

going | liquid

Setting Up



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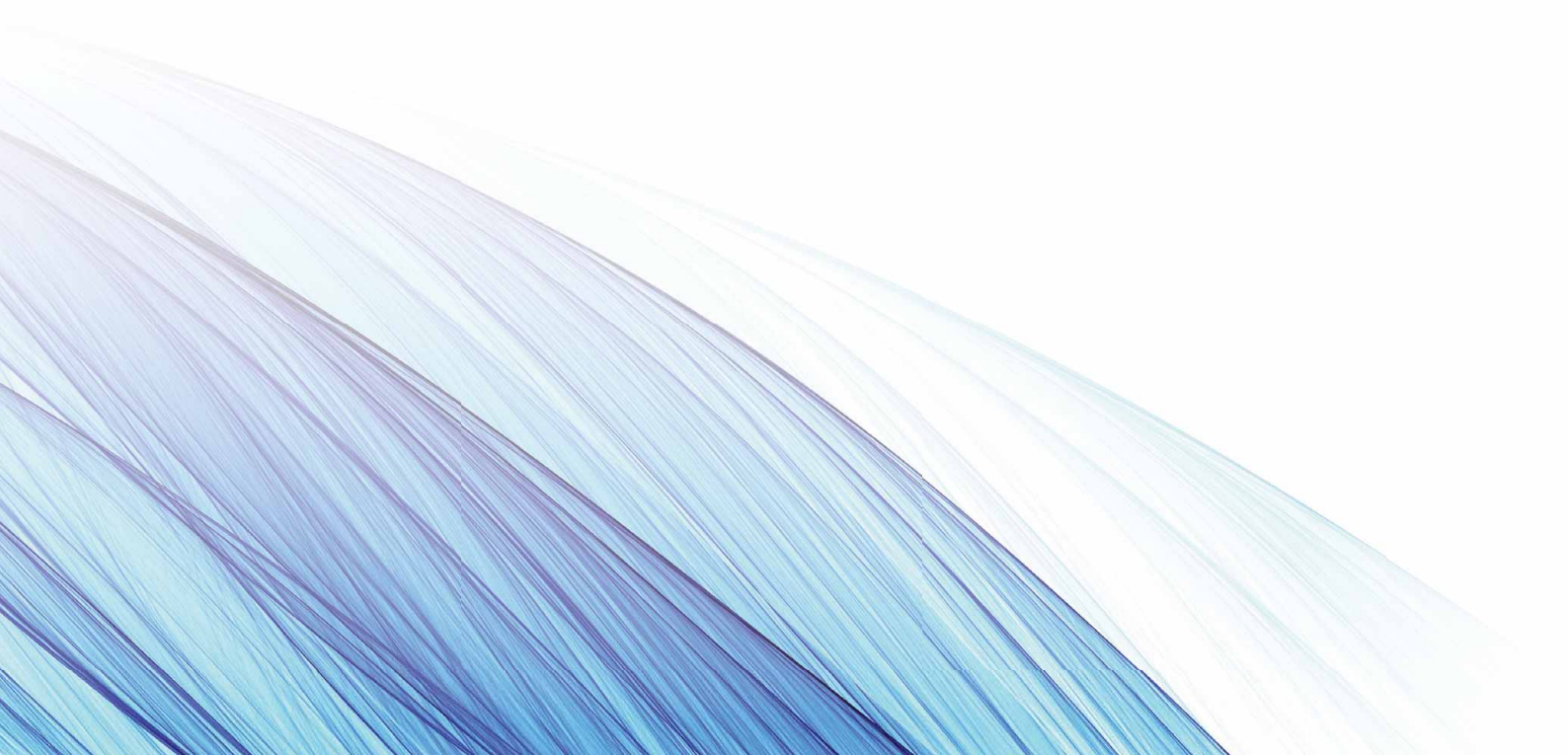
By Going Liquid, you can inoculate, lay down nutrient and root stimulants in a constant stream along the plant row on top of the seed... all in the one pass.

Granular fertiliser just can't do that.

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Cover photo courtesy of Planting Contractor Jason Rogers.



Setting Up

Setting Up

Setting up for liquid fertiliser application requires some basic equipment and is quite simple if you follow the guidelines set out below. General requirements include:

- ✓ On farm storage tanks for bulk liquids
- ✓ A tank for application of liquids (mounted on the tractor, planter or a trailer)
- ✓ Agitator
- ✓ Hypro pump
- ✓ Filtration (supplied with the BNSEasyflo)
- ✓ Flow rate controller
- ✓ Liquid inject distribution system - BNSEasyflo
- ✓ Delivery tubes on tynes or discs

Storage Tanks

Cone bottom silo tanks are recommended for liquid fertilisers, however flat bottom tanks can be used if extra precautions are taken with cleaning procedures to reduce the risk of product contamination. Particular care needs to be taken when transferring between acidic based fertilisers

like CerealRS and alkaline fertilisers such as CalPac. Where more than one product is being used during a planting season, it is preferable to have separate tanks to avoid the need for clean downs during operation.

1000L IBC shuttles can also be used to store liquid fertilisers provided they have been cleaned thoroughly of all contaminants.

22,000L molasses grade tanks with stainless steel butterfly valves are recommended.

Select a clear all weather site that is flat, with adjacent clear access for the delivery truck to unload and then continue driving in an arc. It is imperative that delivery trucks not become bogged if delivery is made after wet weather as this can result in charges from the delivery company for down time.

When setting up a flat bottom tank, lay a sand pad on a maximum 2 degree fall towards the front of the tank where the valve should be located. An elbow should be screwed to the inside of the outlet flange to enable suction from as close as

Products such as CalPac, CerealRS, LegumeRS and UAN are all heavier than water having a specific gravity of approximately 1.3kg per litre of volume. It is therefore important that storage tanks are of a stronger molasses grade (not rainwater tanks) and are made from plastic, fibreglass or stainless steel.



Nurse truck using 1000L IBC shuttles



Nurse truck using a tank

possible to the floor of the tank. We recommend you place gravel around the base of the tank to protect the sand from wind or rain erosion. Whilst 3" fittings are recommended for fast fill from the delivery truck, it is preferable to be able to accommodate both 2" and 3" valves as set up can vary between trucks.

For more information about molasses grade storage tanks contact Camel Tanks on (07) 4662 0807 or Clarke Tanks on 1800 887 979.

Nurse Truck

Depending on the scale of the operation, some growers use an on farm nurse truck to keep planters loaded to avoid down time in returning to the storage tanks. These trucks typically have a pump, water tank and a small flush tank, running off 2"/3" hoses.

Key points for operating a nurse truck:

- ✓ An 8,000-10,000L tank is recommended.
- ✓ A standard fire-fighter pump with 2" or 3" hoses/fittings will suffice for transferring product from the storage tank into the planter or nurse truck, although a gear pump is preferred.
- ✓ Pre-mixing products with a water dilution to match the daily seeding shift is the goal.

Planter

When setting your planter up for liquid fertiliser application, any air-seeder, tow between or tow behind configuration can be used. The most important aspect is having enough capacity to pump liquid from a tank to the row with the least filtration and restrictions possible.

The tank for holding liquids can be mounted on the planter frame, tractor mounted or as part of a tow behind configuration without affecting application results.

Ideally, tank size should allow you to match liquid refills to seed fills to reduce down time. As an example, a 100ha planting shift with 50L/ha requires a 5000L tow behind tank.

Fresh water should be flushed through the pumps and lines at the end of the shift as a clean down procedure. Fresh water will be available if using a nurse truck, otherwise, installation of a flush tank of 50-100L on the planter is recommended.



Filter and pump



Filter

Agitation

When using liquid mixes that include suspensions of micronised nutrient, agitation is essential to ensure consistency of product. CalPac and CerealRS are suspension products and as such require agitation. This is best achieved by running the overflow line from the pump back to the tank. Plumbing the return line such that it stirs up the bottom of the tank is recommended.

To set up agitation in a rapid spray tank, or a similar tank design, we suggest attaching a 32mm poly line from side to side approximately 100mm above the floor of the tank. The poly line should be drilled with approximately 6mm holes along and around the length of the pipe. It can be attached at either end with poly tank flanges, one end plugged and the other as an inlet. Other agitators are commercially available.

Hypro Pump

A hypro pump or centrifugal pump is required to supply pressure to the BNSEasyflo heads as the system does not include a pump or manifold in the kit. Hypro pumps can handle any requirements for BNSEasyflo and agitation, and are simple to set up if you have enough hydraulic capacity on your tractor.

Where a hypro pump is not possible, the use of two 12v / 24v electric marine pumps (one to supply the distributor heads and one to supply

agitation back to the tank) or a petrol fire-fighter may suffice.

Filtration

Although all BioNutrient Solutions liquid inject products are filtered to a minimum of 500 micron (0.5mm), a filtration system is recommended.

Broad 30-35 mesh (600 micron) in-line filters are all that is required for application of liquid products to ensure delivery lines to the planter are free of larger particle contaminants from bore water, tanks or other sources. The BNSEasyflo includes a filter in the kit.

Mesh size for filters can differ between brands. Examples include:

Teejet Mesh Size

US Mesh	Micron	Colour
16	1200	Grey
30	600	Yellow

Hardi Mesh Size

US Mesh	Micron	Colour
30	580	Green

It is recommended when setting up, as much as possible, that there are no places in the hosing which may sag and cause product to settle if left for a period of time. Making a habit of flushing lines after use will also help prevent this from occurring.



BNSEasyflo setup on a Summer planter

Flow Rate Controller and Calibration

For accuracy a flow rate controller is recommended, although not essential to accurate placement of liquids. A variable flow controller is ideal providing it can handle a low pressure situation of 1–1.5 bar. It is also beneficial for the flow controller to have a pressure alarm to indicate any rise in pressure as a result of blockage.

Whether a controller is installed or not, the flow rate needs to be calibrated by judging the amount of liquid streaming to the row and calculating the litres/ha accordingly.

Installing a pressure gauge allows simple identification of the pressure required to maintain even flow at the desired speed and L/ha. It is preferable for the gauge to be large enough to be read from the cab of the tractor.

Distribution System - BNSEasyflo

There are a variety of pumping and injection systems on the market to deliver liquids to the soil. For accuracy and ease of operation we recommend using the BNSEasyflo system which

has gravity drop distributor heads. Fine orifice nozzle systems are to be avoided as they restrict liquid flow due to their small exit points and ultimately lead to blockages and clean downs, irrespective of the product being used.

BNSEasyflo was designed specifically to assist with simple liquid application and is recommended as:

- ✓ It is comparatively cheap and simple to operate.
- ✓ It can be retro-fitted to utilize existing manifold plumbing in place on the planter.
- ✓ It contains minimal moving parts to reduce maintenance costs and opportunities for breakage.
- ✓ The restriction point is large enough to avoid blockages with high viscosity liquids.
- ✓ They are compatible with flow meters and controllers.
- ✓ The flexible configuration allows simple switching from Summer row spacings to Winter row spacing.

More information regarding BNSEasyflo can be found at www.bionutrient.com.au or by contacting head office on (07) 4671 5811.



Liquid inject setup on a single disc planter



Liquid inject point behind the tyne openers

Placement of Heads

When using a BNSEasyflo liquid distribution system it is important to place the heads as evenly as possible across the machine to ensure that the outlet hoses are reasonably even in length. Be mindful when setting BNSEasyflo up on equipment that they won't be inadvertently damaged by the folding mechanism.

Hoses from the pump to the distributor head/s should be large enough to erase the possibility of fluid friction and therefore it is recommended that hoses are at least 25mm from the pump and reduce to 20mm just before the head.

Hosing

When using BNSEasyflo distribution systems, all outlet hosing should be run as steep as possible to avoid air locks in the hoses which interrupt continuous flow of liquids. It is important during set up to ensure that hoses don't sag and allow liquids to settle. To achieve the correct outlet hose length in the initial set up, have the machine lifted to the extent that tines or discs are completely extended.

Placement of Liquid Stream at the Boot

Unlike when using high salt fertilisers, when using BioNutrient Solutions starters the liquid stream needs to be placed in the seed slot, not banded away from it. It is preferable to have the liquid behind the seed in the slot so that the seeder

boot doesn't become moist and clog.

Disc Openers:

- ✓ Avoid splash on the discs to prevent mud build up.
- ✓ Single disc openers need specialist fitting to ensure appropriate placement of the liquid stream to prevent it running down the disc.

Tyne Openers:

- ✓ Bevil the liquid tube on the tyne to avoid mud build up inside the exit point.

The main points to watch with placement include:

- ✓ Make sure the final liquid delivery point is in the slot with the seed.
- ✓ Make sure there is a gap between the delivery points of the seed and the liquid to stop moisture build up in the seed tube.
- ✓ Ensure the liquid tube is cut up at the back (slight bevil) similar to a seed tube to avoid mud blocking the tube.
- ✓ In disc planters, place the tube so that there will be no moisture on the disc and preferably behind the disc.

To attach hosing to a tyne or disc it is ideal to use 12mm OD hydraulic or stainless steel tubing. Physical attachment to the planter shank will vary



BNSEasyflo set up on a Summer planter



BNSEasyflo set up on a demonstration bar

between planters and there is no right or wrong way to do it, as long as it is secure.

Trouble Shooting

- ✓ Remove potential for blockages during application by using suitable distribution equipment such as the BNSEasyflo.
- ✓ Ensure all tanks and lines are clean prior to use with BioNutrient Solutions liquid fertilisers. Where equipment has involved conventional or chemical fertilisers in prior applications, clean thoroughly by flushing well with fresh water.

Things to Avoid

- ✗ Avoid restriction points in lines, filters and bends.
- ✗ Avoid long distances between BNSEasyflo heads and the boot. Use a maximum of 4m centers.
- ✗ Avoid dead end plumbing that isn't easily flushed when required.

Handling of Liquid Products

Hygiene is the key to hassle free planting therefore flushing the system when it is shut down for a period of time is critical. A complete system flush should be carried out whenever the machine

has to be stopped for an extended period, a change of liquid product occurs or there is a suspected contamination.

Key points to remember when handling liquids:

- ✓ Always flush lines and pumps after a shift is complete to avoid corrosion or build up in the lines.
- ✓ Hygiene when handling microbial inoculants is essential to viability. Standard flushing out of lines will meet the hygiene requirements in most situations.
- ✓ Always check product compatibility prior to refilling. Whilst UAN, CalPac, CerealRS and LegumeRS are, to varying degrees and under certain circumstances, compatible and inter-changeable, other products may not be. Contact your agronomist or BioNutrient Solutions head office for further information on product compatibility.
- ✓ When diluting suspensions in a nurse tank or planter, minimise dilution rates as much as possible as the greater the dilution, the greater the associated settling of micronised material will be.
- ✓ Always agitate product in nurse tanks or the planter after prolonged shutdown (more than 3 hours) to ensure an even consistency of liquid distribution.

FAQ's

Q: Is inoculant always added to the planter tank mix last?

A: Yes. As a precaution against external factors, such as rain or machinery breakdown, which may delay the application of the mixed product, inoculant is always the last product to be added. As inoculants have a relatively short active life span once mixed with liquids, they are included in the mix in the final stage of the process to ensuring the best viability and economic return on investment.

Q: How long can a starter tank mix last in the planter in case of rain or breakdown?

A: Where no inoculant has been included, the mix can be kept in the tank for the shelf life of the product. Refer to the specific product label or Material Safety Data Sheet (MSDS) for this information, available from head office or on our website.

Where inoculant has been added to the starter mix, 12 hours is the maximum period within which to use the mix before re-inoculation is recommended.

In both cases, the mix should be re-agitated prior to use if the mix has sat for more than 3 hours.

Q: What sort of filtration is needed when using BioNutrient Solutions liquid products?

A: Minimal filtration is required when using gravity based application systems such as BNSEasyflo. In these instances, a broad in-line filter is recommended (supplied with the BNSEasyflo) to catch particles from bore water or other dirt and gravel intrusions in the water. Orifice systems are not recommended as filtration is critical and they are prone to film build up on the filter which results in flow restrictions.

Q: How will I know if a line is blocked?

A: The pressure will jump up or the flow rate controller will alert the operator.

Q: What do I need to remember when setting up my storage tank?

A: Key points include:

- ✓ **Locate the tank in an all-weather site with a truck size turning circle;**
- ✓ **Use a sand pad for the base;**
- ✓ **Angle the tank 2 degrees towards the tank valve;**
- ✓ **Cover the perimeter of the tank with gravel after setup;**
- ✓ **Whilst 3" fittings are recommended for fast fill from the delivery truck, it is preferable to be able to accommodate both 2" and 3" valves.**



Although BioNutrient Solutions have based the benefits listed herein on on-farm trials of systems and products, it is an indication only and BioNutrient Solutions cannot guarantee the applicability of the benefits listed due to changes in individual circumstances, the way systems and products are used, climate changes and other unforeseen circumstances. BioNutrient Solutions will not be held liable for any loss, injury or damage caused whatsoever, in relation to the systems or products performance in accordance with the benefits listed. No part of this document may be reproduced without express written permission. ©BioNutrient Solutions Pty Ltd 2010. Last updated May 2010.