

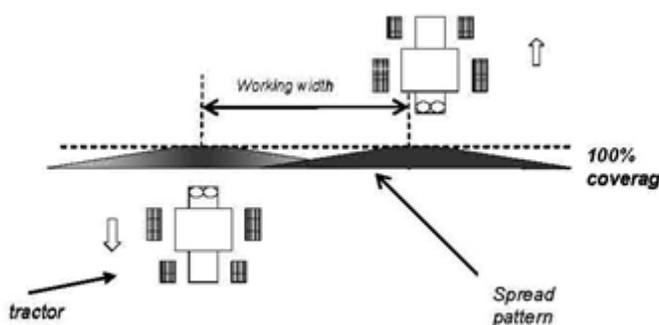
## Targeting Accurate and Uniform Fertiliser Spreading

The use of fertiliser spreaders is an increasing trend in Australian agriculture. In Europe it is an established practice and it is estimated that 90 plus percent of fertiliser is distributed using spinning disc spreaders.

The spinning disc is used for a number of reasons; they are relatively low cost, are easy to maintain, and they provide reasonably high accuracy over widths of up to 36m or more. Fertiliser spreaders are available in a range of capacities, with various working widths and as either three-point linkage or self-propelled options.

Essentially the spinning discs are mounted under the bin and are driven by the tractor transmission. Fertiliser granules drop through the bin orifice onto the disc where they are accelerated and dispersed in a spread pattern across the paddock. Typically, there are two discs rotating in opposite direction, this helps to improve the symmetry of the spread pattern and doubles the working width. The spread pattern is ideally trapezoidal, and by utilising GPS guidance set to give an overlap pattern it is possible to get a uniform coverage.

Figure 1:



*Definition of working width and approximate shape the spread pattern of a twin disc centrifugal spreader.*

Image source: Study of the granular fertiliser and centrifugal spreader using Discrete Element Method (DEM) simulations. IAgE Landwards e-Xtra, Volume 63, Number 1, 2008

The performance and accuracy of distribution pattern of fertiliser spreaders is dependent on the particle properties (consistency of size and shape) the quality of the fertiliser and the

weather conditions. As was demonstrated at the Tulloona Field Day in 2014, wind can impact fertiliser distribution patterns, with wind gust causing particles to land well off target. Additionally, wider working widths of 36m can mean that the spread pattern is less uniform.

Calibration of fertiliser spreaders is as important as the calibration of spray rigs. Calibration will need to be done for each different product to be applied by the spreader. Manufacturers will often provide guidelines which are a useful starting point, but proper calibration will still be beneficial.

The Australian Fertilisers Services Association and the Australian Fertiliser Industries Fertcare initiative have developed Accu-Spread. This involves independent testing and accreditation of fertiliser spreading equipment. Following accreditation, the operator will know the capacity of the spreader to apply a number of products to industry standards. This means growers will have more confidence in applying an accurate rate, improve the efficiency of fertiliser use, and avoiding the patchy uneven patterns readily seen in drone images of crops mid to late season.

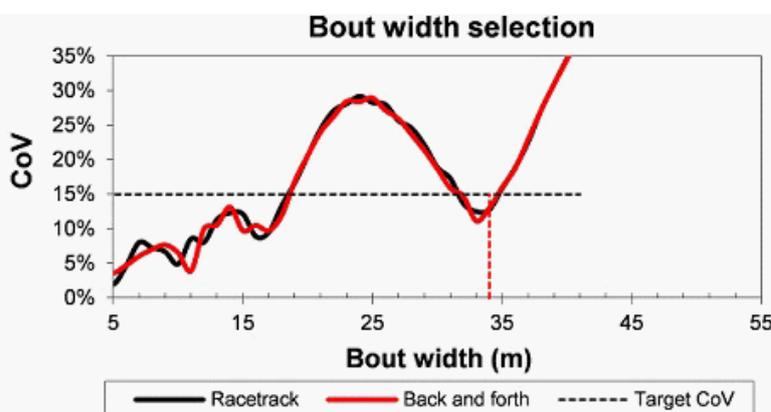
### What is Accu-Spread testing?

The spreader is driven over a line of collection trays while distributing the fertiliser. The trays are collected and the contents weighed. The weight of each tray is recorded along with its position under the spreader path. The weights are entered into a computer program which produces a graph, which will provide the width information needed to produce an acceptable spread pattern.

Data is collected for a race track pattern (around the paddock) and for a back and forth pattern. With the race track pattern, opposite sides of the spreader discharge are overlapped, e.g. the right discharge gets placed on top of the left discharge. For back and forth driving pattern, the spreader discharge from the same side is overlapped, e.g. right discharge gets placed on top of the right discharge.

Figure 2 below, plots the CoV against the bout width for the product spread. The allowable spread width is represented where the red and black lines are under the target 15% CoV industry benchmark. Any part of the graph over the 15% CoV is outside the Accu-Spread standard.

Figure 2: Bout Width Spread



The graph indicates the recommended maximum spread width for both racetrack and back and forth is 34m in this example. The spreader can spread at any width between 5m and 19m and between 31m and 34m. Spreading at 25m would result in an unacceptable spread pattern for this machine.

There is no minimum bout width standard for a machine to be tested and certified. The test performance of the machine is recorded and, subsequently, a certificate is issued showing that level of performance.

Figure 3: Fertiliser Distribution

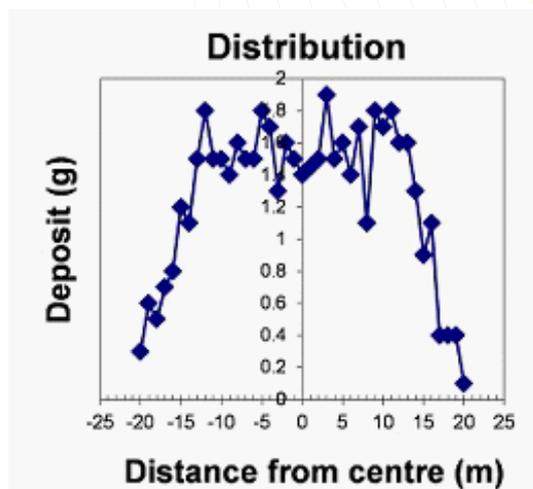


Figure 3, the distribution graph, shows the evenness of spread in a single pass behind the machine. The zero on the X axis represents the spreader line of travel and the dot points on the graph reflect the collection trays either side of centre.

References:

- Study of the granular fertiliser and centrifugal spreader using Discrete Element Method (DEM) simulations. IAgRE Landwards e-Xtra, Volume 63, Number 1, 2008  
<http://www.iagre.org/sites/iagre.org/files/landwardsextra/DEM%20and%20fertilizers%20IAgrE.pdf>
- Australian Fertiliser Service Association. Accu-Spread: <http://www.afsa.net.au/index.php?action=content&page=12>
- Fertcare website: <http://www.fertilizer.org.au/Fertcare/Accurate-spreading>

Further Information

- Information on calibration and Accu-Spread accreditation is available from the Fertcare website: [www.fertcare.com.au](http://www.fertcare.com.au)

There are a range of fertilizer spreaders available on the Australian Market including;

- Dönder: <http://www.ozvalueag.com.au/donder-spreader/>
- Amazone: <http://www.amazone.net/6.asp>
- Agrex: <http://www.agrex.com.au/>
- RotaFlow: [http://www.vicon-machinery.com.au/uploaded/ebrochure/TwinDiscSpreaders2013/Vicon%20RotaFlowRO\\_Spreaders2013\\_LR.pdf](http://www.vicon-machinery.com.au/uploaded/ebrochure/TwinDiscSpreaders2013/Vicon%20RotaFlowRO_Spreaders2013_LR.pdf)

Multi drive mounted spreaders : <http://www.southernspreaders.com.au/index.php/products/mounted-spreader/>

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