

# Detailed guide: Using nitrogen fertilisers in nitrate vulnerable zones

*Updated:* Corrected link

You must follow this guidance if you use any manufactured fertilisers, manures or other materials that contain nitrogen on agricultural land in a nitrate vulnerable zone (NVZ).

Find out if you're in an NVZ.

You must also follow the [guidance on storing organic manures in NVZs](#) and [storing silage, slurry and agricultural fuel oil](#) if you produce or import livestock manures.

The NVZs rules are part of the requirements for cross compliance, known as Statutory Management Requirement 1. You must meet [cross compliance](#) requirements to qualify for full payment under the basic payment scheme and other direct rural payments.

## Fertilisers that contain nitrogen

Nitrogen fertilisers can be manufactured (inorganic, bagged) fertilisers that you buy, other materials containing nitrogen (like waste soil) or organic manures that you produce or bring on to your holding.

Organic manures come from animals, plants or humans. They include:

- slurry
- poultry manures
- solid manures (such as farmyard manure, sludge cake or compost)
- sewage sludge (also called biosolids)
- other liquid manures (such as abattoir waste or anaerobic digestate)

## How much nitrogen you can apply to your crops

There's a limit on the average amount of manufactured fertiliser and crop-available nitrogen from organic manure that you can apply to most crops each year – this is known as the N-max limit.

These are shown in the following table:

Crop	N-max limit (kilograms of nitrogen per hectare)	Standard crop yield (tonnes per hectare)
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<b>Crop</b>	<b>N-max limit (kilograms of nitrogen per hectare)</b>	<b>Standard crop yield (tonnes per hectare)</b>
Autumn or early winter-sown wheat	220	8
Spring-sown wheat	180	7
Winter barley	180	6.5
Spring barley	150	5.5
Winter oilseed rape	250	3.5
Sugar beet	120	–
Potatoes	270	–
Forage maize	150	–
Field beans	0	–
Peas	0	–
Grass	300	–
Asparagus, carrots, radishes, swedes, individually or in any combination	180	–
Celery, courgettes, dwarf beans, lettuce, onions, parsnips, runner beans, sweetcorn, turnips individually or in any combination	280	–
Beetroot, brussels sprouts, cabbage, calabrese, cauliflower, leeks individually or in any combination	370	–

### **Crops that you can apply more nitrogen to**

You can apply more nitrogen to some crops if your expected yield is higher than the 'standard crop yield' shown in the table.

You can use an additional 80kg of nitrogen per hectare if you've used straw or paper sludge on the previous or current crop.

#### **Wheat and barley**

For wheat and barley, you can use an additional 20kg of nitrogen per hectare for every tonne that the expected yield exceeds the standard yield.

#### **Milling wheat**

On milling wheat varieties, you can use an additional 40kg of nitrogen per hectare.

#### **Wheat and barley on shallow soils**

On autumn and winter-sown wheat and winter barley you can use an additional 20kg of nitrogen per hectare on fields with a shallow soil type (except on shallow soils over sandstone).

#### **Winter oilseed rape**

On winter oilseed rape you can use up to 250kg of nitrogen per hectare. This

includes a maximum autumn (closed period) application of 30kg of nitrogen per hectare of manufactured nitrogen fertiliser.

If you use 30kg of nitrogen per hectare in the autumn, you can only use up to 220kg of nitrogen per hectare in the spring. However, you can increase this by an additional 30kg of nitrogen per hectare for every half tonne that the expected yield exceeds the standard yield.

## **Grass**

On grass that's cut at least 3 times in a year, you can use an additional 40kg of nitrogen per hectare.

### **Grass grown for dehydration or chlorophyll production**

You can use nitrogen up to the level recommended in writing by a [FACTS-qualified adviser](#) if you're growing grass to achieve a protein content of at least 16% in the dried product.

If the land is irrigated, you must not use more than 700kg of nitrogen per hectare. If the land isn't irrigated, you must not use more than 500kg of nitrogen per hectare.

In subsequent years, you must sample these fields between 1 September and 31 October for soil mineral nitrogen levels and give your FACTS-qualified adviser the results.

## **How much organic manure you can use (farm and field limits)**

You can apply up to 170kg per hectare of nitrogen in livestock manure (including manure deposited directly by livestock and spreading) on your holding in each calendar year. This limit is the loading limit and applies as an average across your holding. It's separate from the field limit of 250kg per hectare from organic manures.

You must not use more than 250kg of total nitrogen from all organic manures spread in any 12 month period on any single hectare of your land. This limit (the field limit) doesn't include livestock manures deposited by grazing animals.

You must use standard values to work out how much nitrogen is produced by the livestock on your farm or bought on to your farm. You must plan so that you don't exceed the limit.

You can find the standard values in the [blank field records and standard values tables](#) (XLSM, 128KB)

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You can apply for a ['grassland derogation'](#) to increase this limit if more

than 80% of your holding is grassland.

## Using compost

If the only organic manure you use is certified green or certified green/food compost, you can apply:

- up to 500kg of nitrogen per hectare every 2 years as mulch or worked into the ground
- up to 1,000kg of nitrogen per hectare every 4 years (only as mulch and in an orchard growing fruit of the genera Malus, Prunus or Pyrus)

The compost that you use must not contain livestock manure and must be produced to the [PAS100 protocol](#).

## Plan your nitrogen use

You must plan all your applications of nitrogen on each crop in each field (including grass). This is your fertilisation plan. You must keep it as part of your farm records.

To help with your plan, you can use farm software like [PLANET](#) or tools like the [‘Tried and Tested’](#) nutrient management tools.

You can also use the [blank field records and standard values tables](#) (XLSM, 128KB)

to calculate how much nitrogen is available in different types of livestock manure.

Your plan must show you've taken the following steps before you apply nitrogen for the first time in a field where you're going to plant a crop or have planted a crop:

1. Calculate the amount of nitrogen in the soil that's likely to be available for the crop to use during the growing season.
2. Calculate the optimum amount of nitrogen that should be applied to the crop, taking into account the amount of nitrogen already available in the soil.
3. Calculate the amount of nitrogen from any planned applications of organic manure that's likely to be available to the crop in the growing season in which you spread it.
4. Calculate the amount of manufactured nitrogen fertiliser you need.

You must also carry out steps 1 and 2 before you apply any nitrogen fertiliser or manure for the first time.

You must carry out steps 3 and 4 every time you apply nitrogen fertiliser or manure.

In subsequent growing seasons, before you apply nitrogen to any crop or land

where you're going to plant a crop (including grass) you must:

- repeat steps 1 and 2
- prepare a plan for your fertiliser use for that growing season

For permanent grassland, make your calculations based on the farming year starting on 1 January. Prepare a plan for any manure or fertiliser use for the year after that date.

## **Work out the total and crop-available nitrogen in organic manures**

Before you apply livestock manure, you must calculate the:

- total amount of nitrogen in the manure, using standard values or results from sampling and analysis
- amount of crop-available nitrogen in the manure

You can find the values you need for these calculations in the blank field records and standard values tables.

Before you apply other organic manures, work out the total amount of nitrogen and crop-available nitrogen using the technical analyses supplied by the fertiliser supplier (for example, on the delivery note).

Where these technical analyses are unavailable, typical values may be obtained from other sources such as the [Fertiliser Manual](#) (RB209) or [MANNER-NPK](#) software. The Fertiliser Manual refers to the total amount of nitrogen as 'total nitrogen'. It refers to crop-available nitrogen as 'nitrogen available to the next crop'.

You can also use values from your own sampling and analysis.

You must not spread any organic manure unless you have used one of these methods to work out the crop-available nitrogen in the manure before applying it to crops that have an N-max limit.

## **Assess the risk of run-off before spreading**

It's an offence to allow fertiliser or organic manure to enter surface water (such as rivers or ponds).

You must inspect the field to assess the risk of nitrogen getting into surface water (for example, through runoff) before you spread any fertilisers or organic manures.

In particular, when assessing the risk of runoff, you need to take account of:

- land that's sloping, especially if the slope is over 12 degrees
- ground cover provided by vegetation
- the distance to surface water
- weather conditions
- the soil type and condition

- the presence of land drains

## **Where you can't spread manufactured fertilisers or organic manures**

You must not spread any manufactured fertilisers or organic manures if a field is either:

- waterlogged, flooded or covered in snow
- frozen for more than 12 hours in the previous 24 hours

You must not spread:

- manufactured nitrogen fertiliser within 2 metres of surface water
- manufactured nitrogen fertilisers within a 2 metre zone from the centre of an established hedge (this only applies if you need to meet cross compliance requirements)
- organic manure within 50 metres of a spring, well or borehole or 10 metres of surface water

You must only spread manufactured nitrogen fertilisers and manures on agricultural land that you're using to grow crops (including grass).

You must spread manufactured nitrogen fertilisers and organic manures as accurately as possible.

## **Exceptions for precision spreading equipment for organic manures**

You can spread slurry, sewage sludge and anaerobic digestate no less than 6 metres from surface water if you use precision manure spreading equipment like:

- band spreaders (trailing hose or trailing shoe)
- shallow injectors (that inject no more than 10cm below the surface)
- dribble-bar applicators

## **Exceptions for straw-based solid manure**

You can spread straw-based solid manure (such as farmyard manure) within 10 metres of surface water on land that's notified as a site of special scientific interest or managed under an agri-environment scheme if you meet one of the following conditions:

- you're managing the land for breeding wader birds
- the land is designated as a 'species-rich semi-natural grassland'

You must only spread between 1 June and 31 October and not:

- directly into surface water
- more than 12.5 tonnes per hectare each year

## Using manures with high readily available nitrogen

Some organic fertilisers have more than 30% of their total nitrogen content immediately available to crops. These are called 'high readily available nitrogen manures'.

They include:

- poultry manure (layer manure and litter)
- liquid organic manures (such as sludge, cattle and pig slurries and anaerobic digestate)

If you use sewage sludge or slurry on your holding, you need to follow the rules in this guidance and separate rules on [managing sewage sludge, slurry and silage](#).

### When you can't spread manures with high readily available nitrogen (closed periods)

You must not spread high readily available nitrogen manures on or between the dates shown in this table.

	On grassland	On tillage land
Sandy or shallow soils	1 Sep to 31 Dec	1 Aug to 31 Dec
All other soils	15 Oct to 31 Jan	1 Oct to 31 Jan

Your soil is sandy if it lies over sandstone or it has all the characteristics shown in this table:

Layer of soil	Up to 40cm	From 40cm to 80cm
Content of the soil	more than 50% by weight of particles from 0.06mm to 2mm in diameter	more than 70% by weight of particles from 0.06mm to 2mm in diameter
	less than 18% by weight of particles less than 0.02mm in diameter	less than 15% by weight of particles less than 0.02mm in diameter
	less than 5% by weight of organic carbon	less than 5% by weight of organic carbon

Your soil is shallow if it's less than 40cm deep

### Exceptions for crops on sandy or shallow soils

If you sow a crop on sandy or shallow tillage land on or before 15 September, you can apply manures with high readily available nitrogen between 1 August and 15 September inclusive.

### Exceptions for organic farms

If you're an organic farmer, or you're formally converting to organic status,

you can spread manures with high readily available nitrogen in the periods shown in the table.

You must not spread more than 150kg of total nitrogen per hectare.

<b>Crop</b>	<b>When you can spread nitrogen</b>	<b>Additional limits on spreading</b>
Asparagus, overwintered salad onions, parsley, bulb onions	from the start of the closed period to the end of February	
Brassica	from the start of the closed period until harvest	no more than 50kg of nitrogen per hectare every 4 weeks
Winter oilseed rape	from the start of the closed period to the end of October	
Grass	from the start of the closed period to the end of October	no more than 40kg at any one time

## **Restrictions on applications outside the closed period**

You must not spread more than 30 m<sup>3</sup> /ha of slurry or 8 tonnes/ha of poultry manure in a single application from the end of the closed period until the end of February. You must allow at least 3 weeks between each individual application.

The poultry manure limit remains the same but the slurry limit has been reduced from 50 m<sup>3</sup> to 30 m<sup>3</sup>.

## **Equipment for spreading slurry**

You must only spread slurry using precision spreading equipment or equipment that either:

- has a low spreading trajectory (below 4 metres from the ground)
- spreads slurry at a maximum rate of no more than 1 millimetre per hour when operating continuously

## **Work organic manures into the soil after spreading**

When you spread manure on bare soil or stubble (except if it's been sown with seed), you must:

- work poultry manure, slurry and liquid-digested sludge into the soil (for example, by ploughing) as soon as it's practically possible to do so and within 24 hours at the latest
- work any organic manure into the soil (unless it's been spread as mulch on sandy soil) as soon as possible and within 24 hours at the latest if the land is sloping and within 50 metres of surface water that could receive run-off from it

You don't have to work in slurry and liquid-digested sludge if you have



applied it using a trailing hose, shoe band spreader, dribble bar applicator or an injector.

## **When you can't spread manufactured nitrogen fertilisers (closed periods)**

You must not spread manufactured nitrogen fertiliser on or between the following dates (closed periods):

- from 15 September to 15 January on grassland
- from 1 September to 15 January on tillage land

## **Exceptions to the closed periods for manufactured nitrogen fertilisers**

You can spread manufactured nitrogen fertiliser during the closed period if you grow the crops listed in the table and you keep to the limits and times shown.

If you grow crops that aren't listed in the table, you must have written advice from a FACTS-qualified adviser before you spread manufactured nitrogen fertilisers.

<b>Crop</b>	<b>Maximum amount of nitrogen you can spread within the closed period on each hectare</b>
Winter oilseed rape	30kg (you must not spread nitrogen after 31 October)
Asparagus	50kg
Brassica	100kg (no more than 50kg can be applied every 4 weeks, up to the date on which you harvest the crop)
Grass	80kg (you can apply a maximum of 40kg at any one time, and you must not spread nitrogen after 31 October)
Over-wintered salad onions	40kg
Parsley	40kg
Bulb onions	40kg

## **Exemptions for greenhouses and low-intensity farms**

### **Greenhouses**

You don't need to keep to limits on fertiliser use on land inside greenhouses, glasshouses and polytunnels where the land is enclosed for the whole calendar year. If land is exposed to the open air at any time (for example, if you uncover a polytunnel) the limits apply for the whole of that year.

You don't need to keep records of your use of nitrogen fertilisers or the

yield of arable crops in a greenhouse.

## **Low-intensity farms**

You're a low-intensity farmer if all of the following apply to you:

- at least 80% of your land is grassland
- you apply no more than 100kg of nitrogen per hectare per year as organic manure (including any nitrogen in manure deposited on the field by livestock)
- you spread no more than 90kg of nitrogen per hectare per year as manufactured fertiliser
- you don't bring any organic manure onto your holding

You don't have to keep a record of your actual applications of manufactured fertiliser and organic manure in each field. You must have recorded information to show that you meet the criteria for low-intensity farms. You must still plan your nitrogen use by keeping a fertilisation plan.

When calculating your fertiliser applications, you must not include any area of your holding where you don't spread any fertiliser or work the soil (for example, on rough grazing areas).

## **Keeping records**

You must keep all records of your fertiliser use for at least 5 years.

### **Fertilisation plan**

You must keep records of each step in your fertilisation plan for each field in which you use nitrogen fertiliser.

#### **Step 1**

Record the:

- name and area of the field to be planted
- type of crop to be grown
- month in which you plan to plant the crop
- soil type
- previous crop (If the previous crop was grass, record whether it was cut or grazed)
- amount of nitrogen from the soil that is likely to become available for uptake by the crop during the growing season (the soil nitrogen supply)
- method you used to work out the soil nitrogen supply

#### **Step 2**

Record the:

- anticipated yield, if it's an arable crop
- how you'll manage the crop, if it's grass (cut or grazed)

- the month when you'll plant the crop (unless the previous crop is grass and it has not been ploughed out)
- the crop nitrogen requirement, taking account of the soil nitrogen supply

You must also keep a copy of any advice from a FACTS-qualified adviser with your plan.

You can estimate your expected yield using your farm records for previous crops.

### **Step 3**

Record the:

- area (including location) to which you'll apply organic manure
- quantity and type of organic manure you'll apply
- month when you plan to apply the manure
- total nitrogen content of the organic manure
- amount of nitrogen that is likely to become available for crop uptake in the growing season in which you'll apply the organic manure

### **Step 4**

Record the:

- amount of nitrogen needed from manufactured fertiliser, taking account of the crop available nitrogen from applications of organic manure
- month when you plan to apply the manufactured fertiliser

## **Field records**

You must update your field records within 1 week of sowing, spreading fertiliser or harvesting a crop.

When you sow a crop on which you're going to spread nitrogen fertiliser, record the type of crop and the date you sowed it on.

### **When you spread manufactured fertiliser**

Record the date of spreading and the amount of nitrogen you spread.

### **When you spread organic manure**

Record the:

- area you spread
- quantity of manure you spread
- date of spreading
- method of spreading
- type of manure
- the total nitrogen content of the manure
- the amount of nitrogen that was available to the crop (crop-available

nitrogen)

## **Recording nitrogen calculations**

You must keep evidence of:

- the soil nitrogen supply and how you calculated it
- the crop nitrogen requirement and how you calculated it
- any written advice from a FACTS-qualified adviser

## **Keeping laboratory reports**

You must keep original laboratory reports of any sampling and analysis you have done to find out the nitrogen content in organic manure that you use.

## **Recording yields**

You must record the yield of any arable crop on which nitrogen fertiliser has been used, within one week of finding it out.

## **Recording the size of your holding**

You must keep an up-to-date record of the total size of your holding and update it within 1 month if it changes. This applies to you if the change in area isn't land covered by a greenhouse.

The total size of your holding must include any area not covered by greenhouses and excludes surface waters, any hardstanding (areas for parking vehicles), buildings, roads or any woodland (unless that woodland is used for grazing).

## **Making a risk map**

You must make a risk map and keep it with your farm records if you spread organic manure on your land. You must mark on the map:

- the location of each field and its area in hectares
- areas with sandy or shallow soils
- land with a slope greater than 12 degrees
- land drains (except if they are sealed and impermeable)
- sites where you plan to use temporary field heaps to store manure
- all surface waters (for example, streams or ponds) and land within 10 metres of them
- all springs, wells and boreholes on your land or within 50 metres of the boundary of your land
- all land within 50 metres of a spring, well or borehole
- low run-off risk land (if you intend to spread to this land to reduce the amount of storage you need to provide)

Your risk map can be printed or drawn by hand and it doesn't need to be to scale.

You must update the map with any changes within 3 months of the date of the

change.

## Keeping records of livestock manure

For the previous calendar year, you must complete a record by 30 April showing:

- the area of your holding in hectares
- the numbers of livestock kept on your holding
- the type of animal ('category' in the standard tables) and number of days each animal spent on your holding
- your calculation of the amount of nitrogen produced by livestock

Within 1 week of bringing livestock manure (including poultry manure and slurry) onto your holding or sending it off, you must record:

- the type and amount of manure and the date it was brought onto or sent off your holding
- the total nitrogen content of any manure you send off or bring onto your holding
- the name and address of the supplier or recipient of the manure
- a contingency plan you'll follow if the manure isn't accepted by a recipient (for example, how you plan to store the manure)

If you don't know the nitrogen content of imported manure, you must find this out (by analysis or calculation) as soon as possible, and then record it within a week.

## Further requirements for claimants of direct payments

You must follow the [Code of Good Agricultural Practice](#) for nitrates if you claim direct payments other than those under the [basic payment scheme](#) (for example, agri-environment payments).

## Inspections

The Environment Agency enforces the NVZ rules. Its officers select which farms to inspect. If you have land in an NVZ and don't comply with the NVZ rules, you may be prosecuted and fined.

The Rural Payments Agency inspects a proportion of farmers who claim under the cross-compliance scheme. If you have land in an NVZ and don't comply with the NVZ rules your payment may be reduced.

## Where to get help

Contact the Farming Advice Service for more information on using nitrogen fertilisers and manures in NVZs, and other requirements of cross compliance.

Telephone: 03000 200 301 (Monday to Friday, 8.30am to 5pm). [\(See call](#)

[charges\)](#)

Email: [advice@farmingadvice.org.uk](mailto:advice@farmingadvice.org.uk)

[Find a local FACTS-qualified adviser.](#)