



# Solution Fertilisers

The Nitroflo and Multiflo Range



AGRICULTURE

## Product Guide



OMEX operates throughout the world manufacturing liquid fertilisers and foliar health promoters for the agricultural, horticultural and amenity sectors. Specialist knowledge of fluid dynamics has also allowed OMEX to expand into producing wastewater treatments and deicers.

The OMEX solution fertiliser ranges, **Nitroflo®** and **Multiflo®**, include some of the most concentrated liquid fertilisers available in the UK. They are delivered for farmer application and offer many advantages over conventional solid fertiliser in terms of accuracy, consistency, ease of use, reduced environmental impact and increased yield potential.

[www.omex.co.uk](http://www.omex.co.uk)

## Nitroflo® Storage Sites

OMEX liquid fertiliser is made in the UK, with a storage and distribution network that is unrivaled in the industry, ensuring a fast and efficient delivery to farm, even during peak periods.

Hubs strategically located throughout the UK service OMEX's main manufacturing sites at Bardney and King's Lynn, and inland distribution centres near Swindon, Scotch Corner and Market Drayton. All sites are able to produce the full range and deliver to farms directly.

A tank rental scheme enables farmers to take advantage of seasonal pricing and be prepared for the first weather breaks in early spring.

OMEX's extensive storage facilities are well stocked before the peaks, ready to supply to farms around the UK on demand, giving an excellent delivery service when it counts.



### Central Distribution

Distribution - T: 01526 396014

Bardney Airfield, Tupholme, Lincoln, Lincolnshire LN3 5TP

T: 01526 396000

E: [deliveries@omex.com](mailto:deliveries@omex.com)

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**Want to find out more about the work we're doing to reduce carbon footprint and provide sustainable liquid fertilisers in the future?**

**Head to page 36 to read about our Greener Planet Commitment project**



# Benefits of Nitroflo® Liquid Fertiliser

**The OMEX Nitroflo liquid fertiliser range includes some of the most concentrated products available in the UK.**

They are delivered for farmer application and offer many advantages over conventional solid fertiliser application in terms of accuracy, consistency and ease of use. By using OMEX solution fertilisers, farmers save time, protect the environment, comply with NVZ, regulatory and SFI requirements and maximise crop yields..

All OMEX solution fertilisers are supplied in bulk, eliminating packaging and the need to recycle waste, and provide major handling and storage advantages over solid fertilisers.

## Potential Fixed Cost Savings

Perhaps one of the best times for a farmer to consider converting to liquid fertiliser is when the farm sprayer or spreader is due for renewal or tramline widths are increased. It is at these points that there is an opportunity to consider the effective utilisation of labour and machinery and the respective fixed costs.

Low-Labour Application System - Liquid fertiliser offers a low-labour application system compared with solid fertiliser:

- No offloading with a forklift
- No storage in a secure building
- No re-loading and carting to field
- No dust, no bag disposal
- No wastage (unused fertiliser is returned to the tank)
- No need for a second man to load the spreader

**Wider Tramlines** - By switching to 36m tramlines and the M36+ system on a 200ha farm, the time spent applying fertiliser and agrochemicals can be reduced by around 30 hours/year - an extra 3 spraying days per year. Some solid products will not spread accurately over 24m, so if tramline width is further increased liquid fertiliser will provide a more accurate application.

Wider tramlines also effectively increase the area cropped. The wheelings caused by spreading fertiliser at 24m, even on standard width tyres, cover a minimum of 2.5% of the cropped area. A move to 36m reduces this area to 1.7%, resulting in increased yields. On the same 200 hectare farm, this can mean wheat yield increases worth over £2,500 per year.

**Single Applicator** - If Multiflo® fertiliser is used for compound fertiliser application, there is no requirement for a spreader. This has a potential fixed cost saving of £12.50/ha across the life of the spreader.

**Low Cost Storage** - Liquid nitrogen does not have to meet the same secure storage requirements of ammonium nitrate. Low cost GRP storage tanks are available through rental schemes (see Tank Storage Scheme, page 32). Different OMEX products can be stored in a tank at different times of the year.

**Easing Cash Flow** - On-farm storage tanks can be refilled as required in the spring, meaning that payment is only due after the largest part of the fertiliser requirement has been applied. This is unlike most solid equivalent systems where fertiliser often has to be purchased ahead of spring.

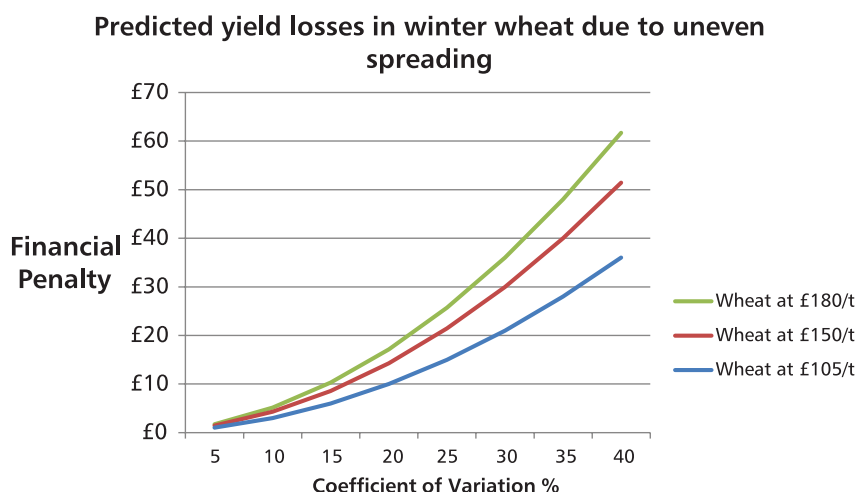




## Accuracy

**Accuracy of Application** - The accuracy of application of nitrogen fertiliser has a major impact on gross margins. Variability across a spreading width is referred to as the coefficient of variation (CoV). The graph shows the impact on profitability as the CoV increases for winter wheat. It is not impossible for solid spreaders to operate with CoVs of 30-40% if they are poorly calibrated or maintained, and 20% is a common average figure. It is only above 20% CoV that striping becomes visible, by which time the financial loss is £15/ha.

Nitroflo is applied by sprayer with an average CoV of 5%, consequently, application of Nitroflo could improve gross margins by £12/ha compared with a spinning disc spreader.



[Ref: IFS Costs and Effects of Uneven Spreading of Nitrogen Fertilisers 2009, Figure 12. Miller, Audsley & Richards]

## Productivity of Field Margins

Managing field headlands to make sure they are as productive as the centre of the field is a constant challenge and ensuring nitrogen is applied at full rate to the edge of the field but no further is probably one of the key issues. Despite ongoing advances in spreader design, it is not possible for a spinning disc to apply an even distribution pattern if the operator is to guarantee that no fertiliser travels beyond the edge of the field.

Yield loss from the outside 8m of a field has been shown to be 3.5t/ha of winter wheat and 10t/ha of potatoes when nitrogen is applied through a spinning disc spreader. The outside 8m of a 15ha field represents 5% of the field, so the yield loss would be 2.63t, worth £420 (wheat at £160/t). A farmer growing 400ha of winter wheat could be losing over £11,000 across the outside 8m of his fields.

Yield Loss				
Average Field Size	% Area in Outside 8m	Outside 8m WW (t)	Yield Loss 100ha WW	£ Loss at £160/t
20ha	4.00%	3.5	14	£2,240
15ha	5.00%	3.5	17.5	£2,800
10ha	5.50%	3.5	19.25	£3,080
8ha	6.00%	3.5	21	£3,360
5ha	7.50%	3.5	26.25	£4,200
4ha	8.50%	3.5	29.75	£4,760

By using Nitroflo, it is possible to apply the full rate of nitrogen right up to the field margin: no compromise to yield, no risk of applying fertiliser beyond the field margin, no risk of pollution.

**The visual impact of using solid N on field margins, compared to liquid nitrogen accuracy:**





## Three Sources of N

Replicated plot trials by independent organisations have demonstrated the yield advantage of liquid nitrogen, compared to solid ammonium nitrate and urea. These yield benefits are a result of the blend of nitrogen sources in Nitroflo, which supply a balanced delivery of nitrogen to the crop, along with the superior application accuracy. The visual impact of liquid vs solid application is particularly evident in dry spring seasons when solid nitrogen is less available to the crop when needed.

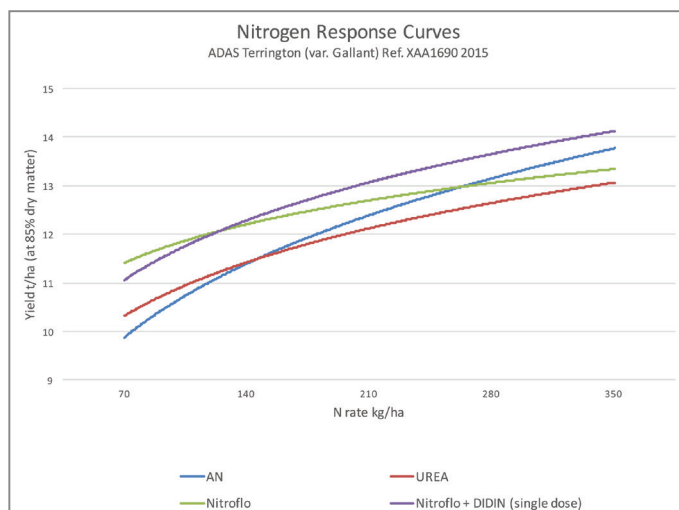
## Application

Nitroflo can be applied across a range of weather conditions including situations when solid nitrogen or agrochemicals cannot be applied. Nitroflo can be applied during rainfall, if ground conditions allow. It can be applied in breezy conditions because, unlike spray from a fan jet, the wind will not cause drift of a vertical stream and booms can be lowered to just above crop height. It is best to avoid damp leaf conditions (for example when a dew is lifting) since the nitrogen can spread on the leaf and be absorbed rapidly; in these conditions some scorch is possible.

**Less Pollution Risk** - By using Nitroflo it is possible to apply the full rate of nitrogen right up to the field margin without losing fertiliser beyond the boundary into the hedge bottom or close to dykes etc. This significantly reduces the risk of polluting water courses without incurring a yield loss along the field margin or loss of nitrous oxide. Furthermore, since only 25% of the nitrogen sources is nitrate N there is much less risk of leaching shortly after application than with ammonium nitrate.

**Use Existing Sprayer** - Nitroflo can be applied through any farm sprayer. The only conversion required is to fit suitable nozzles. There are various types of jets available off the shelf, they all apply a stream of Nitroflo - a method proven to minimise the risk of crop scorch. The best jets are those that apply even quantities in vertical streams across the full boom width, because they remove any variability caused by gradient and boom height. Consequently OMEX recommends the OMEX Streambar.

**Nitrogen & Sulphur Together** - By using one of the Nitroflo-S formulations, the farmer can apply nitrogen & sulphur together. The sulphur is included in sulphate form making sure both nutrients are available when needed. The range of sulphur grades allow the farmer to fine tune the sulphur application in season if required.



**More Crop Available in Dry Conditions** - As soon as Nitroflo is applied it is drawn into the soil. So, even in the driest of springs nitrogen starts becoming available to plants shortly after application.

**Simple to Include Urease Inhibitors.** If conditions dictate, it is simple to include OMEX NitroShield while filling the sprayer if necessary, fulfilling the requirements of the Red Tractor Standard on applications of fertiliser from 1st of April each year.

This picture was taken by OMEX customer Andrew Burden. Both fields are winter wheat, both had N applied the same day, solid fertiliser was applied to the far field, whilst OMEX Nitroflo was applied to the field in the foreground.



# Products - OMEX Nitroflo® Range

For many leading UK cereal growers, liquid nitrogen has become the preferred top-dressing source. OMEX Nitroflo® is one of the most concentrated liquid nitrogen formulations available in the UK. Liquid fertilisers offer a valuable means of optimising crop nutrition and reducing fixed costs, which is why, every year, more growers are switching to OMEX Nitroflo.

## Benefits:

- ✓ Accurate application up to field margins (£31/ha added value)
- ✓ Three sources of nitrogen - ammonium, nitrate and urea - so the best balance between availability to crop when needed and reduced risk of loss through leaching
- ✓ Reduced capital expenditure as Nitroflo can be applied through a normal farm sprayer (saving £12.50/ha depreciation on spreader)
- ✓ No off-loading costs as Nitroflo is pumped directly into holding tanks on-farm (saving £0.83/ha)
- ✓ No bag disposal (potentially saving £1.00/ha)
- ✓ No haz chem storage restrictions and no driver certification required
- ✓ Improved application accuracy. Tests show that application by granular spreader often varies by 20% across the spread width. Farm sprayers are unlikely to vary by more than 5% (making the CoV loss difference between solid and liquid N £12/ha)
- ✓ Better utilisation of time and labour - Nitroflo can be applied in less favourable conditions, when applying solid fertilisers or crop spraying would not be possible
- ✓ Higher work rates. It takes just a few minutes for one man to load the sprayer with Nitroflo
- ✓ An opportunity to upgrade sprayer and increase tramline widths, increasing the cropped area, work rates and accuracy of top-dressing

## Frequently Asked Questions and Comments

### Q “Isn't liquid fertiliser often associated with scorch?”

A Current application methods have virtually eliminated scorch and by following a few simple guidelines, scorch is not a problem.

### Q “Surely liquid nitrogen is too expensive?”

A The price of OMEX liquid nitrogen has for many years been competitive against UK produced ammonium nitrate.

### Q “Liquid nitrogen is corrosive.”

A All nitrogen fertilisers can be mildly corrosive to unprotected steel. By cleaning down a sprayer after applying fertiliser, the sprayer condition will deteriorate no more than if it was used for conventional spraying alone.

### Q “There is a risk of urea volatilising in warm weather.”

A The Nitroflo range contains liquid urea which rapidly enters the soil and is stabilised, reducing the risk of ammonia losses compared to solid urea and OMEX NitroShield can be tankmixed if necessary.

### Q “Isn't it expensive to convert to liquid?”

A The cost of converting should be as little as the cost of a bunded concrete plinth for a storage tank and a set of nozzles. The storage site will be assessed by OMEX, the cost of bunding over the life of the site is low and the cost of storage tank is subsidised by OMEX.

All fertilisers, including liquids, have to be invoiced by a guaranteed weight. Therefore, and to avoid confusion, all OMEX fertilisers are sold by weight with nutrients expressed as a percent by weight and easy to use conversion charts are provided to give application volumes.

### The range includes:

**Nitroflo 30** - the UK's most concentrated liquid nitrogen providing the crop with prolonged, even growth, and ensuring consistent crop quality in addition to easing agronomic management and harvesting. The nitrogen source in Nitroflo is UAN - 50% of N sourced from ammonium nitrate and 50% from urea.

**Nitroflo 28+S** - containing nitrogen and a low level (2.5% SO<sub>3</sub>) of sulphur.

**Nitroflo 26+S** - containing nitrogen and 5% SO<sub>3</sub> sulphur; for top-dressing sulphur responsive crops in the spring during periods of rapid growth and ensuring strong, even growth. The sulphur source is sulphate. The most widely used product in the Nitroflo range.

**Nitroflo 24+S** - containing nitrogen and a higher level of S (7.5% SO<sub>3</sub>) than Nitroflo 26+S. The sulphur source is sulphate.

**Nitroflo 22+S** - containing nitrogen and a higher level of S (10% SO<sub>3</sub>) than Nitroflo 24+S. The sulphur source is sulphate.

**Nitroflo 20+S** - containing a higher level of sulphur (12.5% SO<sub>3</sub>) for deficient areas and crops with a high demand for sulphur, such as oilseed rape. The sulphur source is sulphate.

**Nitroflo 15+S** - containing an equal amount of nitrogen and sulphur; ideal for first nitrogen application on oilseed rape. The sulphur source is sulphate.

**For application charts see page 20, or ask for a copy of the handy application chart**

Product	Analysis w/w		SG	Approximate Analysis w/v		
	N	SO <sub>3</sub>		N	SO <sub>3</sub>	
Nitroflo 30	30%		1.30	39%		390kg/1000 litre
Nitroflo 28+S	28%	2.5%	1.29	36%	3.2%	360kg N 32kg SO <sub>3</sub> /1000 litre
Nitroflo 26+S	26%	5%	1.28	33.3%	6.4%	333kg N 64kg SO <sub>3</sub> /1000 litre
Nitroflo 24+S	24%	7.5%	1.27	30.5%	9.5%	305kg N 95kg SO <sub>3</sub> /1000 litre
Nitroflo 22+S	22%	10%	1.26	28%	12.5%	277kg N 126kg SO <sub>3</sub> /1000 litre
Nitroflo 20+S	20%	12.5%	1.25	25%	15.5%	250kg N 156kg SO <sub>3</sub> /1000 litre
Nitroflo 15+S	15%	15%	1.22	18%	18%	183kg N 183 kg SO <sub>3</sub> /1000 litre

# Products - OMEX Multiflo® NPKS Range

The Multiflo NPKS range of liquid fertilisers, including the innovative **M36+ products**, has been technically engineered to offer farmers the most efficient and effective range of NPKS fertilisers.

Multiflo ensures the crop gets off to the best start and ensures optimum nutrition levels thanks to its liquid composition, allowing easy uptake by the crop.

Multiflo boasts a 100% soluble form of P, derived from the highest quality sources, meaning farmers can rest assured their crops are receiving optimum levels of nutrition.

## True Liquid Compounds

The Multiflo range are true compounds, where each droplet contains the complete analysis of nutrients. As a result every square centimeter of crop is guaranteed to receive the required ratio of NPKS.

## Benefits:

From agronomical to economical, the Multiflo range has a variety of benefits for farmers:

- ✓ Improved accuracy
- ✓ Efficiency, instant uptake by the crop
- ✓ Application right up to the field margin
- ✓ No wastage (unused fertiliser is returned to the tank)
- ✓ Single person application
- ✓ 100% soluble P
- ✓ Dedicated tank storage, freeing up valuable farm storage
- ✓ No offloading with a forklift
- ✓ No plastic bag disposal

## Grades For Growth

The Multiflo® NPKS range has been developed with a variety of ratios to ensure a high quality grade is available for a multitude of growing scenarios. All grades are available with sulphur for improved efficiency:

N-P	N-K	NPK (eq.PK)	NPK (High P)	NPK (High K)
17-8-0	16-0-8	15-3.5-3.5	11.5-10-4	15-3.5-7.5
17-6-0	16-0-4	14-7-7	10.5-13.5-3.5	10-5-9
14-14-0	10-0-10	9-9-9	8-14.5-4.5	9-3-10
7-20-0	3.5-0-10	3.5-10-10	5.5-15-5	7-7-10
			3.5-10-6.5	7-3.5-10
				4.5-4.5-11
				4.5-7-10.5
				3-8-11
				2-6-12
				1-3-12.5

The FACTS qualified OMEX team will work with you to establish the most effective package for your crop and your farm.



## Multiflo Trial Results

As a science led industry leader, OMEX is committed to providing quality data for farmers to make the most efficient decisions for their farm.

Multiflo has demonstrated:

**£138/ha benefit in a seedbed potato trial**

**6t/ha yield increase in a salad potato trial**

**13.7 : 1 return on investment in an OSR trial**

## Example Multiflo Crop Programmes for Spring Application Based on Index 2 Soils

The flexibility of the Multiflo system means an infinite range of programmes can be simply developed to match exact field and crop requirements. Multiflo can supply the full nutritional requirement of the crop or, depending on the level of nutrition in the soil and provided from other sources, Multiflo accurately and sustainably makes up the balance of nutrition required. Some examples are below but speak to your FACTS Qualified Advisor to get tailored recommendations for your fields.

Crop	Multiflo	Rate	Kg/ha N-P-K	Notes
Carrots	7-7-10+S	950 l/ha	80-80-115	Top-dress N if required
	11.5-10-4+S	580 l/ha	80-70-30	Following 300 kg/ha Potash Plus
Early veg - placed	15-3.5-7.5+S	1250 l/ha	225-50-110	+24S injected or placed with cultivator
		700 l/ha	130-30-60	+24S injected or placed with cultivator
Main veg - placed	16-0-8+S	1200 l/ha	220-0-110	+24S injected or placed with cultivator
		700 l/ha	130-0-65	+24S injected or placed with cultivator
Grazing	17-8-0+S	300 l/ha	60-30-0	If staggers risk (1 <sup>st</sup> application)
Grazing	14-7-7+S	350 l/ha	60-30-30	Followed by Nitroflo N+S
Hay	10-5-9+S	600 l/ha	70-40-70	
Leeks	15-3.5-7.5+S	1250 l/ha	225-50-110	
Maize	17-6-0+S	730 l/ha	150-50-0	Balance P and K with MOP/FYM
Oilseed rape	9-9-9+S	450 l/ha	50-50-50	
Onions	10-5-9+S	1250 l/ha	150-75-140	
Potatoes	11.5-10-4+S	800 l/ha	115-100-40	Following 800 kg/ha Potash Plus top-dress with Nitroflo pre-emergence
		1250 l/ha	175-150-60	Example of higher rate application
Redbeet	9-3-6+S	2,400 l/ha	250-80-170	
Silage	15-3.5-7.5+S	550 l/ha	100-20-50	
Sugar beet	5.5-7.5-10.5+S	600 l/ha	40-50-80	Plus 400 kg/ha salt and Nitroflo N+S
	14-14-0+S	200 l/ha	35-35-0	On drill after 250 kg/ha Potash Plus + salt and Nitroflo N+S
Winter cereals	M36+ 7-7-10+S	850 l/ha	70-70-100	Straw removed
Winter cereals	M36+ 14-7-7+S	570 l/ha	100-50-50	Straw incorporated

**DIDIN is a unique nitrogen stabiliser. When added to fertiliser or organic manures and applied to the soil it controls the release of crop-available nitrogen. It allows nitrogen to be applied in a single dose, eliminating the need for repeated applications, saving both time and money. It increases yields and dramatically improves the value of winter-applied slurry and AD digestate.**

- Reduces growing costs
- Reduces nitrate leaching
- Improves value of slurry
- Improves yield and quality
- Simplifies nitrogen management
- Reduces the carbon footprint of applications



## DIDIN in the Soil

Ammonium and urea based nitrogen fertilisers need bacteria to convert them from being relatively immobile to the highly mobile and plant available nitrate form. DIDIN inhibits the activity of the soil bacteria that convert this ammonium-N into nitrate-N, helping reduce nitrate leaching and creating a phased release of crop available nitrogen. As soil temperatures increase and crop growth begins, DIDIN progressively releases more nitrate nitrogen into the soil. After the inhibition has ceased the DIDIN is totally converted to plant-available nitrogen, leaving no residues in the soil.

## DIDIN with Organic Manures and AD Digestate

DIDIN helps convert slurry, manure and the digestate from anaerobic digestion from being waste products into valuable fertilisers. It conserves the nitrogen through the winter, reducing the risk of nitrate leaching and phases the release of nitrate during the following spring and summer, reducing the requirement for additional nitrogen top-dressing. It also helps reduce losses of nitrous oxide following de-nitrification in waterlogged soils and increases crop yield and quality.

## DIDIN for Cereals

A single top-dressing with DIDIN allows the full season's nitrogen requirement to be applied in one simple application, at any time from the end of February to the end of March. The nitrogen is

gradually released as plant-available nitrate at a rate at which the crop can use it. Leaching losses of nitrate are minimised and the risk of denitrification losses of nitrous oxide is also significantly reduced. Since the nitrate for the crop is released from the soil, crop nutrition is maintained at an ideal level, regardless of dry or wet conditions. Conventional applications may remain on the surface in dry conditions, leading to nitrogen deficiency. In conditions when it is too wet to apply nitrogen the crop can also become deficient. With DIDIN, the nitrate is released gradually and consistently through all conditions, maintaining crop growth.

Extensive trials on winter wheat have shown that, in addition to application cost savings, the single nitrogen application with DIDIN produces an average yield increase of 0.5 t/ha, compared to split nitrogen application.

## DIDIN for Potatoes

Potatoes respond particularly well to application of stabilised nitrogen since most of the crop nitrogen requirement is applied immediately prior to planting. Crop uptake of the nitrogen does not start until 6-8 weeks later and, during wet spring conditions, some of the nitrogen applied can be leached beyond the shallow crop roots. The crop is also often heavily irrigated and the use of DIDIN helps prevent nitrate nitrogen being leached by excessive rates of irrigation.

## Application

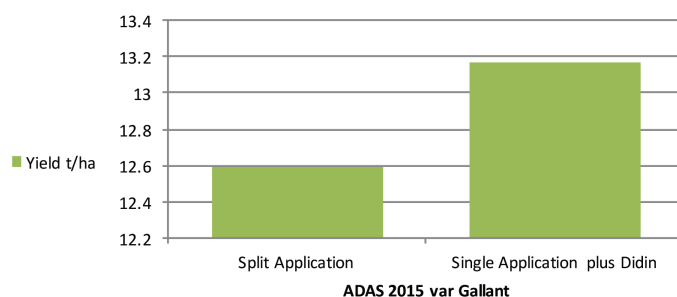
For use on grassland and most winter and spring grown crops including cereals and potatoes, the normal method of application is incorporation in liquid fertiliser. If applying to soil prior to application of solid fertiliser or slurry/FYM/AD digestate, apply in 200-400 litres/ha water (see label for specific volumes).

Fertiliser	Timing	Soil Type	Rate l/ha
Liquid Nitrogen Suspension fertiliser	Spring	Light Medium Heavy / Organic	12.5 10 6
Granular / liquid urea	Spring	Light Medium Heavy / Organic	10 8 6
Granular ammonium nitrate	Spring	Light Medium Heavy / Organic	12.5 10 8
Injected fertiliser	Spring	All types	6
Slurry / FYM / AD digestate	Autumn Winter Spring	All types All types All types	25 - 20 20 - 15 15 - 10

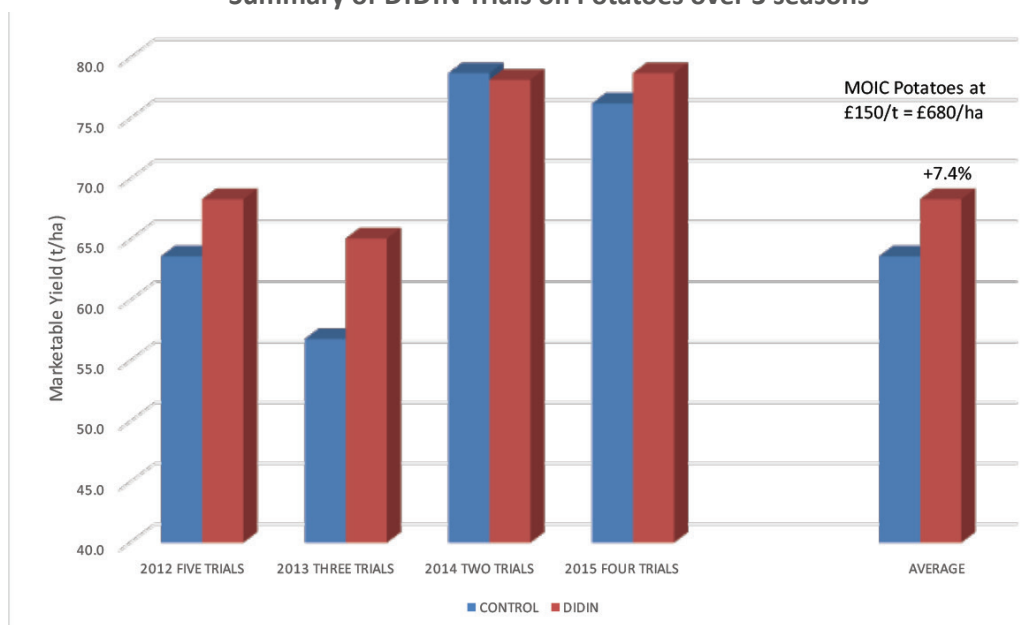
DIDIN is available pre-mixed in all OMEX liquid fertilisers and in 20 litre drums and 1000 litre IBCs.

The field of winter oats to the left received 120kg/ha of N with Nitroflo. The left half as a split dose, the right half as a single dose with DIDIN. On assessment, both halves are at the same growth stage, the difference is the flag leaves of the DIDIN treated half were on average 5cm longer and also wider. The picture was taken in June.

**Winter Wheat Yield 210kg/ha N**



**Summary of DIDIN Trials on Potatoes over 3 seasons**





**NitroShield is OMEX's innovative urease inhibitor. NitroShield reduces ammonia emissions by 70%+ meeting industry guidance and helping farmers grow more efficiently and sustainably.**

NitroShield has been rigorously tested and designed to help farmers reduce ammonia emissions and farm sustainably. From 2024, in England, applications of UAN liquid fertiliser made after 31st March must include an effective urease inhibitor, such as NitroShield, unless agronomic justification is provided by a FACTS qualified advisor.

OMEX has developed NitroShield to reduce ammonia emissions. The innovative new inhibitor reduces emissions by over 70% and meets the requirements of the Red Tractor Farm Assurance standard.

## Reducing Emissions

NitroShield contains NBPT and works by delaying the urease hydrolysis of urea, reducing the risk of ammonia losses. OMEX trials have consistently demonstrated reductions of over 70% in ammonia emissions.

NitroShield will help growers meet assurance standards whilst improving efficiency and ensuring they're using the most effective application rates.

## Research and Development of NitroShield

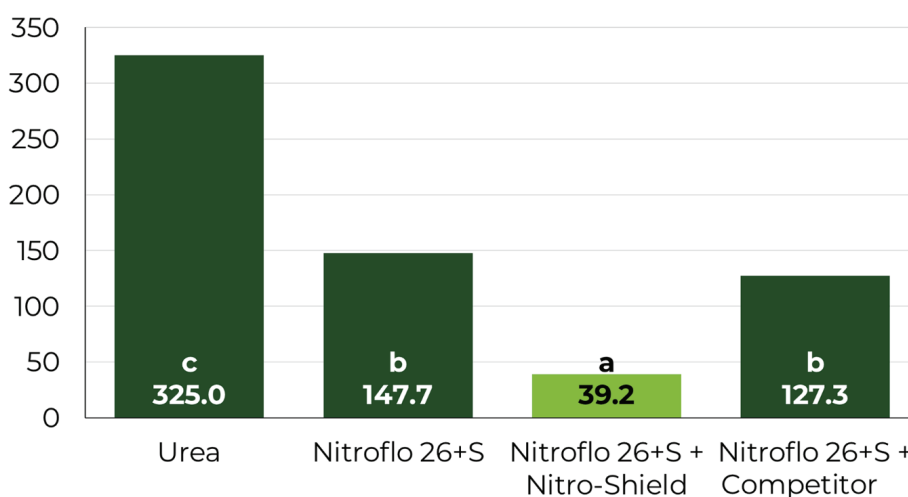
NitroShield has undergone years of rigorous testing. During these trials we've not only looked at how effectively NitroShield reduces emissions, but what the most efficient rate to use is. Alongside our field trials we've been continuously testing the product in the lab, capturing gas emissions which meet international standards with NitroShield consistently reducing ammonia losses by more than 70%.

We've also seen small yield increases when using the OMEX inhibitor, alongside NIAB trials showing a 0.3 t/ha increase in yield.

"Other inhibitors are available" but...

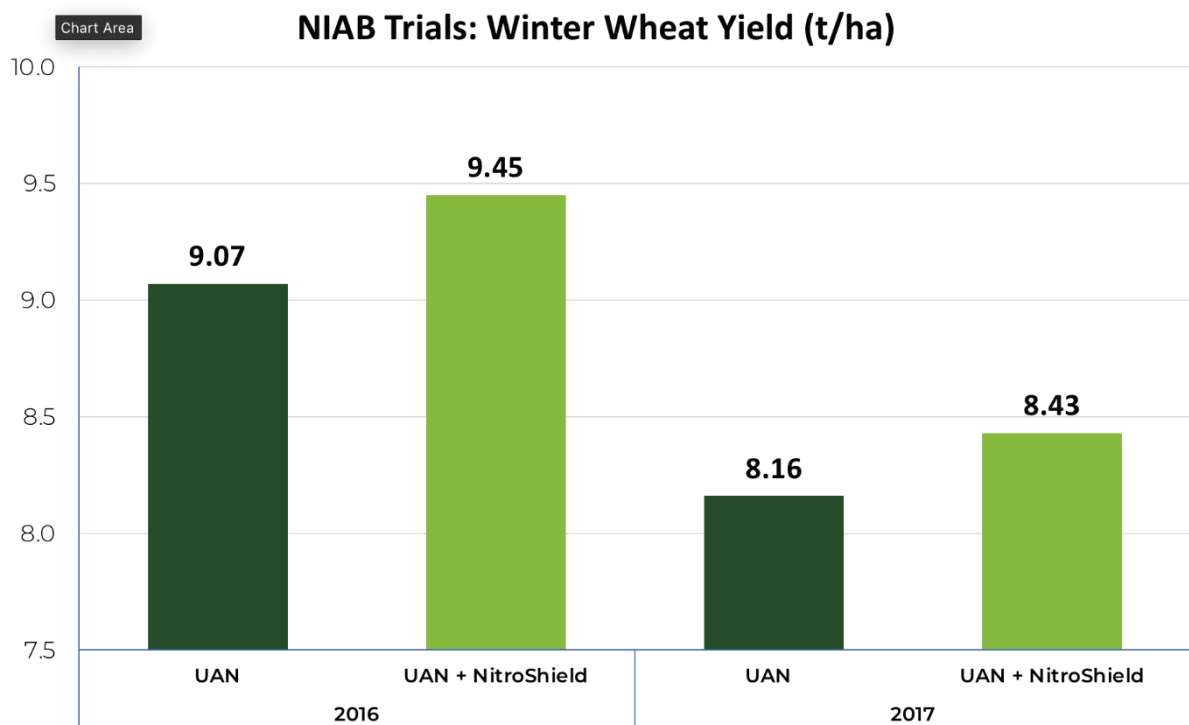
This trial demonstrated how effectively emissions were reduced when using NitroShield compared to a competitor product. The axis on the left represents ammonia emissions in ppm.

**OMEX experiment #5: Ammonia concentration (ppm)**



## NIAB Trials: UK 2016 & 2017

This trial demonstrated the improvement in yield when using the NitroShield urease inhibitor alongside the application of UAN liquid fertiliser, demonstrating an improvement in nitrogen use efficiency (NUE).



## Farmer Benefits of using NitroShield:

Grain yield in wheat trials from 30N + NitroShield v. 30N alone:

- ✓ • 2016, NIABTAG Morley, UK +400 kg/ha
- ✓ • 2017, NIABTAG Morley, UK +300 kg/ha
- ✓ • Mean of trials in UK, CZ, PL +330 kg/ha
- ✓ • 10 trials in France 2014-15 +0.2% Protein

Higher grain yield and protein = improved Nitrogen Use Efficiency

## Key NitroShield Facts:

- ✓ Reduces emissions by over 70%
- ✓ NIAB trials show a 0.3t/ha
- ✓ Increase in yield
- ✓ Meets international standards
- ✓ Safe for all agricultural crops
- ✓ Long shelf life before mixing
- ✓ Improved Nitrogen Use Efficiency

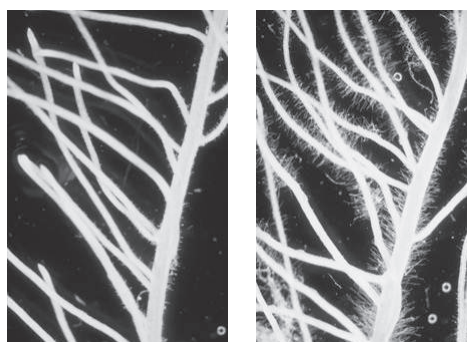
**Polymex is a unique phosphate enhancer that improves crop responses to phosphate in two ways. It delays the immobilisation of water soluble phosphate in the soil, protecting the beneficial water soluble phosphate from being locked up with calcium and magnesium in the soil from the normal few weeks up to six months and it increases the development of fine root hairs.**

Water soluble phosphate is critical for young plants. Young plants need phosphate for establishment and once it is locked up, the phosphate is much less available for these plants. Polymex therefore extends the response to freshly applied fertiliser and offers the opportunity to fine-tune phosphate rates.

Polymex also increases crop rooting, initially through the development of fine root hairs.

The increased rooting further improves the nutrition of the young plant and trials have shown increased tillering and nutrient uptake in winter wheat as a result, with up to an extra 2 tillers produced on Polymex-treated plants within a few weeks of emergence in low fertility situations.

The complete Multiflo® range is available with Polymex.

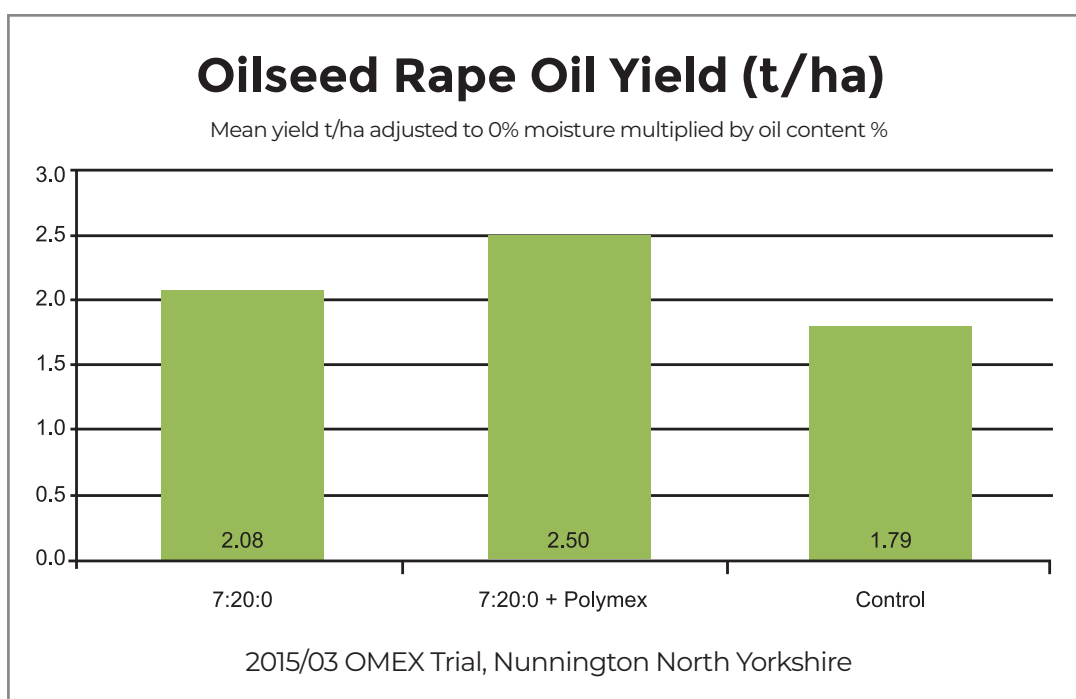


Magnified view shows root hairs on young wheat plants grown with low nutrients either without (left) or with (right) Polymex. (Photo, University of Illinois).



Increased rooting in plants grown with low nutrient supply, plus Polymex on the left. (Photo, University of Illinois).

The chart below shows oil yields from a crop of Oilseed Rape treated with Multiflo® starter fertiliser with Polymex, and untreated control (with no starter fertiliser).





# Protein Plus

**Protein Plus is a concentrated foliar urea solution used to enhance the grain protein content of milling wheat. There are two products available: Protein Plus containing 18%N w/w (approximately 20% w/v), and Protein Plus S containing 18%N and 5% SO<sub>3</sub> w/w (approximately 21% N 6% SO<sub>3</sub> w/v).**

- Foliar urea protein enhancer
- Provides double the protein increase of a “late bag” applied to the soil
- Simple to apply at the milky ripe stage
- Available with Kelpak to increase HFNs and yield



## Milling Wheat

In order to achieve a premium, most milling wheat contracts require a minimum 13% protein content. Since nitrogen is a key constituent of protein, it is important to manage applications effectively to produce the maximum level of protein in the grain. This means applying nitrogen late in the season, to ensure it is converted into protein.

## Soil Versus Foliar

When proteins are being formed, approximately 80% of the nitrogen in the crop is mobilised directly to the grain. It is therefore important to ensure that the crop contains a high level of nitrogen at this critical stage. Applying late season nitrogen to the soil (a “late bag”) is less effective than foliar application as it relies on receiving enough rainfall to move the nitrogen into the root-zone and it provides a less targeted boost to plant nitrogen levels.

## Foliar Flexibility

Since the nitrogen is applied at the time of crop requirement, the rate can be fine tuned for season and response potential. For example, if yields are likely to be high, additional nitrogen can be provided to ensure protein levels are maintained.



## Protein Quality and Sulphur

Sulphur is an important nutrient for milling wheat. As well as helping improve the utilisation of the nitrogen applied, sulphur forms the links in the protein chains that help to create a stretchy, quality dough that goes on to produce good loaf volume on baking.

Protein Plus is available with sulphur to help ensure there is sufficient sulphur available to create the quality proteins required.



## Flour Quality

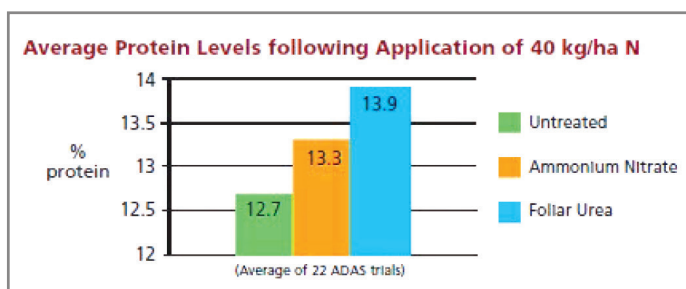
A series of HGCA funded trials demonstrated that the quality of the protein formed after application of foliar urea is better than that produced from late season soil applied nitrogen. In baking tests, loaf volume (a key indicator of protein quality) was significantly higher with foliar urea application than soil applied nitrogen.

## Hagberg Falling Number

It is possible to improve the HFN in crops by including a low dose of Kelpak with the application of Protein Plus. Kelpak protects crops from losing HFN and has also been shown to increase yield when tank-mixed with Protein Plus. Kelpak can also help reduce the risk of scorch from applications in stress conditions.

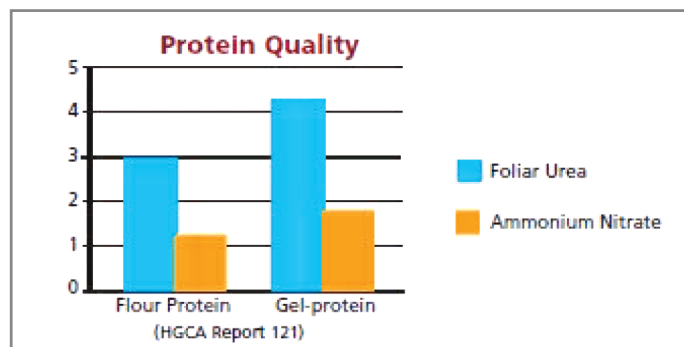
## Application

Protein Plus is applied at the milky ripe grain stage by conventional sprayer with fan jets. Best results are achieved from early morning or late evening application, when the nitrogen is rapidly absorbed and utilised by the crop.



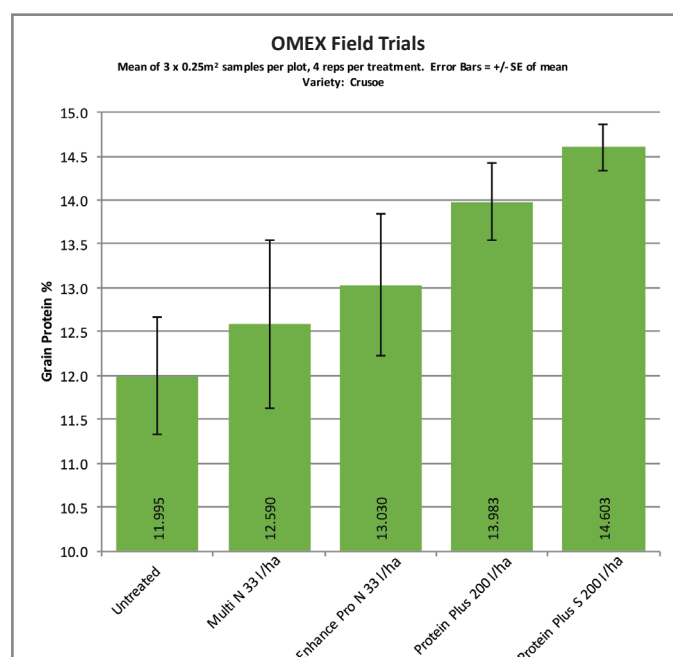
## Trials Results

A large series of trials comparing soil with foliar application demonstrated the increased effectiveness and reliability of Protein Plus application. Foliar urea products, such as Protein Plus, produced twice the increase in protein than that achieved by soil application.



## Application Chart for Protein Plus & Protein Plus S

kg/ha N	l/ha Protein Plus	l/ha Protein Plus S
10	50	48
15	75	73
20	100	97
25	125	121
30	150	145
35	175	169
40	200	193
45	225	217
50	250	242



# Oilseed Extra

**OMEX Oilseed Extra is a unique concentrated foliar nutrient, formulated with crop safeners and uptake enhancers, plus macro and micronutrients designed to increase the yield of all varieties of winter and spring oilseed rape.**

- Yield booster for all varieties of winter and spring OSR
- Simple to apply foliar application
- Complete nutrient formulation
- Provides up to 10:1 return on investment



## Oilseed Rape Canopy Management

For optimal yields, the oilseed rape crop should be managed to avoid over-dense canopies. Excessive leaf area can shade flowers, leading to less seed and pod numbers and reduced yield. However, reducing nitrogen rates in response to reduced Green Area Index can mean that the canopy senesces prematurely; again leading to lost yield potential.

Applying nitrogen to the soil later in the season may reduce the risk of creating an excessively leafy canopy, but, if the application is left too late it can result in reduced uptake into the crop and an increased risk of nitrate leaching from the

unused nitrogen. After flowering, the oilseed rape crop takes up little nitrogen from the soil, but the nitrogen is still required to maintain the canopy which is needed in order to fix sunlight and produce oil.

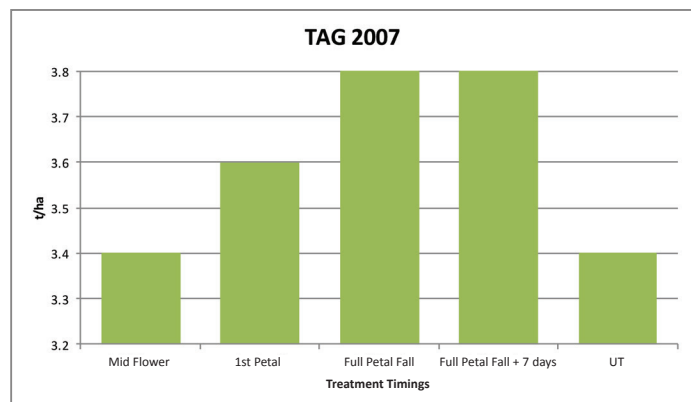
## Oilseed Extra - Foliar Yield Booster

Oilseed Extra provides foliar nutrition to the crop to boost crop performance, maintaining the canopy and feeding the crop while seeds are filling and oil is being produced. The application is not a replacement for soil applied nitrogen but provides an additional 'shot in the arm' for the crop, previously unavailable with conventional nitrogen applications.

## Application

**Oilseed Extra should be applied at 200 l/ha after full petal-fall with a fine to medium spray quality.**

The application can be made undiluted during the early morning or late evening, or with 100 l/ha water for applications during the day. If a fungicide or aphicide application is required at the same time, the two jobs can usually be conveniently combined into one pass, saving time and money.



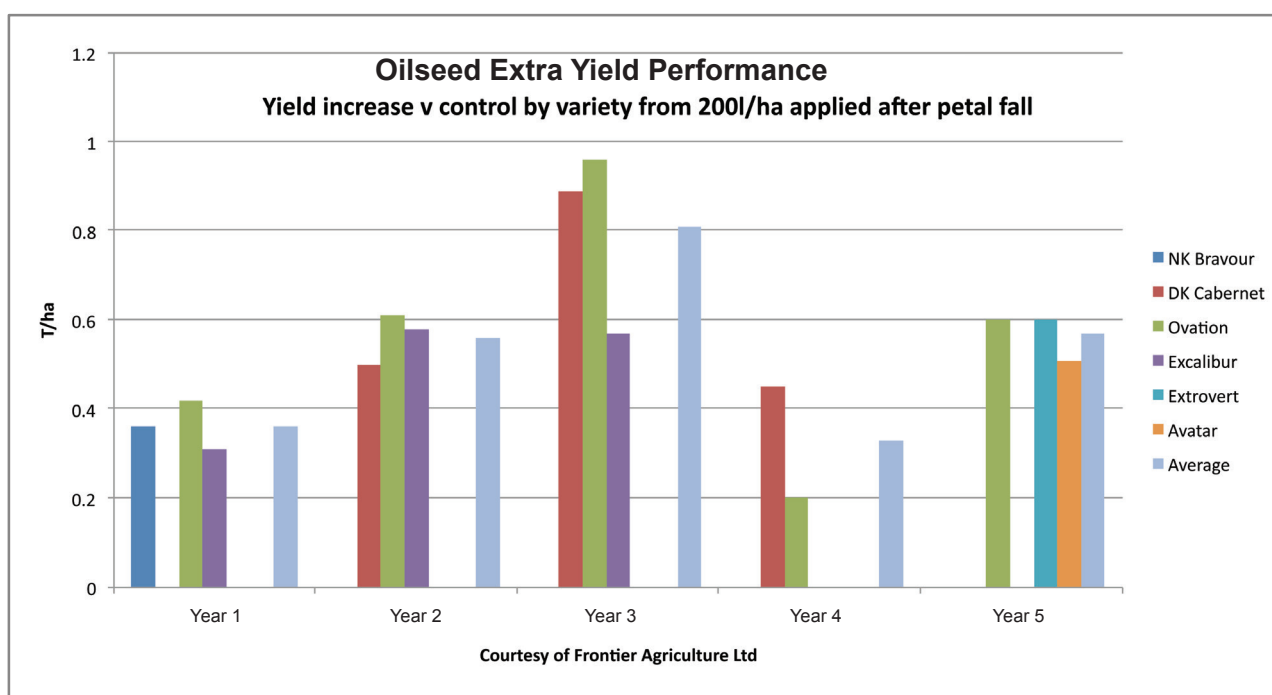
## Advanced Formulation

The formulation of the foliar application is important. Trials comparing the complete nutrient formulation of Oilseed Extra with simple foliar urea applications have shown double the yield increase from the Oilseed Extra application.

As well as containing nitrogen, Oilseed Extra also contains magnesium, micronutrients and a biostimulant. Magnesium is an important nutrient for oilseed rape as it helps transport photosynthates in the plant and is a component of the enzyme, Rubisco, which facilitates oil production in oilseeds. Copper and molybdenum, applied post flowering, have been shown to increase the oil content of rape seed and Oilseed Extra also contains manganese, zinc and sulphur. This complete formulation provides the best possible yield response, up to 1.17t/ha in trials.

## Trial Results

The average yield response to Oilseed Extra application over a 9 year period from a wide range of trial sites and varieties is 0.61 tonnes/ha. The following graph shows the response to two rates of Oilseed Extra (OSE) and foliar nitrogen (Protein Plus), demonstrating the benefit of the advanced formulation of Oilseed Extra compared to simple urea sprays.





# Sulphur

**Sulphur is a vital element for plants and is required in similar amounts to phosphate in most crops.**

Sulphur deposition has decreased dramatically throughout the UK over the last 30 years, as a result of the Clean Air Act. Deficiencies of this vital element are now visible in many areas of the UK. Where deposition is less than 10kg/ha/year most crops will benefit from applications of fertiliser containing sulphur.

Responses to sulphur vary according to soil type, with high yield responses of over 25% possible from winter wheat on sandy soils. The level of response is affected by over winter rainfall on loam and coarse silty soils, with high rainfall increasing the likelihood of a significant yield increase. Clay, fine silts and organic soils have a lower likelihood of yield responses, except in areas with medium to high winter rainfall, where there is a medium chance of a yield response.

## How much to Apply

The continued reduction in sulphur deposition means that many rural areas of the UK currently receive less than around 5 kg/ha of S from the atmosphere. The following recommendation take this into account.

## Oilseed Rape

Most oilseed rape crops require a minimum 100kg/ha  $\text{SO}_3$  sulphur. Crops therefore require an application of 75 - 100 kg/ha of  $\text{SO}_3$ .

## Cereals

Cereals require approximately 60kg/ha  $\text{SO}_3$  of sulphur and much of East Anglia and many areas

in the North East are at medium risk of sulphur deficiency. Crops in these areas therefore require approximately 50 kg/ha  $\text{SO}_3$  sulphur.

## Maize

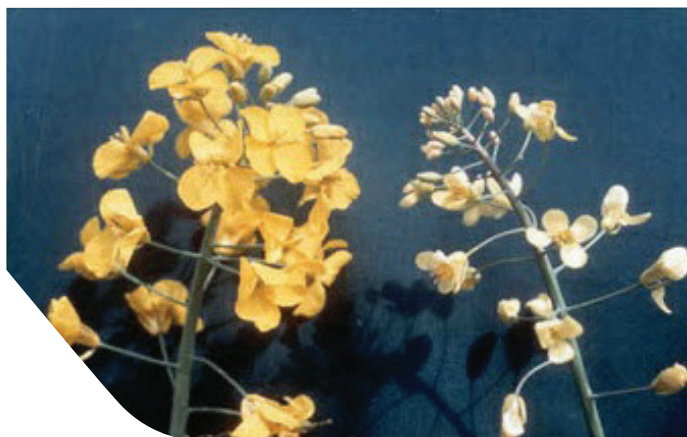
Historically, maize was grown in rotations with often large inputs of manure and slurry, which usually provided sufficient sulphur for the crop. With maize being increasingly grown outside livestock areas it is important to consider the sulphur requirement of the crop and an application of 50-75 kg/ha  $\text{SO}_3$  particularly on light soils is usually required.

## Vegetables

Most brassica crops have a relatively high requirement for sulphur and adequate levels of sulphur are required for improved taste in a number of vegetable crops. Sulphur is also required to ensure efficient nitrogen utilisation in vegetable crops, with deficiency often resulting in reduced nitrogen responses. Application of 40-50 kg/ha  $\text{SO}_3$  is recommended in responsive situations.

## Grassland

Sulphur deficiency reduces the yield and quality potential of grassland and is exacerbated by high forage removal rates. Responsive crops require approximately 40 kg/ha  $\text{SO}_3$ . Top-dressing with Nitroflo 20+S provides immediately available sulphur to supply the crops needs.



Sulphur deficiency (right) in oilseed rape



Sulphur deficiency in winter wheat

# Starter Fertilisers

Minimum cultivation establishment techniques for oilseed rape offer an ideal opportunity to place a starter fertiliser in the root zone of the establishing plant.

To ensure that a crop gets off to a good start, it needs feeding. The best way to do this is to place a starter fertiliser precisely where it is required, effectively creating a nutrient rich seedbed for the crop. OMEX Multiflo® fertilisers offer the most effective means of accurately placing nutrients with 100% solubility in the right place for the emerging seedling.

OMEX Multiflo® starter fertilisers are also ideal for placement on drills for other crops, such as cereals, maize, and sugar beet.

## Advantages of Multiflo® liquid starter fertilisers

- Major saving in autumn nitrogen requirement, up to 75%
- All of nitrogen captured by crop, reducing risk of leaching loss
- Fully soluble phosphate
- No dust, no blockages
- Precise targeting of nutrients
- Flexibility to work well within NVZ nitrogen limits
- Available with Polymex

## Products and Recommendations

Tables below show application rates in l/ha to apply 20-60kg/ha of N:

14-14-0		Percent of Field Covered by Fertiliser Bands				
kg/ha Applied In the Band		10%	20%	25%	33%	50%
N	P <sub>2</sub> O <sub>5</sub>	Application rate l/ha				
30	30	18	35	44	71	88
40	40	24	47	59	94	118
50	50	29	59	74	118	147
60	60	35	71	88	141	176
14-14-0		17 kg N & P <sub>2</sub> O <sub>5</sub> per 100 litres of product				

7-20-0		Percent of Field Covered by Fertiliser Bands				
kg/ha Applied In the Band		10%	20%	25%	33%	50%
N	P <sub>2</sub> O <sub>5</sub>	Application rate l/ha				
20	57	22	44	56	73	111
30	86	33	67	83	110	167
40	114	44	89	111	147	222
50	143	56	111	139	183	278
7-20-0		9 kg N per 100 litres of product 25 kg P <sub>2</sub> O <sub>5</sub> per 100 litres of product				

17-8-0		Percent of Field Covered by Fertiliser Bands				
kg/ha Applied In the Band		10%	20%	25%	33%	50%
N	P <sub>2</sub> O <sub>5</sub>	Application rate l/ha				
30	14	14	29	36	57	71
40	19	19	38	48	63	95
50	24	24	48	60	79	119
60	28	29	57	71	94	143
17-8-0		21 kg N per 100 litres of product 10 kg P <sub>2</sub> O <sub>5</sub> per 100 litres of product				



No Fertiliser



15kg/ha N



30kg/ha N

## Products and Recommendations

**Multiflo® 17-8-0:** contains approximately 21 kg nitrogen and 10 kg phosphate per 100 litres product. For use where a phosphate starter effect is required.

**Multiflo® 14-14-0:** contains approximately 17 kg nitrogen and 17 kg phosphate per 100 litres product. Provides greater starter effect.

**Multiflo® 7-20-0:** contains approximately 9 kg nitrogen and 25 kg phosphate per 100 litres product. Traditional starter fertiliser, provides full starter rate of phosphate.

All products are available with Polymex.

Tables below show kg of nutrient applied in the band at various application rates.

14-14-0 N & P <sub>2</sub> O <sub>5</sub>	Percent of Field Covered by Fertiliser Bands				
Application Rate l/ha	10%	20%	25%	33%	50%
kg/ha N and P <sub>2</sub> O <sub>5</sub> Applied in the Band					
30	51	26	20	15	10
40	68	34	27	21	14
50	85	43	34	26	17
60	102	51	41	31	20
14-14-0: 17 kg N & P <sub>2</sub> O <sub>5</sub> per 100 litres of product					

17-8-0 P <sub>2</sub> O <sub>5</sub>	Percent of Field Covered by Fertiliser Bands				
Application Rate l/ha	10%	20%	25%	33%	50%
kg/ha P <sub>2</sub> O <sub>5</sub> Applied in the Band					
30	30	15	12	9	6
40	40	20	16	12	8
50	50	25	20	15	10
60	60	30	24	18	12
17-8-0: 10 kg P <sub>2</sub> O <sub>5</sub> per 100 litres of product					

7-20-0 P <sub>2</sub> O <sub>5</sub>	Percent of Field Covered by Fertiliser Bands				
Application Rate l/ha	10%	20%	25%	33%	50%
kg/ha P <sub>2</sub> O <sub>5</sub> Applied in the Band					
30	75	38	30	23	15
40	100	50	40	30	20
50	125	63	50	38	25
60	150	75	60	45	30
7-20-0 25 kg P <sub>2</sub> O <sub>5</sub> per 100 litres of product					

17-8-0 N	Percent of Field Covered by Fertiliser Bands				
Application Rate l/ha	10%	20%	25%	33%	50%
kg/ha N Applied in the Band					
30	63	32	25	19	13
40	84	42	34	25	17
50	105	53	42	32	21
60	126	63	50	38	25
17-8-0: 21 kg N per 100 litres of product					

7-20-0 N	Percent of Field Covered by Fertiliser Bands				
Application Rate l/ha	10%	20%	25%	33%	50%
kg/ha N Applied in the Band					
30	27	14	11	8	5
40	36	18	14	11	7
50	45	23	18	14	9
60	54	27	22	16	11
7-20-0 9 kg N per 100 litres of product					





# Application Charts – Nitroflo Range

## Nitroflo 30: 30% N

kg/ha N	l/ha	kg/ha N	l/ha
25	64	110	282
30	77	115	295
35	90	120	308
40	103	125	321
45	115	130	333
50	128	135	346
55	141	140	359
60	154	145	372
65	167	150	385
70	180	155	397
75	192	160	410
80	205	165	423
85	218	170	436
90	231	175	449
95	244	180	462
100	256	185	474
105	269	190	487

Specific Gravity (SG): 1.30

## Nitroflo 28+S: 28% N+2.5% SO<sub>3</sub>

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	2	69
30	3	83
35	3	97
40	4	111
45	4	125
50	4	138
55	5	152
60	5	166
65	6	180
70	6	194
75	7	208
80	7	221
85	8	235
90	8	249
95	8	263
100	9	277
105	9	291

Specific Gravity (SG): 1.29

## Nitroflo 26+S: 26% N+5% SO<sub>3</sub>

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
110	10	305
115	10	318
120	11	332
125	11	346
130	12	360
135	12	374
140	13	388
145	13	401
150	13	415
155	14	429
160	14	443
165	15	457
170	15	471
175	16	484
180	16	498
185	17	512
190	17	526

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	5	75
30	6	90
35	7	105
40	8	120
45	9	135
50	10	150
55	11	165
60	12	180
65	13	195
70	14	210
75	14	225
80	15	240
85	16	255
90	17	270
95	18	286
100	19	301
105	20	316

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
110	21	331
115	22	346
120	23	361
125	24	376
130	25	391
135	26	406
140	27	421
145	28	436
150	29	451
155	30	466
160	31	481
165	32	496
170	33	511
175	34	526
180	35	541
185	36	556
190	37	571

Specific Gravity (SG): 1.28

Please note that the SG varies slightly with temperature

Apply with appropriate nozzles

Avoid application during very windy weather or when the leaf is damp

Do not apply on a rime frost or following severe frost

**Nitroflo 24+S: 24% N+7.5% SO<sub>3</sub>**

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	8	82
30	9	98
35	11	115
40	13	131
45	14	148
50	16	164
55	17	180
60	19	197
65	20	213
70	22	230
75	23	246
80	25	262
85	27	279
90	28	295
95	30	312
100	31	328
105	33	344

**Specific Gravity (SG): 1.27****Nitroflo 22+S: 22% N+10% SO<sub>3</sub>**

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	11	91
30	14	109
35	16	129
40	18	145
45	20	163
50	23	181
55	25	199
60	27	217
65	30	235
70	32	253
75	34	271
80	36	289
85	39	307
90	41	325
95	43	343
100	45	361
105	48	379

**Specific Gravity (SG): 1.26****Nitroflo 20+S: 20% N+12.5% SO<sub>3</sub>**

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	16	100
30	19	120
35	22	140
40	25	160
45	28	180
50	31	200
55	34	220
60	38	240
65	41	260
70	44	280
75	47	300
80	50	320
85	53	340
90	56	360
95	59	380
100	63	400
105	66	420

**Specific Gravity (SG): 1.25****Nitroflo 15+S: 15% N+15% SO<sub>3</sub>**

kg/ha N	kg/ha SO <sub>3</sub>	l/ha
25	25	137
30	30	164
35	35	191
40	40	219
45	45	246
50	50	273
55	55	301
60	60	328
65	65	355
70	70	383
75	75	410
80	80	437
85	85	465
90	90	492
95	95	519
100	100	547
105	105	574

**Specific Gravity (SG): 1.22**

Please note that the SG varies slightly with temperature

Apply with appropriate nozzles

Avoid application during very windy weather or when the leaf is damp

Do not apply on a rime frost or following severe frost



# Application Charts – Multiflo Range

**MULTIFLO 17-8-0+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
5	2	24
10	5	47
15	7	71
20	9	95
25	12	119
30	14	142
35	16	166
40	19	190
45	21	213
50	24	237
55	26	261
60	28	285
65	31	308
70	33	332
75	35	356
80	38	380
85	40	403
90	42	427
95	45	451
100	47	474

Specific Gravity (SG): 1.24

**MULTIFLO 17-6-0+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
5	2	24
10	4	48
15	5	72
20	7	96
25	9	120
30	11	143
35	12	167
40	14	191
45	16	215
50	18	239
55	19	263
60	21	287
65	23	311
70	25	335
75	26	359
80	28	383
85	30	407
90	32	430
95	34	454
100	35	478

Specific Gravity (SG): 1.23

**MULTIFLO 14-14-0+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
5	5	29
10	10	57
15	15	86
20	20	114
25	25	143
30	30	171
35	35	200
40	40	229
45	45	257
50	50	286
55	55	314
60	60	343
65	65	371
70	70	400
75	75	429
80	80	457
85	85	486
90	90	514
95	95	543
100	100	571

Specific Gravity (SG): 1.25

**MULTIFLO 7-20-0+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
2	5	20
4	10	41
5	15	61
7	20	81
9	25	102
11	30	122
12	35	142
14	40	163
16	45	183
18	50	203
19	55	224
21	60	244
23	65	264
25	70	285
26	75	305
28	80	325
30	85	346
32	90	366
33	95	386
35	100	407

Specific Gravity (SG) 1.23

**MULTIFLO 16-0-8+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
10	5	52
20	10	104
30	15	156
40	20	208
50	25	260
60	30	313
70	35	365
80	40	417
90	45	469
100	50	521
110	55	573
120	60	625
130	65	677
140	70	729
150	75	781
160	80	833
170	85	885
180	90	938
190	95	990
200	100	1042

Specific Gravity (SG) 1.20

**MULTIFLO 16-0-4+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
10	3	54
20	5	108
30	8	162
40	10	216
50	13	269
60	15	323
70	18	377
80	20	431
90	23	485
100	25	539
110	28	593
120	30	647
130	33	700
140	35	754
150	38	808
160	40	862
170	43	916
180	45	970
190	48	1024
200	50	1078

Specific Gravity (SG) 1.16

**MULTIFLO 10-0-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
10	10	85
20	20	169
30	30	254
40	40	339
50	50	424
60	60	508
70	70	593
80	80	678
90	90	763
100	100	847
110	110	932
120	120	1017
130	130	1102
140	140	1186
150	150	1271
160	160	1356
170	170	1441
180	180	1525
190	190	1610
200	200	1695

Specific Gravity (SG) 1.18

**MULTIFLO 3.5-0-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	L/ha
4	10	86
7	20	172
11	30	259
14	40	345
18	50	431
21	60	517
25	70	603
28	80	690
32	90	776
35	100	862
39	110	948
42	120	1034
46	130	1121
49	140	1207
53	150	1293
56	160	1379
60	170	1466
63	180	1552
67	190	1638
70	200	1724

Specific Gravity (SG) 1.16

**MULTIFLO 15-3.5-3.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	2	2	56
20	5	5	113
30	7	7	169
40	9	9	226
50	12	12	282
60	14	14	339
70	16	16	395
80	19	19	452
90	21	21	508
100	23	23	565
110	26	26	621
120	28	28	678
130	30	30	734
140	33	33	791
150	35	35	847
160	37	37	904
170	40	40	960
180	42	42	1017
190	44	44	1073
200	47	47	1130

**Specific Gravity (SG) 1.18****MULTIFLO 14-7-7+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	5	5	58
20	10	10	115
30	15	15	173
40	20	20	230
50	25	25	288
60	30	30	346
70	35	35	403
80	40	40	461
90	45	45	518
100	50	50	576
110	55	55	634
120	60	60	691
130	65	65	749
140	70	70	806
150	75	75	864
160	80	80	922
170	85	85	979
180	90	90	1037
190	95	95	1094
200	100	100	1152

**Specific Gravity (SG) 1.24****MULTIFLO 9-9-9+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	10	10	89
20	20	20	178
30	30	30	267
40	40	40	356
50	50	50	444
60	60	60	533
70	70	70	622
80	80	80	711
90	90	90	800
100	100	100	889
110	110	110	978
120	120	120	1067
130	130	130	1156
140	140	140	1244
150	150	150	1333
160	160	160	1422
170	170	170	1511
180	180	180	1600
190	190	190	1689
200	200	200	1778

**Specific Gravity (SG) 1.25****MULTIFLO 3.5-10-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
4	10	10	81
7	20	20	163
11	30	30	244
14	40	40	325
18	50	50	407
21	60	60	488
25	70	70	569
28	80	80	650
32	90	90	732
35	100	100	813
39	110	110	894
42	120	120	976
46	130	130	1057
49	140	140	1138
53	150	150	1220
56	160	160	1301
60	170	170	1382
63	180	180	1463
67	190	190	1545
70	200	200	1626

**Specific Gravity (SG) 1.23****MULTIFLO 11.5-10-4+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	9	3	72
20	17	7	144
30	26	10	216
40	35	14	287
50	43	17	359
60	52	21	431
70	61	24	503
80	70	28	575
90	78	31	647
100	87	35	719
110	96	38	791
120	104	42	862
130	113	45	934
140	122	49	1006
150	130	52	1078
160	139	56	1150
170	148	59	1222
180	157	63	1294
190	165	66	1365
200	174	70	1437

**Specific Gravity (SG): 1.21****MULTIFLO 10.5-13.5-3.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
8	10	3	60
16	20	5	120
23	30	8	181
31	40	10	241
39	50	13	301
47	60	16	361
54	70	18	422
62	80	21	482
70	90	23	542
78	100	26	602
86	110	29	662
93	120	31	723
101	130	34	783
109	140	36	843
117	150	39	903
124	160	41	964
132	170	44	1024
140	180	47	1084
148	190	49	1144
156	200	52	1204

**Specific Gravity (SG) 1.23****MULTIFLO 8-14.5-4.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
6	10	3	56
11	20	6	111
17	30	9	167
22	40	12	222
28	50	16	278
33	60	19	334
39	70	22	389
44	80	25	445
50	90	28	501
55	100	31	556
61	110	34	612
66	120	37	667
72	130	40	723
77	140	43	779
83	150	47	834
88	160	50	890
94	170	53	945
99	180	56	1001
105	190	59	1057
110	200	62	1112

**Specific Gravity (SG) 1.24****MULTIFLO 5.5-15-5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
4	10	3	54
7	20	7	108
11	30	10	163
15	40	13	217
18	50	17	271
22	60	20	325
26	70	23	379
29	80	27	434
33	90	30	488
37	100	33	542
40	110	37	596
44	120	40	650
48	130	43	705
51	140	47	759
55	150	50	813
59	160	53	867
62	170	57	921
66	180	60	976
70	190	63	1030
73	200	67	1084

**Specific Gravity (SG) 1.23**

# Application Charts – Multiflo Range

**MULTIFLO 3.5-10-6.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
4	10	7	84
7	20	13	168
11	30	20	252
14	40	26	336
18	50	33	420
21	60	39	504
25	70	46	588
28	80	52	672
32	90	59	756
35	100	65	840
39	110	72	924
42	120	78	1008
46	130	85	1092
49	140	91	1176
53	150	98	1261
56	160	104	1345
60	170	111	1429
63	180	117	1513
67	190	124	1597
70	200	130	1681

Specific Gravity (SG) 1.19

**MULTIFLO 15-3.5-7.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	2	5	55
20	5	10	109
30	7	15	164
40	9	20	219
50	12	25	273
60	14	30	328
70	16	35	383
80	19	40	437
90	21	45	492
100	23	50	546
110	26	55	601
120	28	60	656
130	30	65	710
140	33	70	765
150	35	75	820
160	37	80	874
170	40	85	929
180	42	90	984
190	44	95	1038
200	47	100	1093

Specific Gravity (SG) 1.22

**MULTIFLO 10-5-9+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
10	5	9	83
20	10	18	165
30	15	27	248
40	20	36	331
50	25	45	413
60	30	54	496
70	35	63	579
80	40	72	661
90	45	81	744
100	50	90	826
110	55	99	909
120	60	108	992
130	65	117	1074
140	70	126	1157
150	75	135	1240
160	80	144	1322
170	85	153	1405
180	90	162	1488
190	95	171	1570
200	100	180	1653

Specific Gravity (SG) 1.21

**MULTIFLO 9-3-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
9	3	10	83
18	7	20	167
27	10	30	250
36	13	40	333
45	17	50	417
54	20	60	500
63	23	70	583
72	27	80	667
81	30	90	750
90	33	100	833
99	37	110	917
108	40	120	1000
117	43	130	1083
126	47	140	1167
135	50	150	1250
144	53	160	1333
153	57	170	1417
162	60	180	1500
171	63	190	1583
180	67	200	1667

Specific Gravity (SG) 1.20

**MULTIFLO 7-7-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
7	7	10	82
14	14	20	164
21	21	30	246
28	28	40	328
35	35	50	410
42	42	60	492
49	49	70	574
56	56	80	656
63	63	90	738
70	70	100	820
77	77	110	902
84	84	120	984
91	91	130	1066
98	98	140	1148
105	105	150	1230
112	112	160	1311
119	119	170	1393
126	126	180	1475
133	133	190	1557
140	140	200	1639

Specific Gravity (SG) 1.22

**MULTIFLO 7-3.5-10+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
7	4	10	84
14	7	20	168
21	11	30	252
28	14	40	336
35	18	50	420
42	21	60	504
49	25	70	588
56	28	80	672
63	32	90	756
70	35	100	840
77	39	110	924
84	42	120	1008
91	46	130	1092
98	49	140	1176
105	53	150	1261
112	56	160	1345
119	60	170	1429
126	63	180	1513
133	67	190	1597
140	70	200	1681

Specific Gravity (SG) 1.19

**MULTIFLO 4.5-4.5-11+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
4	4	10	76
8	8	20	152
12	12	30	227
16	16	40	303
20	20	50	379
25	25	60	455
29	29	70	530
33	33	80	606
37	37	90	682
41	41	100	758
45	45	110	833
49	49	120	909
53	53	130	985
57	57	140	1061
61	61	150	1136
65	65	160	1212
70	70	170	1288
74	74	180	1364
78	78	190	1439
82	82	200	1515

Specific Gravity (SG) 1.20

**MULTIFLO 4.5-7-10.5+S**

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
4	7	10	79
8	13	20	157
12	20	30	236
16	27	40	315
20	33	50	394
25	40	60	472
29	47	70	551
33	53	80	630
37	60	90	708
41	67	100	787
45	73	110	866
49	80	120	945
53	87	130	1023
57	93	140	1102
61	100	150	1181
65	107	160	1259
70	113	170	1338
74	120	180	1417
78	127	190	1495
82	133	200	1574

Specific Gravity (SG) 1.21

### MULTIFLO 3-8-11+S

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
3	7	10	75
5	15	20	150
8	22	30	225
11	29	40	301
14	36	50	376
16	44	60	451
19	51	70	526
22	58	80	601
25	65	90	676
27	73	100	751
30	80	110	826
33	87	120	902
35	95	130	977
38	102	140	1052
41	109	150	1127
44	116	160	1202
46	124	170	1277
49	131	180	1352
52	138	190	1427
55	145	200	1503

Specific Gravity (SG) 1.21

### MULTIFLO 2-6-12+S

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
2	5	10	68
3	10	20	137
5	15	30	205
7	20	40	273
8	25	50	342
10	30	60	410
12	35	70	478
13	40	80	546
15	45	90	615
17	50	100	683
18	55	110	751
20	60	120	820
22	65	130	888
23	70	140	956
25	75	150	1025
27	80	160	1093
28	85	170	1161
30	90	180	1230
32	95	190	1298
33	100	200	1366

Specific Gravity (SG) 1.22

### MULTIFLO 1-3-12.5+S

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
1	2	10	68
2	5	20	136
2	7	30	203
3	10	40	271
4	12	50	339
5	14	60	407
6	17	70	475
6	19	80	542
7	22	90	610
8	24	100	678
9	26	110	746
10	29	120	814
10	31	130	881
11	34	140	949
12	36	150	1017
13	38	160	1085
14	41	170	1153
14	43	180	1220
15	46	190	1288
16	48	200	1356

Specific Gravity (SG) 1.18

### MULTIFLO 8-6.5-9.5+S

kg/ha N	kg/ha P <sub>2</sub> O <sub>5</sub>	kg/ha K <sub>2</sub> O	L/ha
8	7	10	86
17	14	20	171
25	21	30	257
34	27	40	342
42	34	50	428
51	41	60	513
59	48	70	599
67	55	80	685
76	62	90	770
84	68	100	856
93	75	110	941
101	82	120	1027
109	89	130	1113
118	96	140	1198
126	103	150	1284
135	109	160	1369
143	116	170	1455
152	123	180	1540
160	130	190	1626
168	137	200	1712

Specific Gravity (SG) 1.23





# Application Bars & Nozzles

A range of streamer caps and streamer bars are available for applying liquid nitrogen to emerged crops. They vary from simple caps to advanced, self-contained streamer bars. Check with suppliers for latest prices

## **Spraying Systems (TeeJet) Jet Stream**

A simple cap producing 3 divergent vertical streams. Rate is altered by varying pressure and metering disc.

## **Lechler FD Fertiliser Nozzle**

A novel, low pressure deflector nozzle, producing a horizontal fan pattern of coarse droplets with no 'fines'. Even distribution (no streams) and flexible application rates (operate at pressure of 2-4 bar).

## **Spraying Systems (TeeJet) Stream Jet**

A 5-stream jet which produces a 'rain-effect' pattern across the boom. A recent change is that the jet body is now integral with metering disc, so different coloured bodies are used for different rates; no need to change metering discs.

## **Hypro Fastcap® ESI**

6-stream cap, with streams directed down onto crop, claimed to produce a low-atomisation stream of nitrogen. Supplied as nozzle+metering orifice with two nozzles required to cover most application rates. Supplied in a box of 6 nozzles.

## **Hardi Quintastream**

Produce 5 semi-vertical streams, each stream engineered to create an accurate and even application on the crop. They come with Hardi jet bodies but can be adapted to Teejet bodies by removing the nozzle insert from the body and mounting in a Teejet cap. Rate altered by changing restrictor with tool that comes with jet. Different coloured bodies for different rates.

## **Umbrella Jets**

Produce a 'rain-effect' of low pressure, large droplets from a semi-circle of outlets at the base of an extended nozzle body giving a wide range of application rates simply by varying pressure.

## **CFM Streamer Bar**

A channel-fed bar, with 4 vertical streams per bar.

Rate is altered by varying pressure and selecting restrictor that is simple to change.

## **BFS Streamer Bar**

A channel-fed bar, with 4 vertical streams from each ½m spacing bar. Application rate is altered by varying pressure and rotating a wheel in the body of the bar to required metering orifice.

## **OMEX Streambar**

The OMEX Streambar produces 4 vertical streams from each bar, ensuring even coverage across the full boom regardless of the bars height above the ground. Each stream is fed individually to ensure the output from all four streams are identical even with the bar tilted. A wide range of application rates can be achieved and are changed using the built in slider.

## **Spraying Systems (TeeJet) SJ7-VR**

A half umbrella pattern with 7 streams and a variable rate restrictor for use with flow-based controllers. Restrictor is based on reliable EPDM elastomer and allows rate to vary with speed or variable rate map, without the need to change jets.

## **Spraying Systems (TeeJet) SJ3-VR**

Three divergent streams with a variable rate restrictor, only for use with flow based controllers. No need to change metering discs or settings and restrictor provides constant resistance to allow rates to be changed on the move.

## **Pentair (Hypro) ESI variable rate nozzle**

Variable restrictor based on integral variable orifice. Produces 6 divergent streams from novel unique nozzle body. Correct pattern overlap at 3 boom heights provides flexibility. Single nozzle covers wide range of application rates and allows rate to be changed in operation, ideal for variable rate application.

## **AccuRate Dribblebar**

Precision rate control with stainless steel regulator. Applies for 90-2200 l/ha with minimal setting. Minimal drip when switched off. Ideal for use on second spray line.

**Please check with suppliers for latest prices**

# OMEX Streambar



**Streambar bars are the most efficient and accurate method of applying nitrogen to crops and the OMEX Streambar is one of the most convenient and cost-effective bars available.**

Streambars apply liquid nitrogen and sulphur in a vertical stream, allowing nitrogen to be applied at the full rate right up to the field boundary. The vertical spray pattern means boom height is not restricted, allowing booms to run low in windy

conditions and ensuring that the pattern is not affected by undulating ground. Each of the four outlets on the bar is fed independently from the restrictor, so the rate remains completely consistent across the bar on sloping ground.



## Quality Design

The OMEX Streambar is manufactured in the UK and the compact design reduces the risk of breakage if the boom makes contact with the crop, ground or hedges. The bars have linking hooks to allow them to be connected if required, to prevent them twisting out of line. The bars are fully serviceable with three O-ring seals being the only wearing parts.

## Droplet Size

The stream produced by the bar breaks into individual, large droplets soon after leaving the bar and the large heavy droplets are key to reducing the risk of scorch.

## Application Tables

Application rates are conveniently altered with a sliding restrictor, allowing a full wide range of application rates to be achieved without changing nozzle bodies or restrictors and keeping the operator clean and free of contact with fertiliser.

Simple to use application charts are supplied with the Streambars, detailing either the litres/hectare or kg/ha nitrogen applied - removing the need for a separate product application chart. As an office-based support, a simple calculator is also available to run on a PC.



# Storage Tank Schemes

## Rental Scheme for 30m<sup>3</sup>, 40m<sup>3</sup> and 50m<sup>3</sup> GRP and 50 Tonne Steel Tanks

	30m <sup>3</sup>	40m <sup>3</sup>	50m <sup>3</sup>	50 Tonne Steel
<b>Farmer Qualification</b>				
New customer to OMEX Nitroflo	✓	✓	✓	✓
Minimum number of tonnes of Nitroflo per annum	75	100	120	100
<b>OMEX to Supply</b>				
One tank, complete with fully lockable filling valve, inspection and cleaning access hatch, sight gauge on steel tanks, GRP fixing ties and locks.	30,000 litre (approx 37 tonne capacity)	40,000 litre (approx 50 tonne capacity)	50,000 litre (approx 60 tonne capacity)	38,000 litre (approx 50 tonne capacity)
Tank delivered and off loaded on farm	✓	✓	✓	✓
Drawings showing dimensions of tank plus foundations if required	✓	✓	✓	✓
<b>The Scheme</b>				
Year one free of charge	✓	✓	✓	✓
An annual rental (payable in advance)	£400	£525	£650	£525
A retrospective rebate of £2.00 per tonne will be paid per annum on Nitroflo range only	Up to the value of £400	Up to the value of £525	Up to the value of £650	Up to the value of £525
<b>Farmer to Supply</b>				
An accessible site for tank	✓	✓	✓	✓
Concrete foundation and bund for tank	✓	✓	✓	✓
Roofing felt layer beneath tank	✓	✓	✓	✗
Bolts and fixing	✓	✓	✓	✗
Planning permission (if required)	✓	✓	✓	✓

All prices exclude VAT



OMEX Agriculture reserves the right to uplift the tank if annual offtake falls below 56 tonnes for the 30m<sup>3</sup> and 84 tonnes for the 40m<sup>3</sup>, and 112 tonnes for the 50m<sup>3</sup> and 84 tonnes for the 50 tonne steel tank or if rental is unpaid. The farmer is responsible for paying crane hire for the removal of the tank.



## Purchase option for 30m<sup>3</sup>, 40m<sup>3</sup> and 50m<sup>3</sup> GRP Tanks

	30m <sup>3</sup>	40m <sup>3</sup>	50m <sup>3</sup>
<b>Purchase Cost</b>			
GRP tank (ex delivery)	£7,500	£8,900	£9,500
<b>Included</b>			
One GRP tank, complete with fully lockable filling valve, inspection and cleaning access hatch, fixing ties and locks	30,000 litre (approx 37 tonne capacity)	40,000 litre (approx 50 tonne capacity)	50,000 litre (approx 60 tonne capacity)
Tank delivered (charges apply) and off loaded on farm	✓	✓	✓
Drawings showing dimensions of tank plus foundations if required	✓	✓	✓
<b>The Scheme</b>			
Farmer to purchase tanks from OMEX	✓	✓	✓
A retrospective rebate of £2.00 per tonne against OMEX Nitroflo products only	✓	✓	✓
To be paid annually, for 10 years maximum	✓	✓	✓
Cumulative rebate up to the purchase price of the tank	✓	✓	✓
Tank maintenance and security is purchaser's responsibility	✓	✓	✓
<b>Farmer to Supply</b>			
An accessible site for tank	✓	✓	✓
Concrete foundation and bund for tank	✓	✓	✓
Roofing felt layer beneath tank	✓	✓	✓
Bolts and fixing are customers responsibility	✓	✓	✓
Planning permission (if required)	✓	✓	✓

**All prices exclude VAT**

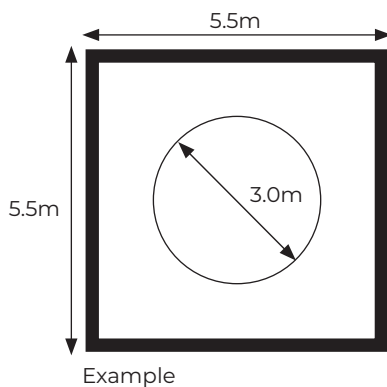
**Please contact your District Sales Manager via the website.**





# Tank Base & Bund Dimensions

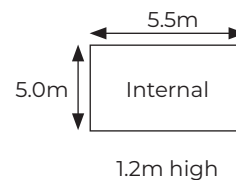
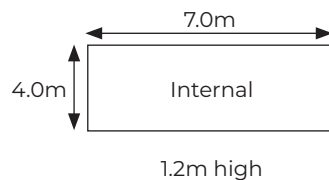
## For 30m<sup>3</sup> GRP Tank



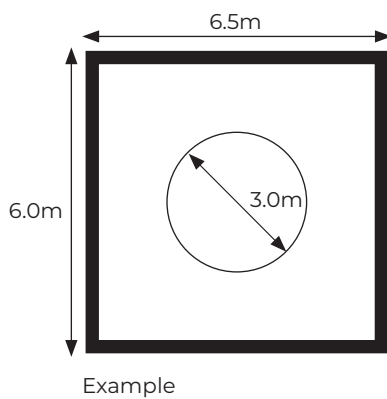
Tank Height: 4.65m

Bunds require a capacity of at least 33 cubic metres

Examples of dimensions



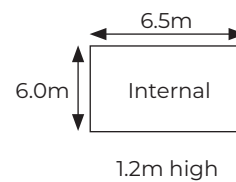
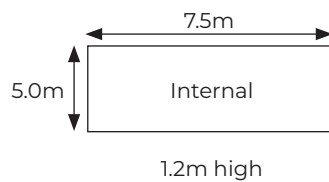
## For 40m<sup>3</sup> GRP Tank



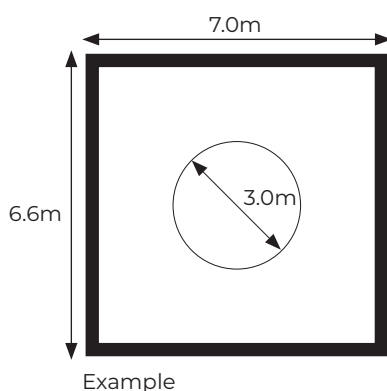
Tank Height: 6.02m

Bunds require a capacity of at least 44 cubic metres

Examples of dimensions



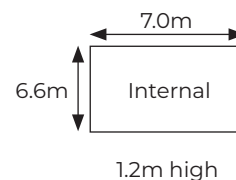
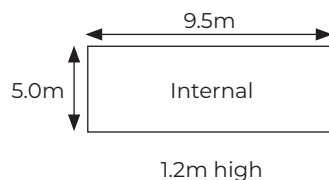
## For 50m<sup>3</sup> GRP Tank



Tank Height: 7.4m

Bunds require a capacity of at least 55 cubic metres

Examples of dimensions

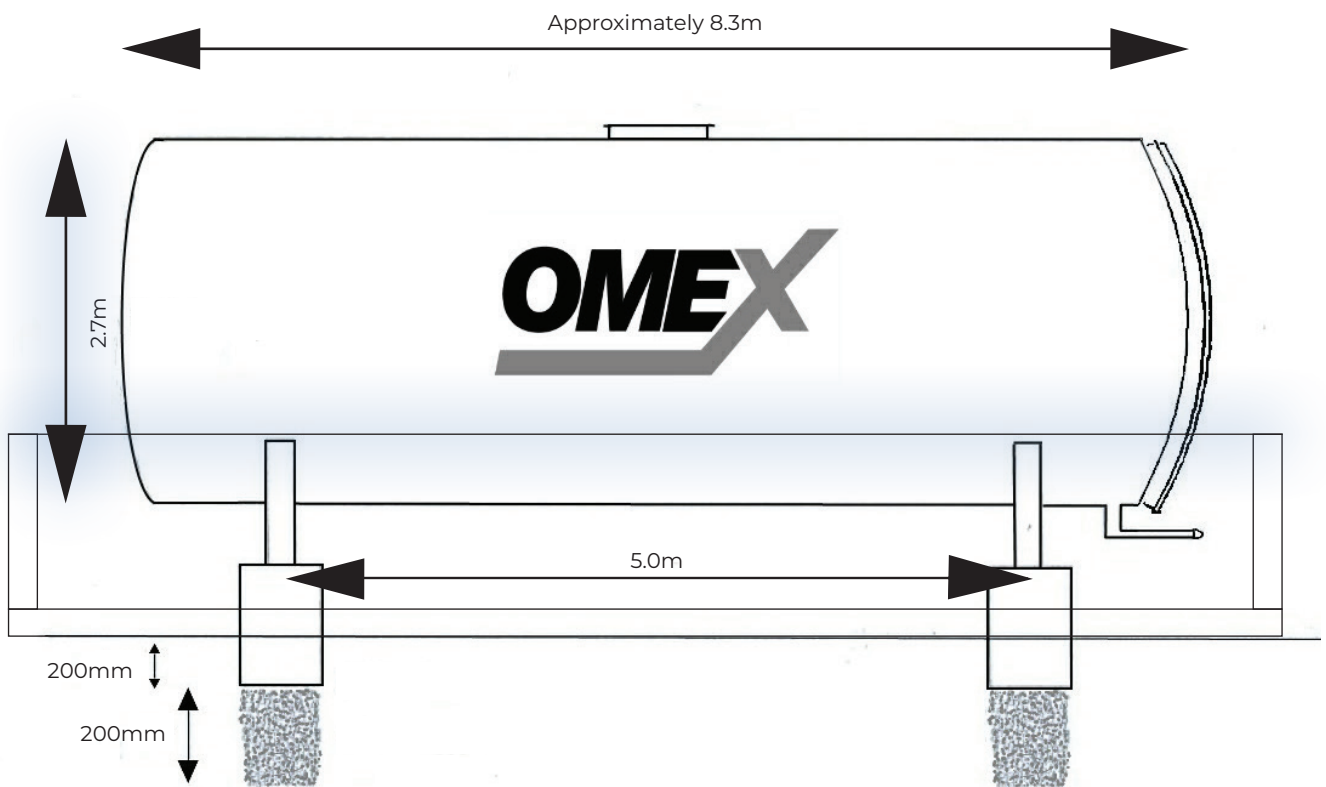


## Tank Base



- The thickness will depend on the ground conditions
- It should be a flat, smooth reinforced concrete slab
- Minimum 200mm thick

## Installation Guidelines - Base for Steel Storage Tanks



Site requires two foundation strips and a water-tight bund with a volume of  $45\text{m}^3$

(0.5m) x (2.5m) x (200mm) deep of 1:2:4 concrete at 5m centres

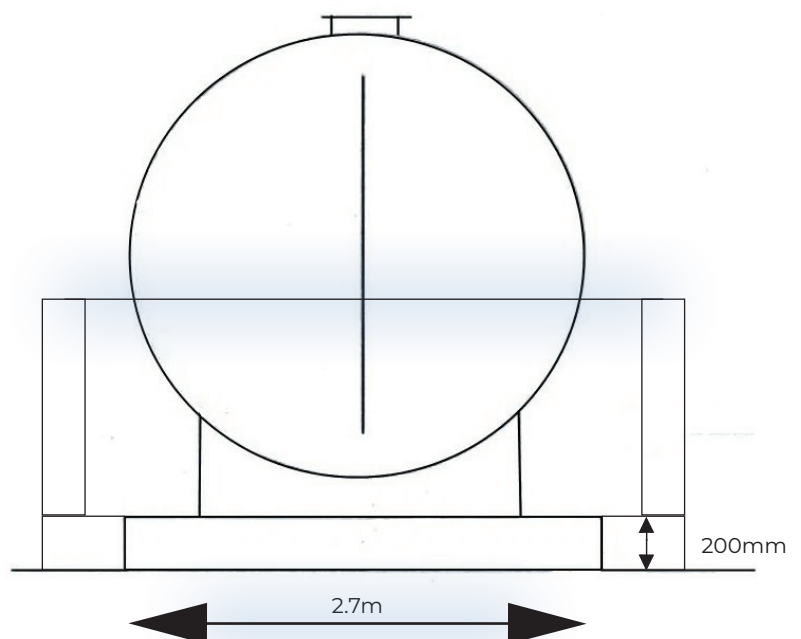
The strips need to be on 200mm of consolidated hardcore. To raise the tank build up with concrete blocks.

### Siting Requirements

Planning permission may be required in some areas. A bund wall of 110% of tank capacity and sealed base is required.

The site should be on level ground.

- Outlet pipe can be turned to suit the site
- Valves should be locked with valve sleeves at all times when unattended
- Padlocks and locking sleeves will be provided with the tank when installed



# Working Towards Sustainable Liquid Fertiliser

## OMEX's Greener Planet Commitment

We're here to support farmers grow more efficiently on our journey to produce sustainable liquid fertilisers. As we work towards our own Net Zero fertiliser goals we're supporting farmers on their sustainability journey by reducing emissions and improving nitrogen use efficiency. Our **Greener Planet Commitment** encompasses our entire sustainability strategy.

## How OMEX supports on-farm sustainability

As the market leader of liquid fertilisers, solely focused and dedicated to supplying the UK market, we at OMEX Agriculture have specialised in liquid fertilisers for almost 50 years. Our liquid fertiliser range includes: **Nitroflo Liquid N+S Fertilisers, Multiflo Liquid NPKS Fertilisers, Speciality Liquid Fertilisers**

As a family-run business we are making a **Greener Planet Commitment**, where with improved infrastructure, attention to carbon footprint, less driven miles and on-farm technical support we help farmers grow more sustainably.

## The Environmental Benefits of OMEX Liquid Fertiliser

**No Wastage:** Bulk liquid fertiliser can be returned to the tank if it's not all needed, making your fertiliser application much more sustainable, with no over applying of unnecessary product.

**Improved Accuracy:** Liquid fertiliser is quickly absorbed into the ground and utilised by the crop. Unlike granular fertiliser liquid is directly applied where the crop needs it, avoiding run off into nearby watercourses.

**No Plastic Packaging:** OMEX liquid fertilisers are supplied in dedicated tanks, negating wasteful plastic packaging and cost. We employ a team of tank inspectors to work with you on placing your tank in the most environmentally friendly location.

**Reducing Emissions:** Inhibitors form a key part of ensuring liquid fertilisers remain a sustainable choice. DIDIN reduces nitrous oxide emissions and improves carbon footprint. NitroShield reduces ammonia emissions.

## Reducing fertiliser miles to farm

As the leading liquid fertiliser supplier in the UK, we continue to invest in reducing driven miles to farm. Our commitment to investing in infrastructure has enabled us to offer a national network of 11 distribution

hubs and port facilities, guaranteeing a 72 hour, or less, delivery time in peak season.

- We're working closely with hauliers to establish sustainable practices.
- We're utilising integrated software to accurately reduce miles, alongside a GB based experienced distribution team.
- Nationwide supply coverage at our 11 dedicated facilities reducing miles and utilising the most efficient routes to farm.

## Science-Led Fertiliser Support

An integral part of our sustainability journey on-farm is providing science-led support.

It's vital that amongst the noise OMEX is offering accurate advice to support you in growing greener, whilst meeting your yield and financial aspirations.

Which is why we have invested in:

- FACTS and BASIS qualified advisors.
- Worldwide R&D field and lab facilities to develop future sustainable liquid fertiliser.
- Dedicated teams to continuously test the efficiencies of our products and how you can better utilise them.
- Gene sequencing data to better understand our products.

## Decarbonising our products

Decarbonised liquid fertiliser will be a key milestone in producing food more sustainably. Our procurement team are actively sourcing lower carbon raw materials to reduce the carbon footprint of both ourselves and farmers.

On our mission to help develop a circular economy our R&D function are researching the most innovative sources to lower the carbon footprint of existing products and supply new green ranges.

We're currently evaluating blue, green and white ammonia as the next step in our sustainability journey.

## Our Environmental Objectives:

- Pollution prevention.
- Zero emissions.
- Zero waste to landfill.
- Resource conservation.



# PROTECTING THE ENVIRONMENT

## THE ESSENTIALS FOR STORING SOLID AND LIQUID FERTILISERS

### Losses from stored fertiliser may:

- seriously damage water quality
- lead to substantial fines for pollution

Today, farm storage of fertilisers is covered by Codes of Practice to prevent water pollution. Unless farmers adhere to these codes, enforcement action could be taken or new legislation imposed.<sup>(1)</sup> This leaflet summaries your obligations under the Codes.

Adhering to the codes is not daunting. Often a little time spent on inspection, planning and a small investment in maintenance will avoid large fines, upset neighbours and loss of reputation.

### Footnote

1. The Anti-Pollution Works Regulations 1999, [www.legislation.gov.uk](http://www.legislation.gov.uk) or from The Stationery Office, T: 0870 6005522
2. Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid and Solid Fertilisers – free from Agricultural Industries Confederation, T: 01733 385230 or from website [www.agindustries.org.uk](http://www.agindustries.org.uk)
3. The Dangerous Substances (Notification and Marking of Sites) Regulations 1990, [www.legislation.gov.uk](http://www.legislation.gov.uk), The Stationery Office, T: 0870 6005522

### GENERAL GUIDELINES FOR ALL STORES

- Site all stores as far from watercourses or surface water drains as possible – never less than 10m.
- Site at least 50m from any well, borehole, or aquifer outcrop where risk of groundwater contamination is high.
- Provide secondary containment for storage where contamination risk is high.
- Ensure good well constructed vehicular access.
- Keep an inventory of fertiliser stored – type, volume, delivery.
- Make all storage as secure as possible with consideration given to lighting and fencing.
- Site all stores away from public access to minimise interference or vandalism.
- Ensure operators are trained in use and emergency procedures.
- Obtain Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid and Solid Fertilisers<sup>(2)</sup> – the definitive reference.

### SOLID FERTILISER STORAGE

Solid fertilisers, provided the storage area is well-sited and constructed, are a low risk of watercourses. The main risk occurs in the event of a fire, if contaminated firewater escapes.

#### PERMANENT STORES

##### Siting

- Locate away from heat sources to minimise fire risk.
- Site away from combustible materials eg fuels, oils, hay, straw and wood.
- Ensure sites are level and not prone to flooding.
- Ensure indoor storage is on smooth, firm, dry, impermeable concrete floors.
- Avoid prolonged outdoor storage but where unavoidable ensure it is protected from rain and sunlight with shrink wrapping and/or sheeting.
- Keep storage areas clean and rodent free.
- Handle all bags with care eg fit pipes on sharp forklift tines.

- Re-bag damaged bags immediately.
- Sweep up spillage and dispose of sweepings in slurry pits or spread thinly on growing crops.
- Do not use sawdust as an absorbent.
- Notify the Fire Authority and Health & Safety Executive if 25 tonnes, or more, of ammonium nitrate is stored at any one time.<sup>(3)</sup>
- Develop contingency plans to contain contaminated firewater and prevent entry to drains or watercourses.

#### TEMPORARY FIELD STORAGE

- Do not store within 10m of ditch, watercourse or land drains.
- Return unused bags to a permanent store as soon as possible.



## FLUID FERTILISER STORAGE

Farmers share a duty of care for siting, use and maintenance, even when fertiliser suppliers provide tanks.

### Using tanks

- Ensure tanks, pipework and valves are fit for purpose, ie resistant to corrosion.
- Ensure all tank fittings are tamper-proof. Lock all valves shut when not in use.
- Ensure delivery companies are aware of emergency procedures.
- Ensure tank, pipework and valves are in good condition before deliveries are made.
- Check tank has sufficient capacity before delivery.
- Avoid overfilling.

### Maintaining tanks

- Have tanks, pipework and valves inspected internally and externally, for damage and corrosion at least annually by a suitably qualified technician.
- Carry out any necessary remedial work immediately.
- Undertake additional checks at

the start of the season and when deliveries are made to and from the tank<sup>(4)</sup>. If in doubt do not use the tank or bowser.

- Drain down and flush through all pipework at the end of each season.
- Keep a maintenance record.

### PERMANENT STORAGE

- Conduct an environmental risk assessment<sup>(5)</sup>. Advice is available from the Environment Agency.
- Construct secondary containment where environment assessment shows high risk. Use of reinforced masonry or concrete is recommended and provision should be made for at least 110% of tank capacity. Properly designed and constructed earth embankments may be an acceptable alternative. All pipes, valves and sight gauges should be within the containment area. (NB As a last resort, the Environment Agency can issue a works notice requiring secondary containment in high risk locations<sup>(1)</sup>).
- Tanks must be on a solid, stable concrete base of footing to take the full tank weight.

- Consider additional stabilisation against high winds for GRP tanks.

### BOWSERS AND MOBILE TANKS

- Temporary storage can pose a significant hazard to watercourses. Thus suitable siting is crucial before filling or dispensing. Transport around the farm needs careful consideration. Roadways and tracks must be able to withstand fully laden bowsters passing over or being parked on them.
- Ensure bowsters and all fittings are fit for purpose and protected from corrosion.
- Ensure bowsters are set down on level, solid ground before delivery is made.
- Provide sufficient support beneath parking legs to carry loaded weight without it sinking into the ground or becoming unstable.
- Ensure all hatches and manholes form a watertight seal when closed.
- Do not move laden bowser unless all hatches, lids and valves are closed and locked.
- Open hatches slightly, when emptying bowsters, to avoid a vacuum which could cause the tank to crumple and collapse.



## DEALING WITH SPILLAGES, EMERGENCY PROCEDURES AND STAFF TRAINING

### DEALING WITH SPILLAGES

- Contain any spillage wherever possible.
- Use inert absorbent materials, eg sand or earth, for liquid spills (not sawdust).
- Block gullies, drainage systems or other routes to watercourses.
- Do NOT hose down a spillage.

### EMERGENCY PROCEDURES

- Identify routes to vulnerable watercourses and groundwater on your farm.
- Establish and test emergency procedures.
- Devise spillage, emergency and firewater procedures to provide containment areas near tanks, bowsters or stores.

- Consider blocking drains and damming watercourses as well as providing drain-blocking mats or drain bungs.
- Use leak-sealing putty on tanks and pipework for temporary repair.
- Inform and train everyone likely to become involved in dealing with a spillage or fire.
- Identify who to contact in the event of a spillage, loss or fire.
- Ensure all have access to important telephone numbers, eg local Environment Agency Office, fertiliser supplier and emergency services.
- Report any significant spillage to the farmer, the supplier and Environment Agency.

### Footnote

(4) Instructions for inspecting condition of fluid fertiliser tanks (free) – Agricultural Industries Confederation 01733 385230 or from website: [www.agindustries.org.uk](http://www.agindustries.org.uk).

(5) Risk assessment guide on siting storage facilities (free) – Agricultural Industries Confederation 01733 385230 or from website: [www.agindustries.org.uk](http://www.agindustries.org.uk).

## FURTHER INFORMATION

Code of good agricultural practice; Protecting our Water, Soil and Air' Download free from [www.defra.gov.uk/publications](http://www.defra.gov.uk/publications) or hard copy (£12.50) from [www.tso.co.uk](http://www.tso.co.uk)

### The Environment Agency

Pollution Prevention Guidance Notes:

PPG2 – *Above ground oil storage tanks* – for containment wall information

PPG18 – *Pollution prevention measures for the control of spillages and fire fighting runoff* – for more detailed information about storing chemicals.

*Policy and practice for the protection of groundwater*

Ground Water Vulnerability Maps

Working in partnership to prevent pollution

Environment Agency – 24 hour Emergency Hotline 0800 807060

For non-emergency general advice, phone 03708 506506



Environment  
Agency



# CODE OF PRACTICE FOR THE PREVENTION OF WATER POLLUTION FROM THE STORAGE AND HANDLING OF FLUID FERTILISERS

## PART 3 - USERS

2014



PRODUCED IN CONSULTATION WITH



Environment  
Agency





## PART 3 – USERS

**This Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid Fertilisers (hereafter referred to as the 'Code') is in three parts:**

**PART 1 – SUPPLIERS**

**PART 2 – TANKER DRIVERS**

**PART 3 – USERS**

The Code is published and recommended by the Agricultural Industries Confederation (AIC). The information is given in good faith and does not imply the acceptance of any legal liability or responsibility whatsoever, by AIC or by individual AIC members for the consequences of its use or misuse or in any particular circumstances.

## PREFACE

**As a user of fluid fertilisers**, you are handling materials which, if spilled in quantity, can be very damaging to the water environment. This Code of Practice has been drawn up to help you to reduce the risk of causing water pollution as a result of losing fluid fertiliser during storage or handling at the farm.

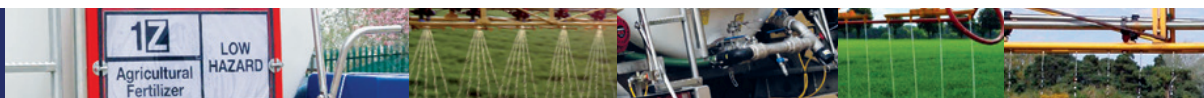
There is clear economic benefit to the user in reducing losses of nutrients to the wider environment, whether from accidental spillage, poor management practices or vandalism. Any of these could result in water pollution which could have serious consequences, both legal and financial. The costs of pollution clean-up and any fish restocking for example would be charged to the polluter or relevant parties. With some forethought and planning for emergencies you should be able to answer the question: 'What would be the consequences of a major spillage of fluid fertiliser at your site?' You must know your site and the surrounding drainage system and what to do and how to react to an accident or emergency so as to minimise the chances of causing pollution.

Preplanning is essential so that you avoid having to deal with a real incident unprepared. Pollution of surface waters by fertiliser is a serious matter but at least it is possible to monitor it directly and carry out remedial action, albeit at some cost. If a major spillage of fluid fertiliser onto the ground is allowed to soak away, any groundwater contamination will be impossible to monitor except by costly techniques and may be impossible to remedy. Pollution of groundwater is potentially very serious because this water can be used

extensively for public drinking water supplies and for industrial and agricultural use. The environment agencies in England, Wales, Scotland and Northern Ireland have identified all groundwater resources and have specific policies for the protection of sources through the control of activities and development in close proximity to source extraction boreholes. Groundwater resources and extraction boreholes are valuable and expensive assets. It is essential that those storing and handling fluid fertilisers are aware of the vulnerability of nearby groundwater sources so that this can be taken into account when siting storage facilities and drawing up emergency plans. The objective must be to ensure that pollution is prevented and that in the event of a major spillage, fluid fertiliser is not allowed to soak through the soil directly, or by way of drains and soak-aways in these vulnerable areas.

If you require further more specific information about the sensitivity of your site with respect to the water environment the environment agencies are always pleased to offer advice. AIC also publishes a **Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Solid Fertilisers**.

*Please request a complete copy of the code if required.*



## PART 3 – USERS

### 3.1 INTRODUCTION

**3.1.1** This 'Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Fluid Fertilisers, (Part 3, [Users])' is a practical guide to help users avoid loss or spillage of **fluid fertiliser** which could cause water pollution.

**3.1.2** This Code is without prejudice to any legal obligations safety requirements or other codes of practice.

**3.1.3** Following this Code is not a defence against a charge of causing pollution, although it should reduce the chance of pollution occurring and will help provide proof of due diligence and good working practice.

**3.1.4** Users should ensure that they carry adequate insurance cover against liability for pollution.

**3.1.5** This Code does not cover guidance for the appropriate usage of **fluid fertiliser**. Reference should be made to Protecting Our Water, Soil and Air: a Code of Good Agricultural Practice (Defra - England), Prevention of Environmental Pollution from Agricultural Activity (Scottish Government - Scotland), and the Code of Good Agricultural Practice (DARD – Northern Ireland), and also to published fertiliser recommendations. See Fertiliser Manual (Appendix 1).

**3.1.6** This Code has been drawn up in consultation with the Environment Agency England, Natural Resources Wales, the Scottish Environment Protection Agency and the Northern Ireland Environment Agency. (Appendix 1)

### 3.2 DEFINITIONS

**For the purposes of this Code, the term:**

**3.2.1** '**User**' shall mean the farmer, grower, application contractor and organisation or individual responsible for the end-use of fluid fertilisers. Delivery and transportation on the public highway is covered in part 2 of this Code.

**3.2.2** '**Supplier**' shall refer to the manufacturer, importer, distributor, merchant, haulier or other organisation or individual who supplies the **user** with **fluid fertiliser**.

**3.2.3** '**Tanker Driver**' shall mean the driver of any vehicle designed to transport and deliver liquid fertilisers in bulk or semi bulk Intermediate Bulk Containers (IBCs)

**3.2.4** '**Fluid Fertiliser**' shall include all solution fertilisers (otherwise known a liquid fertilisers), suspension fertilisers and aqueous ammonia solutions not exceeding 34% ammonia Organic-based fluids containing plant nutrients such as farm slurries, AD Digestate, sewage sludges or other effluents are expressly excluded.

**3.2.5** '**Bund**' shall mean a strongly constructed secondary containment with impermeable walls and floor.

**3.2.6** '**Watercourse**' shall include all surface water whether coastal water, estuary, lake, pond, river, stream, canal and field ditch, (even when dry), unless it is a containment ditch.

**3.2.7** '**Groundwater**' shall be defined as water which is below the surface of the ground in the saturation zone and in direct contact with the ground and/or water held in underground rock formations (aquifers). For the purposes of this Code it is considered that pollution of **Groundwater** could result from incidents occurring where such aquifers outcrop at or near the soil surface, or occurring within 50 metres of a water abstraction borehole, or where no protection of the underlying water exists e.g. where there are soakaways, swallow holes or quarries.

**3.2.8** '**Major Spillage**' shall refer to a spillage which cannot be controlled and/or which involves significant loss of the spillage causing pollution of a **watercourse** or of **groundwater**.

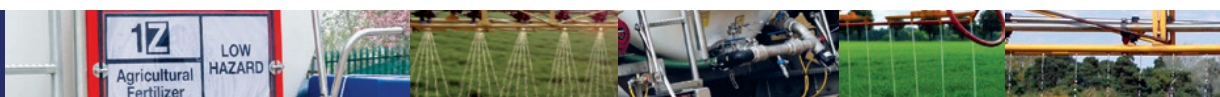
### 3.3 GENERAL PRINCIPLES

**3.3.1** Fluid fertilisers can be applied to a field very accurately, thereby avoiding unwanted and potentially damaging applications to field margins, hedge bottoms or ditches. As with all nutrient sources, including solid fertilisers and organic manures and wastes, care must be taken with their storage, transfer and transportation. Detailed guidelines are given but attention is drawn to six main points:

- Fixed or mobile stores must be sited with care,
- Any spillage which occurs must be properly dealt with to avoid pollution,



<ul style="list-style-type: none"> <li>• Stores, valves and pipework must be properly maintained and inspected, and records kept,</li> <li>• Bowsers or tankers, before being moved, must have their hatches/ lids securely closed.</li> <li>• Valves must be secured so that they can only be opened by authorised personnel,</li> <li>• There must be a spillage contingency plan. Know what to do in an emergency.</li> </ul>	
<p><b>3.3.2</b> All procedures, equipment and installations should be designed to avoid any spillage of <b>fluid fertilisers</b>.</p>	<p><b>3.4.4</b> Existing sites, and preferably all new sites, should be in areas where groundwater vulnerability is low and not in highly sensitive areas. Sensitive areas are in the proximity of boreholes, wells, springs, aquifer outcrops, soak-aways, swallow holes, quarries or within 50 metres of abstraction for potable supply. For further guidance on groundwater protection contact the appropriate environment agency (Appendix 1) or refer to the Environment Agency web-based resource 'What's in your backyard' (See Appendix 1).</p>
<p><b>3.3.3</b> In the event of such spillage, appropriate procedures and resources should be in-place to prevent the pollution of <b>watercourses</b> or <b>groundwater</b>.</p>	<p><b>3.4.5</b> Where permanent storage tanks are unavoidably sited in a high-risk position, serious consideration should be given to the provision of appropriate bunding (Appendix 1).</p>
<p><b>3.3.4</b> Frequent inspections and regular maintenance should be made of all pipework, valves, tanks, bowsers, lagoons, hard-standing, bunds (if provided) and security systems to minimise the risk of accidental leakage or failure. Records should be kept of this maintenance and inspection.</p>	<p><b>3.4.6</b> Consideration should be given as to where any spilled <b>fluid fertiliser</b> would flow in the event of an accident during loading or unloading, or if the store were to develop a leak or be vandalised. Fire-fighting run-off also presents a risk. The total potential spillage must be capable of containment in an impermeable area. Where such areas are on the outcrop of an aquifer, the need to protect <b>groundwater</b> must be considered.</p>
<p><b>3.4 SITING OF FLUID FERTILISER STORAGE TANKS, LAGOONS AND BOWSERS</b></p>	
<p><b>3.4.1</b> Suitable siting of storage tanks, lagoons and bowsers is critical to avoid potential pollution of <b>watercourses</b> or <b>groundwater</b> in the event of any spillage.</p>	<p><b>3.4.7</b> The potential route of any escaping <b>fluid fertiliser</b> should be channeled to a suitable impermeable area by means of permanent soil banks and/or kerbs where necessary. Care should be taken to prevent any spilled <b>fluid fertiliser</b> from running down a road and thus into drains. Soil is a better and more absorbent temporary barrier than sand.</p>
<p><b>3.4.2</b> Good, well-constructed vehicular access for large delivery and off-take vehicles is essential. An impermeable hard-standing should be provided at the point of delivery to enable any minor spillage to be contained.</p>	<p><b>3.4.8</b> Care needs to be taken in every case with the appropriate siting of tankers, mobile tankers or bowsers. Tankers, mobile tanks and bowsers should all be sited so as to minimise the risk of any spillage of <b>fluid fertiliser</b> entering a <b>watercourse</b> or <b>groundwater</b>, even though such siting may be only temporary.</p>
<p><b>3.4.3</b> It should not be assumed that existing sites are correctly sited, even if no pollution problems have arisen. No site should extend to within 10 metres of a <b>watercourse</b> or a drain leading to a <b>watercourse</b>. Bunding of tanks is always recommended</p>	<p><b>3.4.9</b> No <b>fluid fertiliser</b> shall be received into bowsers supported on parking legs unless these legs are resting on made-up roadway or concrete of known and adequate thickness, or are resting on a support of suitable size and thickness, to support the loaded weight of the bower without it sinking into the ground and becoming unstable.</p>



**3.4.9** No **fluid fertiliser** shall be received into bowsters supported on parking legs unless these legs are resting on made-up roadway or concrete of known and adequate thickness, or are resting on a support of suitable size and thickness, to support the loaded weight of the bowser without it sinking into the ground and becoming unstable.

**3.4.10** The **user** has a responsibility to consider and advise on the correct siting of any tankers or bowsters, including those supplied by a haulier or application contractor. The **user** should take into consideration the location of surface water drains and land drains. The **user** must take care to ensure that when laden tankers or bowsters are being moved on their property they are not driven so close to a **watercourse** or causeway that the bank is unable to support the weight. Weak bridges must be avoided.

**3.4.11** **Fluid fertiliser** stores should be sited away from public access to minimise the risk of vandalism, with the outlet(s) and sight gauges securely locked or inoperable when unattended. The stores should be made as secure as feasible, with consideration given to deterrent lighting.

### 3.5 FLUID FERTILISER STORAGE

**3.5.1** **Fluid fertilisers** may be stored in suitable above-ground tanks or, with the exception of aqueous ammonia, in suitably designed lagoons (see 3.5.6). They should not be stored in unsupported flexible containers.

**3.5.2** Permanently-sited tanks and fittings must be fit for the purpose, must be of a suitable material resistant to corrosion and must be sited on a base or footing designed to support the weight of the full tank.

**3.5.3** The outside of steel tanks should be protected against corrosion with a suitable paint.

**3.5.4** Tankers, mobile tanks or bowsters should be fit for the purpose and should be of a suitable material resistant to corrosion. All hatches should have covers which provide a watertight seal when closed. No laden mobile tank or bowser should be moved unless all hatches, lids and valves are securely closed.

**3.5.5** All outlet/inlet valve(s) and sight tubes/gauges should be positioned or protected so that they are not vulnerable to vandalism or accidental damage, particularly from passing vehicles. All valves should be inoperable when unattended, and on bunded tanks should be wholly within the bund. Sight tube valves/gauges should be fitted, closed and locked when not in use, and inside any bund.

**3.5.6** With the exception of aqueous ammonia, **fluid fertilisers** may be stored in lagoons suitably designed and constructed with impermeable walls, floor and cover.

**3.5.7** Users should conduct a thorough, formal and recorded check of all tanks, bowsters and lagoons at least once a year, in addition to normal everyday observation, for damage or corrosion which might give rise to leakage or failure. Appropriate measures should be taken to repair the storage if necessary and records kept of all inspections and repairs. Advice on inspection and maintenance should be sought from the **supplier** of the **fluid fertiliser**.

### 3.6 DELIVERIES AND TRANSFERS

**3.6.1** A tanker driver delivering **fluid fertiliser**, who considers the condition of the store, valves, pipework, access or siting inappropriate, may refuse to off-load the delivery.

**3.6.2** The **user** should be satisfied that the **supplier** of **fluid fertiliser** is operating in accordance with this Code, Part 1, [Suppliers], and has drawn up adequate emergency procedures for use in the event of a **major spillage** occurring during **fluid fertiliser** transfer onto farm. The **user** should ensure that they are able to assist as necessary to contain any spillage and to avoid pollution of any **watercourse** or **groundwater**. Routinely supply and use drip trays.

**3.6.3** The **user** should draw up procedures for use in the event of a **major spillage** occurring on farm at times other than during delivery by the **supplier**. These procedures may involve the assistance of the **supplier** and of the appropriate environment agency. An emergency plan could usefully include drainage and potential containment points.



**3.6.4** The **user** should ensure that, if **fluid fertiliser** is to be delivered into a mobile bowser or road tanker supported on parking legs, these legs are resting on a made-up roadway or concrete of known and adequate thickness, or on a support of suitable size and thickness, to carry the loaded weight of the bowser without it sinking into the ground and becoming unstable.

**3.6.5** All hatches, lids and valves should be securely closed before tankers or bowsers are moved, and valves should be inoperable or locked when unattended.

**3.6.6** Tankers or bowsers should not be filled to capacity, so as to allow for the expansion of contents in warm weather.

**3.6.7** While ideally **users** should be present during deliveries, they should ensure that, in their absence, the delivery tanker driver is able to operate all relevant valves so that they can nevertheless remain in-operable before and after delivery.

**3.6.8** The person undertaking any transfer of **fluid fertiliser** must be aware of all relevant procedures and be capable of taking appropriate action in the event of an incident. They shall remain present and monitor pipework and the receiving tank at all times during the transfer of **fluid fertiliser**. Drip trays should be used where available.

### **3.7 EMERGENCY PROCEDURES FOR DEALING WITH A SPILLAGE INCIDENT AT THE USER'S SITE, (TANKER, BOWSER OR STORAGE TANK):**

**3.7.1** Take appropriate action to minimise the spillage and to prevent the pollution of **watercourses/groundwater**, perhaps using earth barriers/dams. Do not wash down with water unless specifically advised to do so. Immediately contact the appropriate environment agency, or contact the **supplier** of the fertiliser and your employer (if not self-employed) and request that the appropriate environment agency be informed. Remain on site until released by the fertiliser supplier/your employer.

**3.7.2** In the event of a minor spillage such as a leaking hose or valve the procedure should be as follows:

- wearing goggles and gloves, stop the leak,
- where practicable contain the spillage and mop it up. Do not wash down with water unless specifically advised to do so.
- effect repair if possible or inform employer/supplier

Tel No. **01526 396000**.....

**3.7.3** Records should be kept of all reported incidents involving spillage resulting from any major spillages occurring at the site.

## APPENDIX 1

### SOURCES OF INFORMATION

#### **Containment Systems for the Prevention of Pollution:**

Secondary, tertiary and other measures for industrial and commercial premises. CIRIA (C736)  
[www.ciria.org.uk](http://www.ciria.org.uk)

#### **Protecting our Water, Soil and Air: a Code of Good Agricultural Practice for Farmers, Growers and Land Managers, Defra, 2009.**

The Stationery Office, ISBN 978 0 11 243284 5  
[www.gov.uk/government/publications/protecting-our-water-soil-and-air](http://www.gov.uk/government/publications/protecting-our-water-soil-and-air)

#### **Prevention of Environmental Pollution from Agricultural Activity**

The Scottish Government, 2005, ISBN 0 7559 4106 3.  
[www.scotland.gov.uk/Publications/2002/06/14968/7848](http://www.scotland.gov.uk/Publications/2002/06/14968/7848)

#### **Code of Good Agricultural Practice**

DARD, 2008, ISBN 978 1 84807 068 4.  
[www.dardni.gov.uk/cogap](http://www.dardni.gov.uk/cogap)

#### **Fertiliser Manual (RB209) 8th Edition, 2010**

The Stationery Office, ISBN 978 0 11 243286 9  
[www.gov.uk/government/publications/fertiliser-manual-rb209](http://www.gov.uk/government/publications/fertiliser-manual-rb209)

#### **SRUC Technical Notes: Fertiliser Series**

[www.sruc.ac.uk](http://www.sruc.ac.uk)

#### **Eurocode 2. Design of concrete structures. Liquid retaining and containing structures**

BS EN 1992-3:2006  
[www.techstreet.com/products/1278297](http://www.techstreet.com/products/1278297)

#### **Groundwater protection: Principles and practice (GP3)**

[www.environment-agency.gov.uk/research/library/publications/144346.aspx](http://www.environment-agency.gov.uk/research/library/publications/144346.aspx)

#### **Recommendations for Safe Storage and Handling of Wet Process Phosphoric Acid, (Phosphoric Acid Produced from Sulphuric Acid), 1991**

EFMA, Avenue E Van Nieuwenhuyse 4, B-1160, Brussels  
[www.fertilizerseurope.com](http://www.fertilizerseurope.com)

#### **Hazardous Properties of Ammonia, 1990**

EFMA, Avenue E Van Nieuwenhuyse 4, B-1160, Brussels  
[www.fertilizerseurope.com](http://www.fertilizerseurope.com)

#### **Code of Practice for the Prevention of Water Pollution from the Storage and Handling of Solid Fertilisers**

Agricultural Industries Confederation, 2009, Confederation House, East of England Showground, Peterborough, PE2 6XE  
[www.agindustries.org.uk](http://www.agindustries.org.uk)

#### **Guidance for the Preparation of Safety Data Sheets for Fertilizer Materials 2008**

EFMA, Avenue E Van Nieuwenhuyse 4, B-1660, Brussels  
[www.fertilizerseurope.com](http://www.fertilizerseurope.com)

#### **FACTS**

For details of the FACTS Scheme and its qualified advisers in crop nutrition  
Tel: 01335 343945  
[www.basis-reg.com/facts](http://www.basis-reg.com/facts)

#### **THE ENVIRONMENT AGENCY ENGLAND**

Free emergency incident telephone number: 0800 80 70 60  
General enquiries: 03708 506506  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

#### **NATURAL RESOURCES WALES**

Free emergency incident telephone number: 0800 807060  
General enquiries: 0300 065 3000  
[www.naturalresourceswales.gov.uk](http://www.naturalresourceswales.gov.uk)

#### **SEPA**

Free emergency incident telephone number: 0800 807060  
[www.sepa.org.uk](http://www.sepa.org.uk)

#### **NORTHERN IRELAND ENVIRONMENT AGENCY**

Free emergency incident telephone number: 0800 80 70 60  
[www.doeni.gov.uk](http://www.doeni.gov.uk)



Photocopy this form to create your own records



# FLUID FERTILISER STORAGE TANK ENVIRONMENTAL RISK ASSESSMENT FOR SPILLAGES

This assessment should be completed for all existing or proposed installations

## Storage tank sited at

(use field or yard name if relevant)

Tank owner

Owner's address

(if different from location)

Date of assessment

Assessed by

Tank construction (delete as appropriate): GRP/Steel/Other (please specify)

Max tank capacity

litres

gallons

Manufactured by

Date manufactured

Date installed

Maintained and serviced by

HAZARD	✓ YES HIGHER RISK	x NO LOWER RISK
Tank situated where any spillage could enter an open drain, gully or loose fitting manhole cover draining to a ditch, watercourse, lake, pond, land drains or soakaway?		
Is the tank situated over ground or a hard surface that would convey any spillage into a ditch, watercourse, lake, pond, land drains, soakaway or to within 50 metres of a borehole, well or spring?		
Is the tank situated on a free draining, permeable surface?		
Is the tank situated in a position where it can not be observed during delivery or take off?		
Are there any other potential hazards individual to the site that could result in unacceptable environmental damage?		

One or more ticks in the Yes column indicate that the storage tank is at a higher risk. You are recommended to ensure that the tank is provided with adequately designed and constructed secondary containment system which should also enclose ancillary equipment such as the fill and draw off pipework connections.



# TANK INSPECTION CHECKLIST

Tank Location: \_\_\_\_\_

CHECK		Condition score			Repair required		Comments
		1	2	3	Yes	No	
Visible external corrosion							
Visible corrosion of welded seams							
Plastic tanks damaged. cracked or crazed							
Damp areas on outside of tanks (These may indicate pinhole leaks)							
Tank label							
Condition of inlet valve	Internal						
	External						
Condition of outlet valve	Internal						
	External						
Condition of glass support							
Condition of sight of glass valves							
Condition of tank paint work							
Security locks on fittings: (Inlet/outlet valves, delivery hatches, vent pipes and sight glass valves)							
<b>Total Score</b>							

## Secondary Containment System Inspection Checklist (if installed)

CHECK		Condition score			Repair required		Comments
		1	2	3	Yes	No	
Floor of secondary containment system							
Walls of secondary containment system							
Roof of secondary containment system							
Housekeeping inside secondary containment system)							
Drainage outlet							
Adequate to contain 110% capacity of tank							
<b>Total Score</b>							

**Secondary Containment System:** An impermeable structure around a storage tank and ancillary equipment to allow the contents of the tank to be contained should a leak or spill occur. These systems may take various forms. For example: earth embankments, a brick bund or a metal bund. The ideal capacity of a secondary containment system should be a minimum of 110% of the tanks capacity.

## Tank Inspection Score Indicators

Score	Priority	Condition
1-13	No repairs required	1
13-26	Some repairs required	2
26-39	Immediate repairs required	3

## Secondary Containment System Inspection Score Indicators

Score	Priority	Condition
1-6	No repairs required	1
6-12	Some repairs required	2
12-18	Immediate repairs required	3

## Guidelines for Action

Condition	Examples of faults found
1	Near perfect condition: Paint intact, no paint blisters. No corrosion of tank or valves. No cracks in secondary containment. Tanks supports in good condition. Tank is clearly labelled. Locks on all fittings, eg inlet and outlet valves and sight glass valve. No drainage outlet. No repairs required.
2	Adequate condition: Paint system flaking, but still adequate. Slight corrosion of tanks and valves. Some cracks in secondary containment system. Slight cracking around supports. Label is unclear or in wrong position. Locks only on some fittings. External drainage outlet with control valve. Some repairs required.
3	Bad condition: Paint system flaking badly, pitted or corroded; paint system ineffective. Tank and valves corroded. Secondary containment system badly cracked and retaining liquid. Cracked tank supports. Tank unlabelled. No security locks fitted. Bund ineffective. Immediate repairs required.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_



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