

### **3. SPREADING MACHINERY TESTING**

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This section of the Spreadmark Code of Practice contains the following material relating to spreading machinery testing for groundspread vehicles:

- 3.1 Principles for the Technical Framework for Spreader Certification.
- 3.2 Technical Specifications for the Testing of Groundspread Fertiliser Machines.
- 3.3 Principles for the Type Testing of Groundspread Fertiliser Machines.
- 3.4 Procedure for the Type Testing of Groundspread Fertiliser Machines.
- 3.5 Guidelines for Checking Spread Patterns.

## **3.1 PRINCIPLES FOR THE TECHNICAL FRAMEWORK FOR SPREADER CERTIFICATION**

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### **SCOPE**

In order to ensure that nutrients are spread according to the requirements of the programme the following principles will be followed with regard to the testing of fertiliser spreading machines. Operational matters are covered in the Code of Practice for Fertiliser Use.

### **PRINCIPLES**

1. The spreader test procedure that will be used will allow each spreader to be characterised so as to enable it to be set according to variable fertiliser characteristics. The test procedure has been linked to international methods and practice, adapted to New Zealand conditions.
2. Both indoor and outdoor testing will be permitted for ground spreading equipment. For outdoor testing, requirements for wind speed and direction, angle of slope and nature of surface will be set. Outdoor testing will be carried out in a way that does not cause environmental contamination by overloading the test site. For indoor testing the test facility will be of such a size as to not interfere with the test result and sufficient to accommodate reasonable computer start up issues.
3. The evenness of fertiliser spreading is expressed as a Coefficient of Variation (CV). The evenness of spread both across and along the direction of spreader travel is important. Application rate at the time of test and application rate calibration settings will also be recorded.
4. For agronomic reasons the current minimum acceptable performance for groundspreading equipment will be a transverse CV of 15% for fertilisers containing nitrogen and 25% for all other products.

5. The spreadability of fertiliser depends on its physical characteristics. The usual physical characteristics that are used to describe fertilisers are: bulk density (BD); uniformity index (UI); and size guide number (SGN). Spreading equipment will be tested on a sufficiently wide range of fertilisers to evaluate performance over the range of fertiliser characteristics available in the market. It is intended to test spreaders over a range of fertilisers sufficient to provide a guide to the maximum safe bout width for each particular product that the spreader distributes. The aim of this is to allow the trained operator to set the spreader appropriately. Spreaders will be tested with products with a wide range of physical characteristics and will be certified for a maximum recommended bout width.
6. Spreader certification testing will be done on a two-yearly basis by Approved Spreading Equipment Testers who will test spreaders in accordance with the Spreadmark Technical Specification for the Testing of Groundspread Fertiliser Machines and who will prepare Spreader Performance Certificates and forward them to the Executive Director for approval.
7. Spreader operators will use simple field tools (sieve box and bulk density measure) to estimate these parameters in the field, and on the basis of their training, be able to adjust the equipment accordingly.
8. Where spreading equipment manufacturers can demonstrate that their equipment can reliably comply with Spreadmark requirements then individual spreading machine certification may be able to be replaced with type certification.

## 3.2 TECHNICAL SPECIFICATION FOR THE TESTING OF GROUNDSPREAD FERTILISER MACHINES

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### 1. INTRODUCTION

There are two primary factors that determine whether fertiliser is applied evenly and at the correct rate; the performance of the spreading device and the fertiliser flow rate to that spreading device.

The performance of the spreading device is determined by measuring the evenness of transverse and longitudinal distribution.

The fertiliser flow rate has two components; the average flow, which determines the application rate, and the momentary flow, which determines the longitudinal variation. The average flow rate is measured either directly when calibrating the spreader computer or can be determined by experience – the amount of product spread per unit area. Variations in momentary flow can be measured directly or indirectly by measuring the evenness of the longitudinal distribution.

The interaction of these factors is complex and momentary changes in flow may effect transverse as well as longitudinal distribution.

These two primary factors also interact with the operational conditions under which they are measured. It is necessary therefore to define the conditions under which they are measured. These are defined below.

### 2. FACILITIES

Certification tests may be conducted either indoors or outdoors providing all the following specifications are met:

	<b>INDOOR</b>	<b>OUTDOOR</b>
Size	Width sufficient to allow the swath to reach the collectors without hindrance and length sufficient to allow the machine to stabilise prior to passing the collectors (see 4 below)	Width sufficient to allow the swath to reach the collectors without hindrance and sufficient run-up to allow the machine to stabilise prior to passing the collectors (see 4 below)
Slope	Flat	< 5° (the plane of the collectors must be the same as the spreader)
Wind	Nil	< 15 km/hr and < +/- 15° in the direction of travel <sup>1,2,3</sup>

Surface	Flat and hard	Firm and smooth
Antibounce	Lime or similar inert material at 20-25mm depth	Short grass or other vegetation
Site usage	Unlimited	Not to exceed local environmental requirements

**Notes** <sup>1</sup>In winds speeds between 10 and 15 km/hr, both the test entrant and the testing officer have the right to call a halt to testing if either considers the machine will be unduly advantaged or disadvantaged by the conditions.

<sup>2</sup>Where the spreader performance appears to be unduly advantaged by a crosswind component, the testing officer may set aside the result and request a repeat test.

<sup>3</sup>With the agreement of the test officer, the direction of travel may be either “into wind” or “down wind”.

It should also be noted that because of the vagaries of wind speed and direction, outdoor testing can only define the performance achieved under those specific conditions and, that performance may be less than the optimum performance the machine is capable of under ideal conditions.

### 3. TEST PRODUCTS

To obtain a meaningful measure of a fertiliser spreader’s performance, certification requires testing over a range of fertiliser characteristics. The spreader will be tested with three of the following five products which have been chosen to represent the physical range of characteristics normally encountered in NZ. One of the three products used will be urea.

	SGN <sup>1</sup>	UI <sup>2</sup>	PRODUCT EXAMPLE
1	20 – 60	4 – 10	Lime or RPR
2	120	20	Standard Ammonium Sulphate
3	250 – 350	30	Superphosphate
4	320	55	DAP or Granulated Ammonium Sulphate
5	320	60	Urea

**Notes** <sup>1</sup>The Size Guide Number (SGN) is the Mean Particle Size (MPS) in millimetres multiplied by 100.

<sup>2</sup>UI = Uniformity Index which indicates the range of particle sizes within the sample. A low number indicates a wide range of particle sizes.

While the SGN's of superphosphate, DAP and urea are not greatly different, their spreading performance can be. Super may spread differently from DAP because of the different UI. Urea may spread differently from DAP because the bulk density is significantly less.

It is noted that the physical properties of generic fertilisers, such as superphosphate, urea and lime vary over time and between suppliers.

The following measurements will be carried out on each test product:

- size guide number
- uniformity index
- bulk density

#### 4. TEST CONDITIONS

The following conditions must be met for measuring transverse and longitudinal distribution.

Spreader equipment	Clean and in sound working condition. Spinning disc units must have a display of disc speed that can be observed by the operator while spreading
Hopper loading	Sufficient to completely cover the feed mechanism and the hopper outlet throughout the duration of the test.
Application rate	Application rates used during test are to be the average rate for the product in the operators area <sup>1</sup>
Speed over the collectors	As near as possible to the typical operating speed as is consistent with safety considerations.
Distance prior to passing the collectors	20 metres minimum <sup>2</sup>
Number of passes over collectors	One

**Notes** <sup>1</sup>Where an operator spreads significant areas with a product at rates different from the area average, the special rate should be used.

<sup>2</sup>Mechanically driven metering units require significantly less than 20m to achieve normal flow. For machines with computer controlled metering, the run-up distance may depend on the sensitivity of the software controlling the flow rate. All spreaders should be able to achieve stabilised flow within 20 metres of travel if they are to give acceptable performance in the field.

## **5. COLLECTORS AND COLLECTOR LAYOUT**

Collectors and collector inserts used for Spreadmark testing will be of a type approved by the Fertiliser Quality Council for that purpose. Refer to the register of approved collector types in this Code for details.

Collectors used for transverse and longitudinal measurement will also comply with the following specifications:

- Collector size will be nominally 500 x 500 x 150 mm (or of equivalent area).
- Collectors will have suitable anti-ricochet inserts to ensure that as much fertiliser as practicable is collected.

For transverse distribution measurement, a single line of collectors at right angles to the direction of travel will be used. The length of the line will be sufficient to ensure the significant single pass pattern is measured. Collector spacing will be 0.5m centre to centre (i.e. for a single pass pattern 36m wide, 72 collectors are to be used).

For border spreading measurement the collector layout will be as for transverse distribution measurement.

The fertiliser caught in each collector will be weighed and used to produce a Spreader Performance Certificate. (See item 9, Reporting, below).

When measuring transverse distribution patterns there is a need to remove collectors to allow the spreader to pass. The weight of fertiliser collected in these places will be deemed to be the interpolated weight from the boxes on either side of the gaps.

## 6. MEASUREMENT STANDARDS

The following measurements will be made and recorded for each certification test.

Factor	Measurement	Standard
Weight of fertiliser	gm/collector	Scales accurate to +/- 0.1 gm
Application rate <sup>1</sup>	kg/ha	<+/- 30% of set rate
Transverse distribution	Coefficient of Variation	< 15% for N fertilisers and 25 % for all others

Longitudinal distribution	Coefficient of Variation	To be advised in future when limits are applied
Border spreading	Distance from spreader to pattern edge and shape of pattern	N/A

**Notes** <sup>1</sup>Certification is only valid for application rates within 30% of the application rate used during testing.

## 7. SCHEDULE OF TESTS

The following tests will be conducted:

- Transverse distribution tests - all fertiliser products;
- Longitudinal distribution - one fertiliser product.

Product description - SGN, UI and BD measurements will be carried out on samples of all products used.

## 8. RECORDING

The following records will be kept for each test:

Identification	Date:				
	Operator:				
	Machine:				
	Technician:				
	Location:				
Facilities	Indoor / outdoor:				
	Size of venue:				
	Slope:				
	Wind speed:				
	Direction in relation to wind:				
Test Products		Rate	SGN	UI	DB
	Product 1				
	Product 2				
	Product 3				

	Product 4				
	Product 5				
Test Conditions	Speed over collectors: Transverse: Longitudinal:				
	Spreader condition:				
	Hopper loading:				
	Distance/time of run-up: Transverse: Longitudinal:				
Collectors	Number per pass: Transverse: Longitudinal:				
	Distribution: Transverse: Longitudinal:				
Certification	Certified Bout Width Product 1 = Product 2 = Product 3 = Product 4= Product 5= Shape of CV v Bout Width graph=				

## 9. CERTIFIED BOUT WIDTHS

The tester will generate a CV versus bout width graph from the test information obtained for each fertiliser tested and will determine the Certified Bout Widths from these graphs.

The Certified Bout Width of a spreader will be the bout width where the test result is 15% or less for nitrogenous fertilisers and 25% or less for non-nitrogenous fertilisers. Refer to the Glossary of Terms (Section 4) in this Code for a definition of nitrogenous fertiliser.

Spreaders will have both their 'Round and Round' and their 'To and Fro' bout widths determined for each fertiliser tested.

If the CV versus bout width graph is 'S shaped' and intersects the appropriate CV limit at more than one bout width then this is to be recorded as, for example, "Up to 16 m and 22 to 29 meters".

## 10. REPORTING

Approved Spreading Equipment Testers will, at the conclusion of the test, produce a Spreadmark Spreader Performance Certificate.

The Spreadmark Spreader Performance Certificate must show, at least:

- The spreading company name and a vehicle identification number.

- The Certified Bout Width (or Bout Width Range) for each fertiliser tested (see item 9, for details) for both 'Round and Round' and 'To and Fro' patterns.
- A description of the physical characteristics of that fertiliser. The description to include: product name, bulk density (BD), uniformity index (UI), size guide number (SGN) and a graph of the particle size distribution.
- The date of the test and the expiry date of the certificate. The expiry date will be two years after the date of the test.

Spreadmark Spreader Performance Certificates will not be issued for spreaders where the Certified Bout Width, when tested on urea, is less than 12 meters for either 'To and Fro' or 'Round and Round' spread patterns. An exception to this rule is made for machines with single spinners which only travel 'Round and Round'. These machines can be issued with Spreadmark Spreader Performance Certificates if they can achieve 12 meters on a "Round and Round" spread pattern.

On completion the Spreader Performance Certificate will be sent to the Spreadmark Executive Director for approval. This approval will take the form of the Executive Director's signature on the certificate.

### **3.3 PRINCIPLES FOR THE TYPE TESTING OF GROUNDSPREAD FERTILISER MACHINES**

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#### **SCOPE**

The Fertiliser Quality Council wishes to encourage the development and use of fertiliser spreading equipment that can effectively and reliably spread fertiliser.

To facilitate this the principles below will be followed with regard to the Type Testing and Type Approval of fertiliser spreaders. A list of fertiliser spreading equipment models that have Spreadmark Type Testing Approval will be maintained in this Code.

#### **PRINCIPLES**

1. "Good spreaders" will be recognised by being Spreadmark Type Approved. Spreaders which meet the following general criteria can become Spreadmark Type Approved. Spreadmark Type Approved spreaders will:

- be able to achieve satisfactory spreading performance over the range of the fertiliser types (particle sizes) specified by the spreader manufacturer.
- perform satisfactorily over the normal range of application rates for the fertiliser types specified by the spreader manufacturer.
- have transverse spreading patterns that are substantially unaffected when operating on hill country compared to the flat (Note: this criteria will be added later when the following bullet point will be added to section 1 of the Assessment Criteria for Type Tested Spreaders: "the effect of operating on hill country will be assessed by comparing the performance on one product up and down hills with performance on the flat").
- have longitudinal distribution patterns that are satisfactory over a representative range of fertiliser types and application rates.
- have substantially the same performance characteristics between different units of the same model.
- be provided with suitable, user-friendly operator's handbook that has sufficient information to enable that the operator is able to achieve satisfactory spreading with the fertilisers and application rates defined above.

Satisfactory spreading performance is defined as meeting the Spreadmark evenness standards at the range of bout widths for which the spreader has been designed at the required application rates for a given fertiliser specification.

2. It is recognised that the spreading characteristics of spreaders are largely defined by the disc design, disc speed and the design of the drop off zone. The evaluation process and the model description will accommodate this.

3. There is much that is not fully understood about the characteristics of spreaders (e.g. stability of spreading characteristics when the properties of the fertiliser changes slightly and reproducibility between machines). Best practice in these areas is not well understood and will change over time. We will learn from our experience with Type Approval and it is recognised that this will probably lead to alterations of the rules and the criteria.
4. Type Approval will be subject to a re-approval process.
5. In order to maintain credibility, testing for Spreadmark Type Approval can only be done by a Spreadmark Approved Equipment Tester who is not an employee of a spreader manufacturer or importer.

### **3.4 PROCEDURE FOR THE TYPE TESTING OF GROUNDSPREAD FERTILISER MACHINES**

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#### **1. EVALUATION PROCESS**

- 1.1 Manufacturers or importers of fertiliser spreading equipment wishing to gain type certification for their spreaders should contact:

The Executive Director  
Federated Farmers Inc  
PO Box 414  
ASHBURTON

- 1.2 Upon receipt of an application for a particular model/s of fertiliser spreading equipment to be considered for Spreadmark type Approval the Executive Director will forward the application to the Spreadmark auditor who, without unreasonable delay, will contact the applicant to evaluate whether the proposal meets the requirements of this Code.
- 1.3 The Spreadmark auditor will provide such guidance as is appropriate, consider the information provided from reputable overseas sources or from the recognised Spreadmark Equipment Testers, who have followed the assessment criteria below, and formulate a recommendation to the Spreadmark Executive Director. This recommendation must include whether or not to grant Spreadmark Type Approval for the model/s under consideration and, if the recommendation is to grant approval, any limitations to that approval.
- 1.4 The Spreadmark auditor shall report their findings to the Executive Director. Where appropriate, the Executive Director will issue a Spreadmark Type Approval certificate and will cause the register of Spreadmark Type Approved fertiliser spreading equipment to be altered.

#### **2. ASSESSMENT CRITERIA**

The criteria that will be applied to assess whether a particular fertiliser spreader model should be Spreadmark Type Approved are described below.

##### 2.1 Spreading performance envelope of the type

The purpose of this part of the testing programme is to ensure that satisfactory spreader performance can be achieved over an appropriate range of fertilisers and application rates and that spreaders have reasonably stable operating characteristics over small variations in fertiliser characteristics.

In order to do this one spreader unit will be tested as follows:

- The evenness of distribution will be tested with a range of fertiliser types representing the particle size ranges (SGI and UI) that the spreader has been designed to spread. Normally six to nine fertiliser types will be used.
- The effect of application rate on the evenness of distribution will be tested by transverse distribution measurements at the minimum, median and maximum agronomic rate for each product.
- The effect of flow rate on the transverse distribution pattern will be assessed at the lowest application rate at the slowest forward speed and at the highest rate at the highest forward speed with a limited number of products.
- Longitudinal variation will be measured with three products covering the range of SGNs at their median application rates.

As the intention is to identify where differences occur, it may not be necessary to test all products at all rates. Products may be grouped and one product used as a representative product once it has been established that their spreading performance is the same. If however, differences appear between similar products, more intensive testing will be done to define the extent of the difference and where they occur. The actual amount of testing will be determined by the need to have enough information to decide whether the spreader performance is satisfactory over the appropriate range of fertilisers and application rates and whether or not the spreader has reasonably stable operating characteristics over small (normal) variations in fertiliser characteristics.

The manufacturer/importer may self-impose limits to the testing of the spreader model. Examples of this could be to test on lime only, to test only on the flat or upper limits to the application rate could be set. Any such limits will be recorded and reported on the type test certificate and on the published list of Approved Spreaders.

All tests will be carried out in accordance with the Technical Specification for the Testing of Groundspread Fertiliser Machines.

## 2.2 Reproducibility of the type

A number of units of the same model will be tested to identify whether different units of the same model of spreader have substantially the same performance characteristics. These tests will be carried out at critical points identified during the testing of the type performance envelope (eg at low application rates with difficult to spread products).

The number of units that will need to be evaluated to check reproducibility between machines will normally be two or more and the number of transverse distribution measurements made will normally be six per unit. Spreadmark test data may also be used as reproducibility

evidence. The actual number of vehicles tested and transverse distribution measurements needed will be sufficient to enable a clear opinion to be formed about the reproducibility between machines for that model of spreader.

In order to be type approved the shape of the curves on the Spreader Performance Certificates, under the same test parameters, will need to be substantially the same. Where fertilisers with slightly different characteristics are used on different machines an attempt will be made to correct for this when comparing the shapes of the curves.

Reproducibility testing may be carried out at different times and places to the type performance envelope testing described in section 2.1, above. Reasonable care will be taken to use fertiliser products with the same or very similar SGN and UI values to those used for spreader performance envelope testing. It may be necessary to retain product between type tests or reconstitute product by particle size to ensure that products of the same SGN and UI are used for type testing.

### 2.3 Documentation

In order to be Spreadmark Type Approved, machines will be provided with a suitable, user-friendly operator's manual describing their performance characteristics and adjustments. The information in the operator's manual must be consistent with the information found in the spreader performance envelope testing (see section 2.1, above).

## **3 STANDARD DESIGN**

Manufacturers or importers wishing to apply for type approval need to define the spreader model that is being described, have the facility to manufacture spreaders reproducibly and make a commitment to advise of changes to the spreader design.

The design shall be defined on a set of drawings showing the critical dimensions of the spreading equipment. These will include the vane and disc dimensions and the dimensions which characterise the drop-off zone (the area in which the fertiliser enters the spinning disc). These drawings will be used to check that the design of the approved models remains the same.

The spreader manufacturer must have processes that are capable of ensuring that approved designs are made consistently.

#### **4. TESTERS**

Testing for Spreadmark Type Approval will be by a person recognised by the Fertiliser Quality Council as being able to do so.

Testing for Spreadmark Type Approval may not be done by a Spreadmark Approved Equipment Tester who is an employee of a spreader manufacturer or importer.

#### **5. COSTS AND FEES**

Manufacturers and importers seeking Spreadmark Type Approval pay the tester for the costs of producing the reports that describe the results of the testing for each of the assessment criteria outlined.

Applicant manufacturers and importers also pay the Fertiliser Quality Council for:

- Direct costs incurred in gaining and maintaining Type Approval, and
- An annual promotion and administration levy of \$500 + \$100 per unit sold in that year + GST per spreader type listed. This levy shall not exceed \$2,000 plus GST per spreader type listed in any one year.

Where fertiliser spreading companies manufacture their own Type Approved fertiliser spreaders for their own use, the number deemed to be "sold" will be the total number of that type manufactured in that year.

#### **6 REVISION OF TYPE TESTING RULES**

From time-to-time there will be a need to revise the Spreadmark Type Testing Rules. Revised rules will apply to applications received after the date of the change and to all re-approvals.

Manufacturers and importers of fertiliser spreaders will be consulted about proposed changes.

#### **7. MODIFIED DESIGNS**

When approved designs are modified they will normally not require the full testing required of a new application. There shall be sufficient testing to show that the modified design is an improvement on the performance envelope of the original type test.

#### **8. REAPPROVAL**

Manufacturers and importers holding a Spreadmark type testing approval will be asked periodically to confirm that the design has not altered and may be

asked to demonstrate that the approved design still conforms to the current version of the Type Testing rules.

Checks on the distribution pattern of Type Approved spreaders may be carried out from time-to-time to confirm that type performance for that model is being maintained. Spreadmark certification test data may be used to re-confirm type performance characteristics.

## **9. SPREADER PERFORMANCE CERTIFICATES**

Type tested spreaders must be sold with a Spreader Performance Certificate for that model covering the products used during type testing and showing the Coefficient of Variation (CoV) versus Bout Width (BW) performance for that model. This certificate, which must be dated, gives the fertiliser spreading company a Spreadmark certificate, valid for a two year period.

These manufacturer/importer supplied Spreadmark Performance Certificates for Type Approved machines can be given an extended life where it can be demonstrated to the Spreadmark Auditor's satisfaction that there is appropriate evidence of maintenance and on-going checking of the spread pattern.

## **10. LIST OF TYPE APPROVED GROUNSPREADERS**

A list of Spreadmark Type Approved Groundspread Spreaders can be found in this Code. The list will, from time to time, be given appropriate publicity.

## **3.5 GUIDELINES FOR CHECKING SPREAD PATTERNS**

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### **1. INTRODUCTION**

The purpose of this guide is to assist companies wishing to check the spread pattern of their fertiliser spreaders.

Spread pattern checks should be carried out:

- After damage or a major service of the spreading mechanism,
- Between two-yearly checks to meet the annual spreader checking requirement (see section 4.2 of the Spreadmark System Standard),
- In order to prepare machines for testing by Spreadmark Approved Spreader Testers,
- In order to demonstrate a checking history to substantiate a request for the extension of a Spreadmark Spreader Performance Certificate (see section 4.9 of the Spreadmark System Standard).

The procedure for checking the spread pattern of fertiliser testers is based on the process used by Spreadmark Approved Spreading Equipment Testers but is considerably simpler.

Note that there is a considerable amount of information and background material available to spreader checkers in earlier sections of this Code. Checkers are referred to “Principles for the Technical Framework for Spreader Certification” and the “Technical Specification for the Testing of Groundspread Fertiliser Machines”.

### **2. PROCEDURE**

#### **2.1 Test Site**

Select a suitable site for checking the spreaders. This will generally be outdoors on flat land with relatively short grass. Testing should ideally be either directly into or with the wind. The wind speed should not be so high as to distort the spread pattern (generally about 15 kph).

Do not conduct too many tests in the same location to avoid over-fertilising the land.

If testing indoors ensure that the test venue is large enough to give a proper run up and also large enough to avoid ricochet effects.

## **2.2 Participation**

It is recommended that operators will be involved in the testing of machines that they drive. This will enhance their knowledge of factors affecting the performance of their machine.

## **2.3 Test Products**

Spreaders should be checked with more than one fertiliser. The fertilisers used for testing should be typical of those normally spread with that machine.

When testing, record the bulk density and the sieve box results for the fertilisers used.

## **2.4 Collectors**

Collectors should be laid out across the direction of travel. Anti-bounce inserts should be fitted. Collectors may be laid out continuously or at one meter spacings – depending on the number available.

Collectors should collect a reasonable amount of the swath. For most machines it has been found that about 20 trays at a one meter interval provides sufficient information to allow sound assessments of spreader performance to be made.

## **2.5 Material Collected**

The fertiliser collected in each tray should be weighed to the nearest 0.1 gram or the volume measured using graduated tubes.

## **2.6 Graphs**

The test information gathered should then be graphed to produce a spread pattern graph which can be compared with the original test pattern.

In order to demonstrate that the Recommended Bout Width remains valid the test information (tray placement vs weight or volume collected) should be loaded into the appropriate computer software. This service may be available from one of the Spreadmark Approved Testers listed in this Code.