



## **Marshall Multispread Technical Bulletin Spreading Sulphate of Ammonia**

**Updated : May 23 2017**

### **Background**

Sulphate of Ammonia (SOA) fertiliser is increasingly being used by Australia farmers as a cost effective source of Sulphur and Nitrogen.

The SOA fertiliser supplied to Australian farmers is typically a by-product of the Nickel refining process, as such the properties (particle size distribution and bulk density) will vary from product to product and are dependent on the level of down stream material processing used.

Typically SOA contains 21% N and 24% S by weight. The particles size and shape varies from a fine crystalline material with average particle sizes between 0.5 and 1mm, to a prilled granulated product with average particle sizes around 3mm. Bulk density is typically 950 kg/m<sup>3</sup>, however moisture and humidity influence the density of the SOA as it is a hygroscopic material.

Roesner Pty Ltd undertakes regular field testing with growers and fertiliser suppliers to determine the optimum spread widths for the different grades of the SOA available across Australia. This bulletin outlines the optimum spread width for a range of different Sulphate of Ammonia grades using the latest Marshall Multispread Type D spinner system.

## Determining Optimum Spread Width

To determine the optimum spread width for a particular fertiliser, the ACCUspread test procedure is used.

The test uses 0.5m square trays aligned in transverse rows perpendicular to the direction of travel of the spreader which collect the fertiliser as the spreader passes. The fertiliser collected in each tray is weighed with 0.1g accuracy, with the mass from each tray entered into a computer programme. The computer programme outputs a distribution curve and co-efficient of variation (CV) chart that determines the optimum width of pass in the field.

According to the ACCUspread code, when spreading Urea and other granulated fertilisers the acceptable CV threshold is 15%. For non-granulated products like Lime and Gypsum the acceptable CV is 25%. Despite some forms of SOA being in a crystalline state, due to its nitrogen content it is considered a granulated fertiliser and therefore the 15% CV threshold is used.

The tests are carried out in the open at wind speeds below 10km/h. The spreader travels at normal operating speed (15-25km/h) over the trays. In order to ensure statistical accuracy, the spreader must undertake a number of passes over the trays to increase the size of the sample in each tray, a minimum application rate of 100kg/ha applied over three passes is recommended by the ACCUspread test regime. Any reduction in the application rate applied compromises the accuracy of the test results.

Whilst not a requirement of the ACCUspread code, for each tray test the particle size distribution of the fertiliser is recorded.



ACCUspread testing at Southern Brook, May 2017

## Grades of SOA Tested

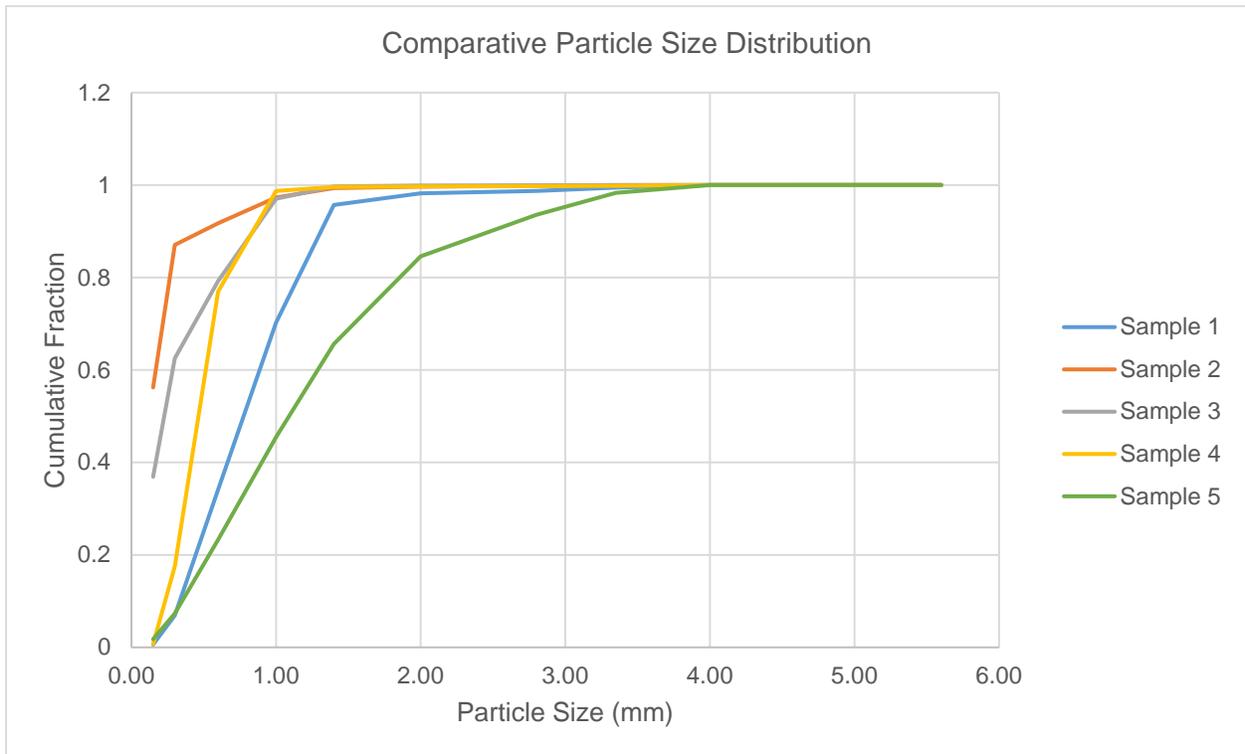
Sample No	Test Date	Fertiliser Supplier	Test Location	Spreader Model
1	26/04/2017	Landmark	Cramphorne WA	916T
2	11/02/2016	Summit	Harvey WA	912T
3	11/02/2016	Macro Fertil	Harvey WA	912T
4	08/03/2012	Landmark (SG)	Cummins SA	980T
5	08/03/2012	Landmark (WG)	Cummins SA	980T

### Notes :

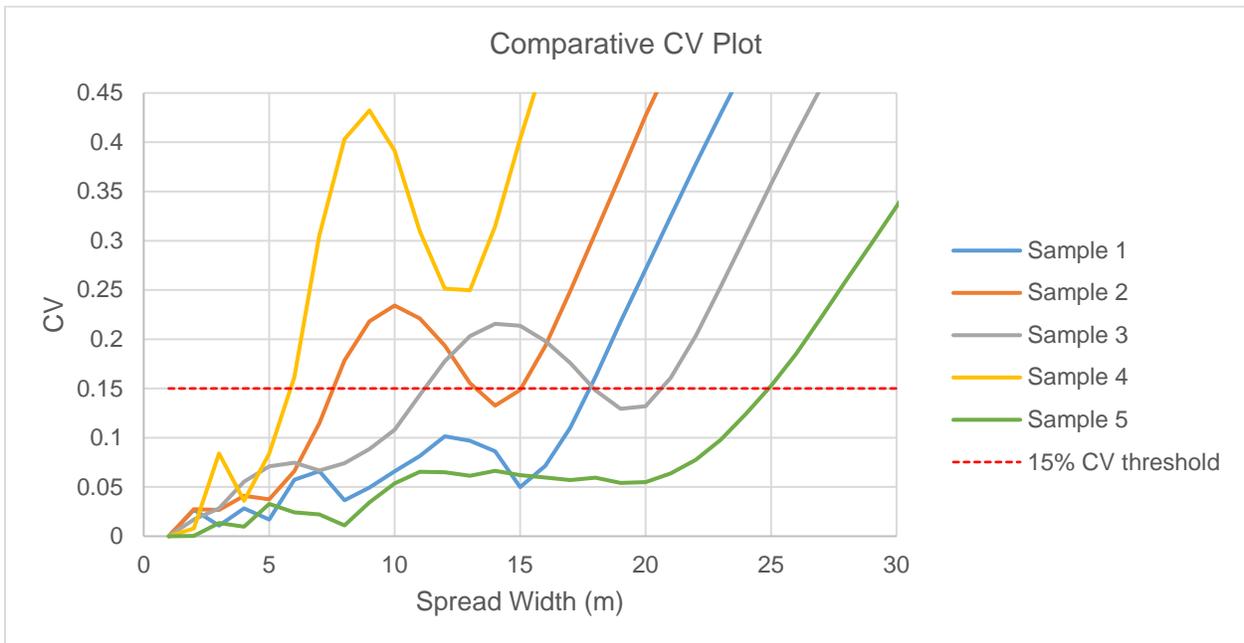
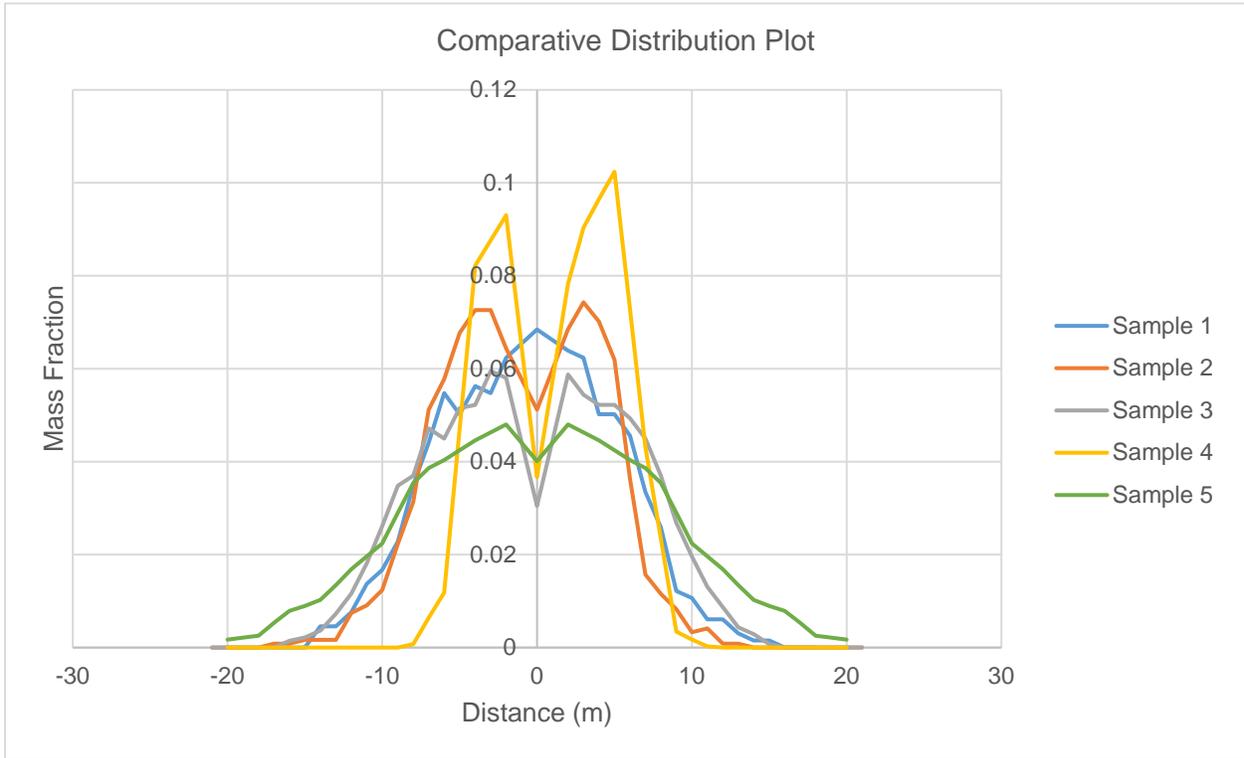
Sample 2 was provided direct from the manufacturer to Summit Fertiliser, no down stream processing was undertaken.

Sample 4, SG : Southern Grade is a highly crystalline material, sourced from Nickel Refinery in WA.

Sample 5, WG : Western Grade, a higher percentage of larger particles, down stream processing to increase particle size, sourced from Nickel Refinery in WA.



## Test Results



## Optimum Spread Widths at 15% CV

Sample	Optimum width
Sample 1	18 m
Sample 2	15 m
Sample 3	21 m
Sample 4	7 m
Sample 5	25 m

## Discussion

Particle size distribution influences the maximum spread width that can be achieved with the various SOA grades. Sample 1 and Sample 5 had a higher median particle size ( S1, 50% under 1mm, S5, 50% under 1.4mm)

Sample 3 had a median particle of 0.3mm and would be considered a relatively fine material, however a spread width of 21m was achieved. The Macro Fertil product (Sample 3) contains a small percentage of particles in the 0.6 to 1mm size range that have superior ballistic properties compared to particles under 0.3mm diameter, increasing the overall spread width.

The finer SOA grades, Samples 2 and 4 achieved narrower spread widths.

The test carried out at Cramphorne in April 2017, Sample 1, is considered to be indicative of the performance of the Marshall Type D spinner system with an average SOA grade sourced in WA. The majority of the Marshall customers with the Type D spinner system are spreading average quality SOA grades at 18m. Those customers that use the finer grade products generally spread at widths between 14-18m, depending upon the wind conditions and fertiliser properties.

SOA grades with higher median particle sizes are generally more expensive due to the additional processing and quality control during manufacture. However the higher input cost must be considered against the additional labour and fuel costs that are incurred when travelling at narrower spread widths with the finer more inexpensive SOA grades.

Adjustments can be made to the Multispread machine to alter the spread pattern for the finer SOA grades. These adjustments include :

1. Decreasing the spinner speed to 750-800 RPM, changing the air flow characteristics around the spinner disc, allowing finer particles to travel further;
2. Changing the pitch of the small Type D1 vane;
3. Using the D2 granulated spinner vanes rather than the D1 all purpose vane.

For further information please contact Roesner Pty Ltd Technical Support on 1800 651 288 or [info@roesner.com.au](mailto:info@roesner.com.au)