer, 13 to 25 months	x	0.18 =	X 22 =
1 Steer/Heifer, 3 to 13 months	x	0.14 =	X 22 =
1 Bull beef, 3 months and over	x	0.18 =	X 22 =
1 Bull for breeding, over 25 months	x	0.18 =	X 22 =
1 Bull for breeding, 3 to 25 months	x	0.18 =	X 22 =
1 Calf, up to 3 months	x	0.05 =	X 22 =
1 Sow place (including litter up to 7 kg) fed on a diet supplemented with synthetic amino acids	x	0.08 =	X 26 =
1 Sow place (including litter up to 7 kg) fed on a diet without synthetic amino acids	x	0.08 =	X 26 =
1 Maiden gilt place	x	0.04 =	X 26 =
1 Breeding boar 66 kg to 150 kg	x	0.04 =	X 26 =
1 Breeding boar over 150 kg	x	0.06 =	X 26 =
1 Weaner place (7 to 13 kg)	x	0.01 =	X 26 =
1 Weaner place (13 to 31 kg)	x	0.01 =	X 26 =
1 Grower place, 31 to 66 kg (dry fed)	x	0.03 =	X 26 =
1 Grower place, 31 to 66 kg (liquid fed)	x	0.05 =	X 26 =
1 Finisher place, 66 kg to slaughter (dry fed)	x	0.04 =	X 26 =
1 Finisher place, 66 kg to slaughter (liquid fed)	x	0.07 =	X 26 =
Total column 3 = Total Volume of Slurry to store (m^3) →			**m3**

Step 2: Adjust the volume to take account of slurry that is moved off the farm during the storage period, or where solids are removed with a slurry separator

If this is not applicable to your farm, proceed to Step 3.

You can make this adjustment if any of the following are applicable:

- you **always** export some of your slurry during the storage period, either to another farm for land spreading (for agricultural benefit) or to be disposed of under contract to a manure processing facility or to an approved treatment or recovery outlet. Where slurry is exported from the farm you must confirm details of the recipient, the quantity of slurry exported and its estimated total N content;

- you **always** use a mechanical separator to remove solids from the slurry. In the calculation you may reduce the volume of cattle slurry by 15 to 20%, and reduce the volume of pig slurry by 5 to 10%.

In Table B below, please provide a calculation showing the amount and justification for reducing the figure calculated at Step 1.

Table B

Revised storage capacity after deductions from export or separation →	m^3

Step 3: Calculate the volume of rainwater falling directly on the slurry store or draining to it from yards and buildings

Rain falling directly onto stores, or draining to them from yards, roofs, middens and silage pits etc. can have a massive impact on the volume of slurry that you have to contend with. It is therefore of great importance to calculate accurately the rainwater collection area that contributes to store.

To calculate this you need to know:

- The surface area (square metres) of any unroofed/uncovered existing stores

- The area of open yards, silage clamps, middens, roofs etc. that drain into the slurry store (in square metres)

- The average monthly rainfall for the months when storage is required. Use monthly rainfall information (30 year average in millimeters). 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

Although it is not a legal requirement, you may find it useful to create a plan of your steading. This will help you to identify areas where rain falls directly onto slurry stores, or where contaminated areas drain to them. A scale plan will also make it easier for you to calculate the areas involved; otherwise you will have to take the measurements using a tape or wheel.

3.1 Enter the measurements of each area which collects rainwater and drains to the store into Table C below

Table C

Calculation of areas contributing to slurry storage				
	Yards/buildings/lagoons etc. description	Length (a)	Width (b)	**Area in m2 (a x b) = m2**
1				
2				
3				
4				
5				
	Unroofed circular stores description	Circumference	Radius (r) = (circumference) ÷ (3.142) ÷ (2)	**Area in m2 = (r x r) X (3.142)**
6				
7				
8				
	Total contributing area →			**(box a) m2**

3.2 Use the average rainfall figure for your locality and enter the monthly rainfall figures into Table D below

The total figure (contributing area) from Table C should be entered on Table D (box b).

Table D

Month		**Jan**	**Feb**	**Mar**	**Oct**	**Nov**	**Dec**
Monthly rainfall figure (mm)		**mm**	**mm**	**mm**	**mm**	**mm**	**mm**
Total contributing area from Table c (box a)	**(box b) m3**	Multiply the total contributing value from box b by the average rainfall value for your locality. Then divide by 1000 to convert to cubic metres (m3). Record the m3 value in the boxes below.					
Monthly dirty water production from rainfall (m3)		**m3**	**m3**	**m3**	**m3**	**m3**	**m3**

The values for each month shown above will have to be taken into consideration in later total calculations for cumulative amounts contributing to store.

Step 4: Calculate the volume of wash-water that is collected in the slurry store. If you do not produce wash-water or collect it separately from slurry, proceed to Step 5

4.1 Dairy Farms (only complete this calculation if the washings are contributing to store)

- Enter the number of dairy cows that will be milked during the minimum storage period into Table E below
- Multiply by the appropriate volume for the cleansing equipment used on your farm i.e. high pressure hose or high volume hose (you can use actual figures for your farm if known)
- Multiply by the number of days in the month. This will give you an estimated volume of cleaning water going into the store – add the figure to the last column in Table E (dairy) (you may use actual figures for your farm if known)

Table E

Month	Number of dairy cows	Multiply by the washing volume 0.018m^3 (without power hose) or 0.035m^3(power hose)	Multiply by days in month	Estimation of cleaning water used (per month) (m^3)
October		X	X 31	=
November		X	X 30	=
December		X	X 31	=
January		X	X 31	=
February		X	X 28	=
March		X	X 31	=
		Total dairy washings		=

4.2 Pig Farms

Using Table F below add in the number of pigs against the standard figures shown for cleansing equipment and the number of washes per day. Then multiply together the number of pigs, the washing volume, and the number of days in the month. This will give you an estimated volume of cleaning water going into the store
– add the figure to the last column in Table F (Pigs) (you may use actual figures for your farm if known).

Table F

Estimation of water used in cleansing operations (adapted from PEPFAA Code)				
Month	Cleaning out pens after each batch (10 pigs per pen)	Multiply by the washing volume 0.018m3 (high pres. hose)	Multiply by days in month cleaning carried out	Estimation of cleaning water used (per month) (m3)
October		X	X	=
November		X	X	=
December		X	X	=
January		X	X	=
February		X	X	=
March		X	X	=
		Total pig washings		=

You have now gathered all the information required to estimate the amount of water that is contributing to your store.

Note: there may be opportunities to remove some rainfall contribution to the slurry store. You can assess this later (see under Step 7 "review rainfall contribution to store").

Step 5: Calculate the total volume of slurry to be stored

Enter the volumes calculated at Steps 1 to 4 above into Table G below

Table G

Total volume of livestock excreta to be stored as slurry (Steps 1 and 2)	
Total volume of rainwater collected to slurry store (Step 3)	
Total volume of wash-water collected to store (Step 4)	
Total volume of slurry to be stored	**m^3**

Step 6: Calculate your existing storage capacity

Storage capacity of a rectangular store or lagoon

Measure the length (metres) and the width (metres) and average depth (metres) from the top of the bank to the base of the store. Make sure you reduce the measured depth by 0.75 metres to allow for freeboard (this give you the effective working depth). You will also have to reduce the length and width measured from the inside of the bank top to allow for the sloping sides. Enter the relevant data into Table H below to calculate the storage capacity (cubic metres). **Safety note: Do not attempt to measure the depth of such a store while it contains any liquid.**

Table H

Store	Description	Length (a)	Width (b)	Depth* (c)	Volume a x b x c = volume m3
1					
2					
3					
4					
Total capacity rectangular stores and lagoons					**m3**

***Depth minus freeboard.**

***Freeboard** is the term given to the unfilled depth (safety margin) at the top of a slurry or effluent tank or compound. Freeboard allowances are: 750mm for earth bank lagoons and 300mm for all other structures. Freeboard is not a legal requirement for structures which are exempt under the SSAFO Regulations (structures completed before 1991). It is, however, considered best management practice to adhere to freeboard requirements in all structures.

Storage capacity of a circular store

You will already have calculated the area of circular stores at Table C in this booklet. Enter the relevant areas into Table I below.

Multiply the floor area (m2) by the depth (m) (reduce the depth by 0.3 m to allow for freeboard) to give the capacity of the slurry store (m3).

Table I

Store	Description	Area from Table C	Depth*	Volume
1				
2				
3				
4				
			Total capacity circular stores	**m^3**

***Depth minus freeboard.**

***Freeboard** is the term given to the unfilled depth (safety margin) at the top of a slurry or effluent tank or compound. Freeboard allowances are: 750mm for earth bank lagoons and 300mm for all other structures. Freeboard is not a legal requirement for structures which are exempt under the SSAFO Regulations (structures completed before 1991). It is, however, considered best management practice to adhere to freeboard requirements in all structures.

If you have both circular stores and rectangular stores or lagoons:

Calculate the existing slurry storage capacity for your farm by adding up Table H and Table I totals in Table J below.

Table J

Total slurry store capacity =	**m^3**

Step 7: Comparing slurry production with available storage capacity

This section will enable you to identify whether you have sufficient storage capacity to contain all the slurry collected on you farm over 26 weeks (for pig enterprises) or 22 weeks (for cattle or mixed livestock businesses). Enter the following information into Table K below:

1. Enter the relevant totals from Tables I, H or J into box X.
2. Enter the total volume from Table G into box Y.

Table K

Total Storage Capacity (slurry)	Total Production (all contributors)
X)	**Y)**

1. If X is greater than Y, you have more than the MINIMUM storage required.
2. If Y is greater than X, you do not have sufficient storage capacity and will need to consider the actions that you can take to resolve this. You will need to consider the following options:
   - Whether there are opportunities to reduce the volume of rainwater going into the existing store e.g. covering slurry stores, diverting clean water away from the store
   - Reducing contaminated areas by reviewing the way in which livestock move around the steading
   - Whether there are opportunities to export the excess slurry to another farm or an appropriate processing facility
   - Changes to the housing system for some of the livestock kept on your farm e.g. move some stock onto a bedded housing system or consider off wintering some stock
   -

Review rainfall contribution to store (only if the previous step shows insufficient storage)

Using Table L below, enter the total rainfall collection area that could be excluded, and the average monthly rainfall, and the **5** or **6** month storage period in the table below to calculate the potential volume reduction (PV):

Table L

Total rainfall collection area that could be excluded (m2)		*Average Monthly Rainfall (mm)		Storage period (months) Enter 5 for cattle and 6 for pigs		Potential volume excluded from slurry store	
m2	X	mm	÷ 1000	X	=	**PV**	**m3**

IF **PV** is equal to or greater than **X minus Y** the current storage capacity on your farm would meet the MINIMUM storage required if you carry out the improvements.

***Use monthly rainfall information (30 year average in millimeters) for the average monthly rainfall amount. 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

STORAGE OF SOLID MANURE

Solid manure is defined in the NVZ Regulations as “organic manure which can be stored or stacked in a freestanding heap without slumping and does not produce free drainage of liquid within the stacked material”.

This definition will normally apply to litter-based poultry manure, laying hen manure (only if covered by a waterproof cover to exclude direct rainfall) and straw-based farmyard manure (including any stackable separated solids from the mechanical separation of slurry).

Storage of solid manure in Temporary Field Heaps

Research has shown that the nitrate losses from the field storage of solid manure, as defined above, are low. These solid manures can therefore be stored temporarily in field heaps on suitable sites, subject to the following rules:

- A temporary field heap cannot remain in place for longer than 12 months, from the first creation of the field heap
- The site of a previous field heap cannot be reused within 24 months of the previous site being cleared
- Field heaps must not be located within 10m of any surface water or 50m of a well, borehole or similar structure used as a water supply;
- Field heaps must not be located on land that slopes down toward a body of surface water and has a slope of 12 degrees or any location where there is a significant risk of nitrogen from the field heap entering a body of surface water.
- Field heaps must not be located in an area identified as high risk on the risk assessment map
- Poultry manure that is not mixed with litter must be covered by a waterproof cover.
- The location of temporary field heaps must be identified on the Risk Assessment Map.

If all the solid manure on the farm can be stored in temporary field heaps, then for the purposes of storage capacity, you do not have to calculate the quantities of solid manure produced by livestock on the farm.

Manure that does not meet the definition of solid manure cannot be stored in a field heap. It must therefore be stored on an impermeable base on the farm steading or other dedicated manure storage site (see below).

Storage on the farm steading or other permanent storage site

Livestock manures which do not meet the definition of slurry or solid manure i.e. the manure is not fully liquid but is unable to be stacked without slumping and/or would produce free drainage of liquid from within the stack, must be stored on an impermeable base and the run-off collected. When, after drainage of the liquid fraction of the manure, it then meets the definition of solid manure, it may be transferred to a temporary field site.

If solid manure is not being stored in a temporary field heap, then it must also be stored on an impermeable surface which prevents drainage to the water environment. Any area used for such storage must:

- be covered to prevent rainfall ingress, or
- have adequate facilities to collect and store any run-off from the storage site.*

*Rainfall run-off from a midden which mainly contains farmyard manure (FYM)** can be treated in a constructed farm wetland. The wetland must be fit for purpose and SEPA must be contacted before proceeding with any construction.

**Farmyard Manure is defined in the Regulations as “livestock excreta mixed with bedding material (such as straw) but does not include poultry manure other than duck manure”.

Calculating the storage capacity for poultry manure which cannot be stored in a temporary field heap or moved off the farm

You must provide 26 weeks storage for poultry manure which cannot be stored in temporary field heaps or moved off the farm

If you need to undertake this calculation, you must use the standard values for the production of excreta by different poultry types to calculate how much storage you need

This is the minimum requirement for poultry manure. You may need to provide extra storage to cope with your local situation, crop rotation or for other operational reasons.

- You must use the standard calculation procedure for estimating whether you have sufficient manure storage or whether you need to provide extra storage.
- You may deduct any poultry manure moved off the farm during the 26 weeks (6 months) period. If you do move poultry manure off your farm, you must provide details of the quantity moved and the name and address of the recipient.
- You must keep a record of your storage calculation.
- You must update your storage calculation if circumstances change.

Poultry manure which cannot be stored in a temporary field heap must be stored:

- in the livestock house, or
- on a concrete base constructed to the appropriate standard.

If you store poultry manure or solid manure on a concrete base without a roof then you must make provisions for the safe storage of run-off. Any run-off from heaps on concrete is defined as slurry.

You will need to calculate the capacity of existing poultry manure storage, which must be stored on a concrete base.

Existing poultry manure storage

To calculate your poultry manure storage capacity you should measure the store's length (m), its width (m) and working height (m). Then multiply the length, width and working height to obtain storage capacity (m3). Record the relevant measurements into Table M below. Remember that the capacity within the poultry house should be included in the storage capacity calculation.

Table M

Store	Description	Length (a)	Width (b)	Height (c)	Volume a x b x c = volume m^3
1					
2					
3					
4					
5					
6					
7					
8					
Total capacity poultry manure storage →					**(box 1)** **m^3**

Calculating the amount of poultry manure produced

Select the class(es) of poultry applicable to your enterprise from the Table N (part 1 below) and transfer the details to Table N (part 2) where you will calculate production of poultry manure

Table N (part 1)

Poultry type	Volume per poultry type per week (tonnes)
1000 Laying Chickens up to 17 weeks	0.28
1000 Laying Chickens (caged) over 17 weeks	0.84
1000 Laying Chickens (free range) over 17 weeks	0.64
1000 Broiler Chickens (table)	0.42
1000 Broiler Chickens (breeder) up to 25 weeks	0.28
1000 Broiler Chickens (breeder) 25 weeks and over	0.84
1000 Turkeys (male)	1.12
1000 Turkeys (female)	0.84
1000 Ducks	0.70

Solid manure production from poultry

Complete Table N (part 2) as follows:

1. Select the poultry class from the table above
2. Enter the number of birds from the chosen class (1000 = 1)
3. Enter the weekly production figures (tonnes) multiplied by the number of housed birds entered in the previous column
4. Enter the housing period (in weeks) and multiply this by the weekly (m3) figure in the preceding column
5. Divide the figure in the ‘weeks housed’ column by 0.9 (laying hen) or 0.5 (all other poultry) to allow for the density of poultry manure
6. Enter the number in the estimated ‘poultry manure production’ column
7. Total up the last column and put this figure of the gross monthly production figure for poultry manure in box 2.

Table N (part 2) – poultry storage

Poultry class (Table 2)	Number housed	Excreta production (Tonnes/week)	Weeks housed	FYM density value 0.9 Laying hen 0.5 Other poultry	Poultry manure production (m3)
Laying Hen (Cages)	**20**	**X 0.84**	**X 52**	÷ **0.9**	= **971**
Laying Hen (free range)	**5**	**X 0.64**	**X 26**	÷ **0.9**	= **92**
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
		X	**X**	÷	=
Gross monthly production of poultry manure →					**(box 2) m3**

Poultry manure production versus storage capacity

You must identify whether you have sufficient storage facilities with concrete bases for the storage of poultry manure.

Note: Any liquid containing poultry manure draining from concrete pads must be collected and stored. You must comply with construction standards set by The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003.

To calculate whether you have sufficient storage, take the combined figure for production (Table N (part 2) box 2) and the total storage capacity (Table M box 1) and enter them into the Table O below.

Table O

Total storage capacity Table M (box 1)	Total production Table N (box 2)
X)	Y)

1. If **X** is greater than **Y**, you have more than the **MINIMUM storage** required for the closed periods.
2. If **Y** is greater than **X**, you must provide **extra storage capacity** to make up the difference.

Calculating production of farmyard manure (FYM)

If you need to calculate the storage capacity of permanent midden sites for FYM, follow the guidance below.

Table P

Standard figures of livestock excreta per week (m3)	Volume of excreta per livestock type per week (m3)
1 Dairy cow (over 9000 litre milk yield)	0.45
1 Dairy cow (6000 to 9000 litre milk yield)	0.37
1 Dairy cow (up to 6000 litre milk yield)	0.29
1 Dairy heifer replacement, 13 to first calf	0.28
1 Dairy heifer replacement, 3 to 13 months	0.14
1 Beef suckler cow (over 500 kg)	0.32
1 Beef suckler cow (up to 500 kg)	0.22
1 Steer/Heifer for slaughter	0.22
1 Steer/Heifer, over 25 months	0.22
1 Steer/Heifer, 13 to 25 months	0.18
1 Steer/Heifer, 3 to 13 months	0.14
1 Bull beef, 3 months and over	0.18
1 Bull for breeding, over 25 months	0.18
1 Bull for breeding, 3 to 25 months	0.18
1 Calf, up to 3 months	0.05
1 Sow place (including litter up to 7 kg) fed on a diet supplemented with synthetic amino acids	0.08
1 Sow place (including litter up to 7 kg) fed on a diet without synthetic amino acids	0.08
1 Maiden gilt place	0.04
1 Breeding boar 66 kg to 150 kg	0.04
1 Breeding boar over 150 kg	0.06
1 Weaner place (7 to 13 kg)	0.01
1 Weaner place (13 to 31 kg)	0.01
1 Grower place (31 to 66 kg) (dry fed)	0.03
1 Grower place, 31 to 66 kg) (liquid fed)	0.05
1 Finisher place (66 kg to slaughter) (dry fed)	0.04
1 Finisher place (66 kg to slaughter) (liquid fed)	0.07
1 Lamb (from 6 months up to 9 months)	0.01
1 Lamb/Hogg (from 9 months old to first lambing, tupping or slaughter)	0.01
1 Breeding ewe to 60 kg (inc lamb to 6 months where applicable)	0.02
1 Breeding ewe over 60 kg (inc lamb to 6 months where applicable)	0.04
1 Goat	0.02
1 Breeding deer	0.04
1 Deer (other)	0.02
1 Horse	0.17

In order to calculate the volume of FYM to be stored, you will have to extract relevant information from Table P (above) and complete the calculations in Table Q.

Column A: Enter the livestock classes appropriate to your farm from table P

Column B: Enter the number of animals for each class

Column C: Enter in the weekly excreta volume for each class of livestock

Column D: Enter the housing period (in weeks)

Column E: Enter the "Straw addition factor" (1.3 for dairy cattle or 1.15 for all other types of livestock)

Column F: Divide the number in the "straw addition" column by 0.70 to allow for the density of FYM

Column G: Multiply B x C x D x E, then divide by F. Enter the calculated value into column G.

Finally, add up the column G totals and record them as your estimated FYM production in the box at the end of the last column.

Table Q

A	B	C	D	E	F	G
Livestock class (from Table 1)	Number housed	Excreta production (m3/week)	Weeks housed	Straw addition factor	FYM density value	Solid manure production (m3) & tonnes
e.g. Dairy cow (high yield)	**100**	**X 0.44**	**X 22**	**X 1.30**	**÷ 0.70**	**= 1798**
e.g. Large Suckler	**50**	**X 0.32**	**X 22**	**X 1.15**	**÷ 0.70**	**= 578**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
		X	**X**	**X**	**÷ 0.70**	**=**
Gross production of solid manure Cattle, Sheep & Pigs →						**m3**

Calculate the storage capacity for solid manure (FYM)

To calculate your FYM storage capacity needs, you should measure the length (m) of the storage area, its width (m) and average height (metres) to which you can safely stack the manure. Enter the measurements into Table R below, to calculate the capacity of existing FYM stores.

Table R

Store	Description	Length (a)	Width (b)	Height (c)	Volume a x b x c = vol (m^3)
1					
2					
3					
4					
5					
6					
Total capacity FYM storage →					**m3**

If, when you compare the totals from Tables Q and R, you find you have insufficient storage for FYM, you should consider storing FYM (that meets the definition of solid manures) in field heaps on suitable locations around your farm.

Notes

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