9 Nmax STANDARD REFERENCE AND RESIDUE GROUPS

This booklet contains the standard reference information that you will require to complete the Nmax calculation for your farm.

Contents

Page 11, Previous Crops in Nitrogen Residue Group 6

Grassland –

3-5 year high N leys, grazed within 2 months of ploughing out Permanent grass, high N, grazed within 2 months of ploughing out

Page 12, Livestock Manure Nitrogen Efficiency

Pages 13, 14 and 15

Appendix 1, Livestock Manures, Typical Standard Values per Manure Type – You should use these standard values unless you use your own analysis

Pages 16 and 17

Manure Sampling Protocol

As the nitrogen content of manure is significantly variable, it is acknowledged that analysis of manures for nitrogen content can be more accurate than the standard values provided. If you have nitrogen analysis results for your manures, you can use these values in place of the standard values to ensure that you are making the best use of all livestock manure nutrients.

This page replaces page 4 in booklet 9

Table 14 – Site classes based on average summer rainfall for each NVZ locality

	Locality	Total April to September average rainfall	Site class	
			Shallow/Sand soils	All other soils
Nairn & Moray	Fochabers and Nairn	385	4	2
	Rothes	455	3	2
Aberdeenshire	Aberdeen and Banchory	410	4	2
	Banff	382	4	2
	Fraserburgh and Keith	410	4	2
	Inverurie and Turriff	410	4	2
Kincardineshire, Angus & Perthshire	Blairgowrie and Stonehaven	440	3	2
	Carnoustie and Coupar Angus	375	4	2
	Montrose and Perth	375	4	2
Perthshire & Fife	Auchterarder	530	2	1
	Kirkcaldy, Ladybank and St Andrews	385	4	2
Lothians & Borders	Coldstream	370	4	2
	Dalkeith and Dunbar	350	4	2
	Duns and Eyemouth	370	4	2
	Galashiels and Jedburgh	370	4	2
	Penicuik and Selkirk	445	3	2
Dumfries & Galloway	Dumfries and Lochmaben	515	2	1
Stranraer	Stranraer	434	3	2

Table 15 – Standard nitrogen requirement for each grass field based upon site class and grass crop usage

Grass management	Site class 1	Site class 2	Site class 3	Site class 4	Site class 5
i) 2 or 3 cut silage + grazing	310	300	290	280	270
ii) 1 cut silage + grazing	280	270	260	250	240
iii) Grazing with low clover	270	260	250	240	230
iv) Hay + grazing	220	210	200	190	180
v) Grass with high clover	100	90	80	70	60

STEP 1
Find the appropriate table based on the previous crop.
In our example the previous crop was a cereal.

Nitrogen Residue Group 1 – Previous Crops in Nitrogen Residue Group 1 are: **cereals, carrots, swedes, tu**

STEP 3
Look up the predominant soil type in the field. In our example, the predominant soil type is sandy loam.

		Predominant Soil T			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc, e	5.5	150	130	80	50
Winter Barleyc	6.5	200	180	120	80
Spring Wheata,b	7.0	170	150	100	60
Winter Wheata,b	8.0	220	200	140	80
Spring Oatsc	5.0	120	100	50	20
Winter Oatsc	6.0	160	140	90	50
Spring Oilse	n/a	100	100		20
Winter Oilse	4.0	200	200		80
Winter Oilse	n/a	30	30		30
Potatoes	n/a	245	225		145
Forage Maiz	n/a	140	120		40
Kale	n/a	180	160		60
Swedes and Turnips	n/a	110	90	50	20
Linseed	n/a	80	60	30	0

STEP 2
Look up the planned crop.
In our example, we planned to grow winter wheat.

STEP 5
Determine which adjustment factor to apply. In our example, adjustments "b" apply, if appropriate.

STEP 4
Look up the standard nitrogen requirement in kg/ha, based on planned crop and soil type.
200 kg/ ha in our example

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
al 15 kg N/ha is permitted for high N grain distilling varieties.

STEP 6
Look up adjustments:
"b" allows an additional 40 kg N/ha if the variety grown is a recognised milling variety.

Important Note!!

o upward adjustment for excess winter rainfall on N Residue Group 1 Crops

Nitrogen Residue Group 1 – Previous Crops in Nitrogen Residue Group 1 are: **cereals, carrots, swedes, turnips (removed) and linseed**

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc, e	**5.5**	**150**	**130**	**80**	**50**
Winter Barleyc	**6.5**	**200**	**180**	**120**	**80**
Spring Wheata,b	**7.0**	**170**	**150**	**100**	**60**
Winter Wheata,b	**8.0**	**220**	**200**	**140**	**80**
Spring Oatsc	**5.0**	**120**	**100**	**50**	**20**
Winter Oatsc	**6.0**	**160**	**140**	**90**	**50**
Spring Oilseed Rape	**n/a**	**100**	**100**	**50**	**20**
Winter Oilseed Rape (spring)d	**4.0**	**200**	**200**	**120**	**80**
Winter Oilseed Rape (autumn)	**n/a**	**30**	**30**	**30**	**30**
Potatoes	**n/a**	**245**	**225**	**175**	**145**
Forage Maize, Rape	**n/a**	**140**	**120**	**70**	**40**
Kale	**n/a**	**180**	**160**	**100**	**60**
Swedes and Turnips	**n/a**	**110**	**90**	**50**	**20**
Linseed	**n/a**	**80**	**60**	**30**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

Important Note!!

There is no upward adjustment for excess winter rainfall on N Residue Group 1 Crops

Nitrogen Residue Group 2 – Previous Crops in Nitrogen Residue Group 2 are: **harvested fodder (whole crop), oilseed rape, hemp, vining peas and potatoes**

Grassland Management Regimes in Residue Group 2:

- **1-2 year low N** leys[1], **not grazed** within 2 months of ploughing out or during September or October

[1]**low N** means average N use in last 2 years was less than 150 kg/ha/year

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc,e	**5.5**	**140**	**120**	**70**	**40**
Winter Barleyc	**6.5**	**190**	**170**	**110**	**70**
Spring Wheata,b	**7.0**	**160**	**140**	**90**	**50**
Winter Wheata,b	**8.0**	**210**	**190**	**130**	**70**
Spring Oatsc	**5.0**	**110**	**90**	**40**	**10**
Winter Oatsc	**6.0**	**150**	**130**	**80**	**40**
Spring Oilseed Rape	**n/a**	**90**	**90**	**40**	**10**
Winter Oilseed Rape (spring)d	**4.0**	**190**	**190**	**110**	**70**
WOSR (autumn)	**n/a**	**20**	**20**	**20**	**20**
Potatoes	**n/a**	**235**	**215**	**165**	**135**
Forage Maize, Rape	**n/a**	**130**	**110**	**60**	**30**
Kale	**n/a**	**170**	**150**	**90**	**50**
Swedes and Turnips	**n/a**	**100**	**80**	**40**	**10**
Linseed	**n/a**	**70**	**50**	**20**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

If actual localised rainfall from 1st October – 1st March exceeds 450 mm: add 10 kg N/ha

Nitrogen Residue Group 3 – Previous Crops in Nitrogen Residue Group 3 are: **harvested fodder (root only), beans, combining peas and whole crop lupins**

Grassland Management Regimes in Residue Group 3:

- **1-2 year low N** leys, **grazed** within 2 months of ploughing out or during September or October
- **1-2 year high N** leys[2], **not grazed** within 2 months of ploughing out or during September or October
- **Thin permanent grass, low N, no clover**

[2]**high N** means average N use in last 2 years was more than 150 kg/ha/year, or high clover

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc,e	**5.5**	**130**	**110**	**60**	**30**
Winter Barleyc	**6.5**	**180**	**160**	**100**	**60**
Spring Wheata,b	**7.0**	**150**	**130**	**80**	**40**
Winter Wheata,b	**8.0**	**200**	**180**	**120**	**60**
Spring Oatsc	**5.0**	**100**	**80**	**30**	**0**
Winter Oatsc	**6.0**	**140**	**120**	**70**	**30**
Spring Oilseed Rape	**n/a**	**80**	**80**	**30**	**0**
Winter Oilseed Rape (spring) d	**4.0**	**180**	**180**	**100**	**60**
Winter Oilseed Rape (autumn)	**n/a**	**10**	**10**	**10**	**10**
Potatoes	**n/a**	**225**	**205**	**155**	**125**
Forage Maize, Rape	**n/a**	**120**	**100**	**50**	**20**
Kale	**n/a**	**160**	**140**	**80**	**40**
Swedes and Turnips	**n/a**	**90**	**70**	**30**	**0**
Linseed	**n/a**	**60**	**40**	**10**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

If actual local rainfall from 1st October – 1st March exceeds 450 mm : add 20 kg N/ha to crops grown in sandy, shallow or sandy loam soils
: add 10 kg N/ha to crops grown in other mineral, humose and peaty soils

Nitrogen Residue Group 4 – Previous Crop in Nitrogen Residue Group 4 is: grain lupin

Grassland Management Regimes in Residue Group 4:

- **1-2 year high N** leys, **grazed** within 2 months of ploughing out or during September or October
- **3-5 year low N** leys, **not grazed** within 2 months of ploughing out or during September or October
- **Thick permanent grass, low N**

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc,e	**5.5**	**110**	**90**	**40**	**10**
Winter Barleyc	**6.5**	**170**	**140**	**80**	**40**
Spring Wheata,b	**7.0**	**130**	**110**	**60**	**20**
Winter Wheata,b	**8.0**	**180**	**160**	**100**	**40**
Spring Oatsc	**5.0**	**80**	**60**	**10**	**0**
Winter Oatsc	**6.0**	**130**	**100**	**50**	**10**
Spring Oilseed Rape	**n/a**	**60**	**60**	**10**	**0**
Winter Oilseed Rape (spring)sd	**4.0**	**140**	**140**	**80**	**40**
Winter Oilseed Rape (autumn)	**n/a**	**0**	**0**	**0**	**0**
Potatoes	**n/a**	**205**	**185**	**145**	**115**
Forage Maize, Rape	**n/a**	**100**	**80**	**30**	**0**
Kale	**n/a**	**140**	**120**	**60**	**20**
Swedes and Turnips	**n/a**	**80**	**60**	**20**	**0**
Linseed	**n/a**	**10**	**0**	**0**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

If actual local rainfall from 1st October – 1st March exceeds 450 mm : add 20 kg N/ha to crops grown in sandy, shallow or sandy loam soils
: add 10 kg N/ha to crops grown in other mineral, humose and peaty soils

Nitrogen Residue Group 5 – Previous Crops in Nitrogen Residue Group 5 are: **leafy brassica vegetables, Leafy non-brassica vegetables and grazed fodder**

Grassland Management Regimes in Residue Group 5:

- **3-5 year high N** leys, **not grazed** within 2 months of ploughing out or during September or October
- **3-5 year low N** leys, **grazed** within 2 months of ploughing out or during September or October
- **Permanent grass, high N**, **not grazed** within 2 months of ploughing out or during September or October

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc,e	**5.5**	**80**	**60**	**10**	**0**
Winter Barleyc	**6.5**	**140**	**110**	**50**	**10**
Spring Wheata,b	**7.0**	**100**	**80**	**30**	**0**
Winter Wheata,b	**8.0**	**150**	**130**	**70**	**10**
Spring Oatc	**5.0**	**50**	**30**	**0**	**0**
Winter Oatsc	**6.0**	**100**	**70**	**20**	**0**
Spring Oilseed Rape	**n/a**	**30**	**30**	**0**	**0**
Winter Oilseed Rape (spring)d	**4.0**	**110**	**110**	**50**	**0**
Winter Oilseed Rape (autumn)	**n/a**	**0**	**0**	**0**	**0**
Potatoes	**n/a**	**175**	**155**	**135**	**105**
Forage Maize, Rape	**n/a**	**70**	**50**	**0**	**0**
Kale	**n/a**	**110**	**90**	**30**	**0**
Swedes and Turnips	**n/a**	**70**	**50**	**10**	**0**
Linseed	**n/a**	**10**	**0**	**0**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

If actual local rainfall from 1st October – 1st March exceeds 450 mm : add 20 kg N/ha to crops grown in sandy, shallow or sandy loam soils
: add 10 kg N/ha to crops grown in other mineral, humose and peaty soils

Nitrogen Residue Group 6

Grassland Management Regimes in Residue Group 6:

- **3-5 year high N** leys, **grazed** within 2 months of ploughing out
- **Permanent grass, high N, grazed** within 2 months of ploughing out

		Predominant Soil Type in Field			
Planned crop	Standard yield (t/ha)	SAND or SHALLOW	SANDY LOAM or OTHER MINERAL	HUMOSE	PEATY
Spring Barleyc,e	**5.5**	**40**	**20**	**0**	**0**
Winter Barleyc	**6.5**	**100**	**70**	**10**	**0**
Spring Wheata,b	**7.0**	**70**	**0**	**0**	**0**
Winter Wheata,b	**8.0**	**110**	**90**	**30**	**0**
Spring Oatsc	**5.0**	**10**	**0**	**0**	**0**
Winter Oatsc	**6.0**	**60**	**30**	**0**	**0**
Spring Oilseed Rape	**n/a**	**0**	**0**	**0**	**0**
Winter Oilseed Rape (spring)d	**4.0**	**70**	**70**	**10**	**0**
WOSR (autumn)	**n/a**	**0**	**0**	**0**	**0**
Potatoes	**n/a**	**135**	**115**	**115**	**115**
Forage Maize, Rape	**n/a**	**30**	**10**	**0**	**0**
Kale	**n/a**	**70**	**50**	**0**	**0**
Swedes and Turnips	**n/a**	**50**	**30**	**0**	**0**
Linseed	**n/a**	**0**	**0**	**0**	**0**

Adjustments

a. For wheat, an additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
b. For wheat, an additional 40 kg N/ha is permitted to milling wheat varieties.
c. For barley and oats, an additional 15 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.
d. On winter oilseed rape, the spring application can be increased by up to 30 kg N/ha if the expected yield is over 4.0 t/ha.
e. On spring barley, an additional 15 kg N/ha is permitted for high N grain distilling varieties.

If actual local rainfall from 1st October – 1st March exceeds 450 mm : add 20 kg N/ha to crops grown in sandy, shallow or sandy loam soils
: add 10 kg N/ha to crops grown in other mineral, humose and peaty soils

Livestock manure nitrogen efficiency

A key aim of the revised Action Programme is to maximise the efficiency of livestock manure use. Applications in the autumn and winter result in a small percentage of the total nitrogen applied being taken up by the crop. For example, an autumn (August to October) application of 6% dry matter cattle slurry surface applied on a sandy loam soil, will result in as little as 5% of the total nitrogen becoming available to the crop. In comparison, 35% of the total nitrogen would become available if the same application were made in the spring. Incorporating the spring application by ploughing it in would increase the amount recovered in the crop to 40% and injecting it would increase this further to 45%. There is therefore a clear environmental and financial benefit in making more efficient use of the nitrogen available from livestock manure applications.

Default minimum efficiency values have therefore been introduced with the intention of minimising the inefficient use of livestock manure. The default values represent the values that can be achieved if applications are made in the spring using the most efficient methods of application.

If you are not applying livestock manures at the optimal time of year using the most efficient methods of application you may not be able to supply the optimum nitrogen requirement of your crop. This is because the default efficiency value may result in a reduction in the balance of manufactured nitrogen that can be applied. The situations where this is likely to occur have been highlighted in red in Appendix 1

The default minimum efficiency values are set out in the table below. **Note that these values apply to all soil types and all methods of application.**

Type of livestock manure	Percentage content of nitrogen taken up by crop on and from 1st January 2014
Cattle slurry	40%
Pig slurry	50%
Poultry manure or litter	30%
Solid manure	10%

Appendix 1: Livestock Manures, Typical Standard Values per Manure Type

Farmyard manure (FYM) - Percentage of nitrogen available to next crop following FYM applications (all crops and all soil types)

FYM type	Manure Reference Number	Total N (kg/t)	Dry Matter %	% N available to following crop
Cattle FYM	**1**	6	25	10
Separated solids from cattle slurry	**2**	4	40	10
Pig FYM	**3**	7	25	10
Separated solids from pig slurry	**4**	5	40	10
Sheep FYM	**5**	7	25	10
Duck FYM	**6**	6.5	25	10
Horse FYM	**7**	7	30	10

Poultry manure – Percentage of nitrogen available to next crop following Poultry Manure applications (use the value in brackets for grassland and winter oilseed rape cropping)

***These values assume incorporation by ploughing. Cultivation using discs or tines is likely to be less effective in minimising ammonia losses and intermediate values of nitrogen availability should be used.**					Autumn		Winter		Spring	Summer use on Grassland
					August- October		November-January		February -April	
Manure Type	**Manure Reference Number**	**Incorporation time***	**Total N (kg/t)**	**Dry Matter %**	Sands Sandy Loams Shallow	All other soils	Sands Sandy Loams Shallow	All other soils	All Soils	All Soils
					% Nitrogen Available to the Following Crop					
Layer manure	**8**	Over 24 hrs	19	35	**30**	**30** (30)	**30**	**30**	35	35
Layer manure	**9**	Within 24 hrs	19	35	**30**	**30** (30)	**30**	40	50	N/A
Broiler/Turkey litter	**10**	Over 24 hrs	30	60	**30**	35 (40)	**30**	**30**	30	30
Broiler/Turkey litter	**11**	Within 24 hrs	30	60	**30**	30 (35)	**30**	30	40	N/A

Cattle and Dirty Water – Percentage of nitrogen available to next crop following Cattle Slurry and Dirty Water applications (use the value in brackets for grassland and winter oilseed rape cropping)

					Autumn		Winter		Spring	Summer use on Grassland
					August-October		November-January		Feb - April	
Manure Type	Dry Matter %	Ref No.	Incorporation time/ method	Total N (kg/t)	Sands Sandy Loams Shallow	All other soils	Sands Sandy Loams Shallo...	All other soils	All Soils	All Soils
					% Nitrogen Available to the Following Crop					
Cattle slurry – Surface applied	2	12	Not incorporated	1.6	40	40 (40)	40	40	45	40
Cattle slurry – Surface applied	6	13	Not incorporated	2.6	40	40 (40)	40	40	40	40
Cattle slurry – Surface applied	10	14	Not incorporated	3.6	40	40 (40)	40	40	40	40
Cattle slurry – ploughed in	**2**	**15**	**Within 6 hrs**	**1.6**	40	40 (40)	40	40	**50**	**N/A**
Cattle slurry – ploughed in	**6**	**16**	**Within 6 hrs**	**2.6**	40	40 (40)	40	40	**40**	**N/A**
Cattle slurry – ploughed in	**10**	**17**	**Within 6 hrs**	**3.6**	40	40 (40)	40	40	40	**N/A**
Cattle slurry – Band-spread	2	18	Band-spread	1.6	40	40 (40)	40	40	50	40
Cattle slurry – Band-spread	6	19	Band-spread	2.6	40	40 (40)	40	40	40	40
Cattle slurry – Band-spread	10	40	Band-spread	3.6	40	40 (40)	40	40	40	40
Cattle slurry - shallow injected	**2**	**21**	**Shallow injected**	**1.6**	40	40 (40)	40	40	**55**	**45**
Cattle slurry - shallow injected	**6**	**22**	**Shallow injected**	**2.6**	40	40 (40)	40	40	**45**	40
Cattle slurry - shallow injected	**10**	**23**	**Shallow injected**	**3.6**	40	40 (40)	40	40	40	40
Separated - Strainer box	*	**24**	Select from above	1.5	*Use the appropriate values for 2% dry matter cattle slurry					
Separated - Weeping wall	*	**25**		2						
Separated - Mechanical	*	**26**		3						
Dirty Water	**0.5**	**27**	**Not incorporated**	**0.5**	40	40 (40)	40	40	**50**	40

Pig Slurry – Percentage of nitrogen available to next crop following Pig Slurry applications (use the value in brackets for grassland and winter oilseed rape cropping)

					Autumn		Winter		Spring	Summer use on Grassland
					August-October		November-January		Feb - April	
Manure Type	Dry Matter %	Ref No.	Incorporation time/ method	Total N (kg/t)	Sands Sandy Loams Shallow	All other soils	Sands Sandy Loams Shallow	All other soils	All Soils	All Soils
					% Nitrogen Available to the Following Crop					
Pig slurry – surface applied	2	28	Not incorporated	**3.0**	**50**	**50 (50)**	**50**	**50**	55	55
Pig slurry – surface applied	4	29	Not incorporated	**3.6**	**50**	**50 (50)**	**50**	**50**	50	50
Pig slurry – surface applied	6	30	Not incorporated	**4.4**	**50**	**50 (50)**	**50**	**50**	**50**	**50**
Pig slurry – ploughed in	**2**	**31**	**Within 6 hrs**	**3.0**	**50**	**50 (50)**	**50**	**50**	**65**	**N/A**
Pig slurry – ploughed in	**4**	**32**	**Within 6 hrs**	**3.6**	**50**	**50 (50)**	**50**	**50**	**60**	**N/A**
Pig slurry – ploughed in	**6**	**33**	**Within 6 hrs**	**4.4**	**50**	**50 (50)**	**50**	**50**	**55**	**N/A**
Pig slurry – Band-spread	2	34	Band-spread	**3.0**	**50**	**50 (50)**	**50**	**50**	60	60
Pig slurry – Band-spread	4	35	Band-spread	**3.6**	**50**	**50 (50)**	**50**	**50**	55	55
Pig slurry – Band-spread	6	36	Band-spread	**4.4**	**50**	**50 (50)**	**50**	**50**	50	50
Pig slurry - shallow injected	**2**	**37**	**Shallow injected**	**3.0**	**50**	**50 (50)**	**50**	**50**	**65**	**65**
Pig slurry - shallow injected	**4**	**38**	**Shallow injected**	**3.6**	**50**	**50 (50)**	**50**	**50**	**60**	**60**
Pig slurry - shallow injected	**6**	**39**	**Shallow injected**	**4.4**	**50**	**50 (50)**	**50**	**50**	**55**	**55**
Mechanical separator	**	40	Select from above	3.6	**Use the appropriate value for 2% dry matter pig slurry					

Protocol for Sampling Slurry and Solid Manure for Analysis

Why correct sampling matters

The nutrient content of slurry can vary considerably within a store due to settlement and crusting. Similarly, the composition of solid manure in a heap can vary depending on the amount of bedding and losses of nutrients during storage.

It is important that the sample taken represents an 'average' of what is found in the store or heap.

General principles of sampling

It is important, where this is practical and safe, to take a number of samples. If you are unable to take such samples safely you will need to use standard values for manure nutrient content.

Take samples from a range of positions within the store or heap, bulk them together, mix them and then take a representative sub-sample.

The final sample can be sent to the laboratory for total nitrogen analysis. It would be advisable to obtain other analyses at the same time in order to make best use of manures and save you money on fertiliser costs.

Slurries

You must take at least five sub-samples of 2 litres. Pour into a larger container, stir thoroughly and pour a 2 litre sample immediately into a smaller clean container to provide the sample for analysis.

Above-ground stores

Ideally, slurry should be fully agitated and sub-samples taken from the reception pit. If this is not possible, **and provided there is safe access from an operator's platform**, the five sub-samples can be taken at a range of positions, using a weighted 2 litre container attached to a rope.

Below-ground pits

It may be possible to obtain sub-samples at various positions using a weighted container as above, but **never enter the pit**, as lethal gases may be present. **Do not attempt to take samples during or soon after slurry agitation** as large amounts of lethal gases may be released from the stirred slurry.

Earth-banked lagoons

If the slurry has been well agitated, sub-samples can be obtained from the tanker or irrigator as outlined below. **Do not attempt to sample direct from the lagoon** unless there is an operator's secure platform that provides safe access.

Sampling while spreading

If the tanker is fitted with a suitable valve, it may be possible to take five sub-samples from the stationary slurry tanker at intervals while field spreading is in progress. Or, trays placed in the field can be used to collect samples while the material is being spread.

Solid manures

You must take at least 10 sub-samples of 1 kg each, taken as described below, and place on a clean, dry tray or sheet. Break up any lumps and thoroughly mix the sample. Then take a representative sample of around 2 kg for analysis (you should check the weight required with the laboratory).

Manure heaps

Provided the manure is **dry and safe to walk on**, identify at least ten locations which appear to be representative of the heap. Having cleared away any weathered material with a spade or fork, dig a hole approx. 0.5m deep and take a 1 kg sample from each point. Alternatively, take sub-samples from the face of the heap at various stages during spreading.

Pig and poultry manure heaps only

For permanently housed pig and poultry enterprises that **only produce solid manures**, you may wish to provide samples to check compliance with the Livestock Manure N Farm Limit in Nitrate Vulnerable Zones. You must provide 4 samples for analysis in a calendar year (one in each quarter) by following the advice for manure heaps, but the manure heaps must not be more than 12 months old.

Weeping-wall stores

Do not attempt to take samples before the store is emptied as it is **not safe to walk on the surface of the stored materia**l. Sub-samples may be taken from the face of the heap once emptying has commenced.

Sampling during spreading

Trays placed in the field can be used to collect samples while the material is being spread. **Take care to avoid the possibility of injury** from stones and other objects which may be flung out by the spreading mechanism.

Storage and analysis

Slurry samples sent to a laboratory for analysis should be dispatched in clean screw-topped 2 litre plastic containers. Leave at least 5 cm of airspace to allow the sample to be shaken in the laboratory. For solid manures, use 500-gauge polythene bags and expel excess air from the bag before sealing.

Clearly label the samples on the outside of the container or bag and dispatch them immediately or within a maximum of seven days if kept in a refrigerator.

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