SPREADMARK CODE

Spreadmark Code of Practice:

For the Application of Nutrients in New Zealand

www.fertqual.co.nz

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All of the documents in the Spreadmark Code of Practice will be controlled. Each part of the Code and associated booklets will have the name, version date and page number.

Changes will only be made to the Spreadmark Code and associated documents after they have been approved by a Forum meeting of the Fertiliser Quality Council.

The Spreadmark Code and related documents are available on the website of the Fertiliser Quality Council (www.fertqual.co.nz). If this is a printed version you should check the website for any updates since printing to ensure you're reading the latest version.

Introduction

The Spreadmark scheme is a nutrient placement quality assurance programme. Its key objective is to ensure nutrients are applied in a way that delivers the most sustainable environmental and agronomical outcomes.

The Spreadmark programme was established by Groundspread NZ, formerly known as the New Zealand Groundspread Fertilisers' Association Incorporated (NZGFA), in 1994. It was subsequently expanded by a group with representatives from Federated Farmers, Groundspread NZ (NZGFA), the NZ Agricultural Aviation Association (NZAAA), fertiliser companies, and the Fertiliser Association of New Zealand.

The scheme registers applicators, provided they have certified application unit, trained operators and appropriate quality management systems. Applicators are subject to regular independent audit to provide assurance to all stakeholders.

There is no doubt that the proper placement of nutrients is of considerable agronomic benefit to farmers and growers and maintains environmental sustainability through environmental risk management processes.

The precision placement of nutrients is dependent on a number of factors summarised in the widely recognised 4 Rs - placement of the right product at the right rate, in the right place at the right time. This requires careful integration of operator skills, suitable spreading units, appropriate nutrients and appropriate application conditions. It is the integration of these factors that is at the heart of the Spreadmark scheme.

Certification is voluntary but the scheme has been designed and will be operated and promoted in such a way as to encourage all applicators to become involved.

The Spreadmark scheme is governed by the Fertiliser Quality Council. This Council has representatives from nutrient user groups, nutrient applicators and nutrient manufacturers.

The Spreadmark scheme operates closely with its sister scheme, Fertmark. The two schemes operate to ensure that high quality nutrients are manufactured and spread in a way that precision agriculture is fostered and the environment is protected. Both programmes have strong links to the Fertiliser Association of New Zealand Code of Practice for Fertiliser Nutrient Management.

The Spreadmark scheme **does not** cover matters related to health and safety. Applicators are expected to have their own health and safety protocols in place, independent of the Spreadmark scheme. Last but not least I would like to acknowledge the contribution of my predecessor Chairman Anders Crofoot who provided leadership and guidance over most of the period this latest review took place.

Jim Galloway
Chairman
Fertiliser Quality Council

Acknowledgements

The Fertiliser Quality Council gratefully acknowledges the contribution of the following groups - without whose input this scheme would not have been possible:

- Groundspread NZ (NZGFA)
- Federated Farmers NZ Inc.
- Fertmark Registered Companies
- Ministry for the Environment
- The Fertiliser Manufacturer's Research Association of NZ (Fertresearcg)
- The Centre for Precision Agriculture, Massey University and Lincoln Ventures Limited
- The Ministry of Primary Industrie's Sustainable Farming FundFarming Fund
- Agmardt
- The NZ Agricultural Aviation Association

Supporting information

Supporting information, **which forms part of this Code** is found here and includes:

- **Booklet 1:** Spreadmark Procedures, Protocols and Policies.
- **Booklet 2:** Technical Specification for the Testing and Certification of Solid Nutrient Application Units.
- **Booklet 3:** Technical Specification for the Testing and Certification of Liquid Nutrient from Nozzles and for Nutrient Spread as a Slurry.
- **Booklet 4:** Spread Pattern Testing and Certification for Fixed Wing Aerial Application of Solid Nutrients.

Index

1. GLOSSARY of Terms

TERM	EXPLANATION
Aircraft	Includes fixed wing planes, helicopters and unmanned aerial vehicles (UAVs) including drones.
Approved Aerial Pattern Test Certificate	This is a report produced by an Approved Spreading Unit Tester that the nutrient application unit has been tested and the track spacing (bout width) required to achieve a CV% of 15 for nitrogenous nutrient and 25% for all other products has been shown. The report shall also include other data collected, as required.
Bout Width (BW) /Track Spacing	The distance between successive passes or runs of an aircraft or ground applicator.
Buffer Zone	The distance between an identified sensitive area and the edge of an area where nutrient is being applied
Bulk Density (BD)	The weight per unit volume of bulk product, kg per m^3 or tonnes per m^3 (t/m^3).
CAA	Civil Aviation Authority.
CV%	Coefficient of variation. It is the ratio of the standard deviation to the mean and is used to indicate the evenness of spread. A CV% of zero would mean perfectly even spreading.
GIS	Geographical information system – an electronic or computerised map.
GPS	Global Positioning System.
Groundspread NZ (NZGFA)	Voluntary membership association for ground-based nutrient applicators
MCTOW	Maximum certified take-off weight.

TERM	EXPLANATION
Micron	A length measurement. I mm = 1000 microns.
Nitrogenous Nutrient	A nutrient with more than 3.0% total nitrogen.
Nutrient	Any substance that is primarily intended to sustain or increase growth, productivity or quality of plants or animals through application of essential nutrients to the plant or soil. The term nutrient includes lime and can be in a solid or fluid form. Note that the term nutrient in the Spreadmark Code relates only to those substances that fit the above definition.
Nutrient Application Unit	Any device or system fitted to increase the application width of nutrients. Application "machinery", "equipment" and "device" are all now referred to as "nutrient application unit".
Nutrient Budget	Statement of the total nutrient inputs and outputs for a specific land area or management unit.
Nutrient Management Plan	A documented plan that describes how the major plant nutrients (nitrogen, phosphorus, sulphur potassium and any other of importance) will be managed. A nutrient management plan will cover an appropriate timeframe for the activity - typically annually.
NZAAA	New Zealand Agricultural Aviation Association
Operator	Person in control of a product spreading unit. This includes pilots, drivers, and UAV operators.
SDS	Safety Data Sheet
Sensitive Area	Includes: • Dwelling houses • marae • Waahi Tapu • educational facilities • traditional food gathering areas • amenity areas and public places • domestic and community water supplies • water bodies and associated riparian vegetation • on-target plants and/or crops which are sensitive to agrichemicals • organically certified properties e.g. Bio-Gro • wetlands, indigenous flora and fauna habitat areas and reserves • protected places
SGN	Size Guide Number – the mean or average particle size, expressed as mm x 100. e.g., SGN of 350 = 3.50 mm diameter. It can be measured using a Sieve Box https://fertqual.co.nz/download/sieve-box- instructions/wpdmdl=1839&refresh=65aed34096e3e1705956 160
Shall	Where "shall" or "must" are used in this Code the requirement is mandatory

TERM	EXPLANATION
Should	Where "should" is used in this Code best endeavours shall be used to comply with requirements
Specific Gravity	The ratio of the mass of a given volume of a substance to the mass of an equal volume of water. The load (weight) carried by an agricultural aircraft is usually indicated by the volume in the hopper. Some nutrients which have a high specific gravity (e.g. suspension) can lead to overloading.
Spreader / Boom	Any device or system fitted to increase the application width of nutrients, maintaining acceptable precision standards, as it is discharged.
Spreadmark Registered	The application unit used has been pattern tested and the operator has satisfied the audit requirements for Spreadmark Certification.
Standard Deviation	A measure of how dispersed the data is in relation to the mean.
Suspension Nutrients	The solid components have been ground to reduce particle size and mixed with water to form a suspension. May also be referred to as liquid nutrients and slurries. Note that the solid particles will settle out of suspension if the particle size is too large. Also note that the specific gravity of the suspension can be higher than solid product.
Swath Width	The maximum width of a spread pattern from one pass of the aircraft, UAV, or ground applicator under controlled test conditions.
UI	Uniformity Index – a ratio of small particles to large particles and indicates the range of particle sizes. A UI of 100 would mean all particles are the same size. For "well granulated" nutrients (e.g., DAP) the UI is normally about 50. For nutrients with a wide range of sizes the UI may be less than 10. It can be measured using a Sieve Box https://fertqual.co.nz/download/sieve-box-instructions/wpdmdl=1839&refresh=65aed34096e3e1705956 160

2. SPREADMARK System Standard

Scope

Spreadmark certified companies must have a quality management system in place. This is the quality management standard that will be used by the Auditor to assess the degree to which the nutrient spreading company's management system works to ensure that customer needs and Spreadmark standards are reliably met.

Standard

3.1 Management

a. The nutrient spreading company must have a documented system which shows how farmer/grower requirements are communicated and reliably delivered. The Spreadmark Business Management System Template for ground spreaders can be downloaded from the FQC website. https://fertqual.co.nz/resources/

b. The company must designate someone to have overall responsibility for quality assurance.

c. Proper records must be kept of orders and deliveries.

3.2 Customer needs

a. There must be a way of recording customer orders completely, including maps provided and identification of sensitive or excluded areas.

b. There must be a way of reliably communicating customer orders to appropriate staff.

c. Records of orders delivered must be recorded so that reconciliations between individual orders and deliveries can be made.

3.3 Environmental

a. The application of nutrients to agricultural land is an activity of profound economic importance but which has the potential to inadvertently cause environmental damage. For this reason, nutrient spreading companies must comply with good environmental care practices in all parts of their operations.

b. Nutrient spreading companies shall have an acceptable written environmental care policy and companies must follow their environmental care policy.

c. All nutrients should be applied in accordance with the Code of Practice for Fertiliser Nutrient Management https://www.fertiliser.org.nz/Site/code-of-practice/ in particular the relevant parts of Section 5 "Fertiliser Use Practices".

d. All nutrients shall be applied in accordance with any regional or unitary council Land and Water Plan https://www.groundrules.mpi.govt.nz/.

e. Spillages of product shall be avoided. If spillages occur, they shall be cleaned up in a way that minimises environmental damage and complies with such legal requirements that apply.

f. When on public roads all loads shall be covered to prevent product dust blowing over following vehicles or onto roads.

g. The wash down of spreaders shall be done under controlled conditions and with measures in place to prevent wash water flowing into waterways.

h. A safety data sheet (SDS) for the product being carried should be available within the company.

3.4 Nutrient Application Units

a. Only units with a current Spreadmark Spreader Performance Certificate may be used on jobs where a Spreadmark certification has been requested or specified. In addition, either all nutrient spreading units in the company shall hold a current Spreadmark Spreader Performance Certificate, or there shall be a system in place to ensure that non-certified units are not used for jobs where Spreadmark certification has been requested or specified.

b. The substantial majority of spreaders in a Spreadmark registered nutrient spreading company shall hold a current Spreader Performance Certificate. When auditing this requirement due recognition shall be made of units where it is reasonable that they not be certified (e.g. new spreaders which have not yet been tested and specialised orchard units). Refer also to Section 5.5 (b) of Booklet One.

c. Written records shall be kept of all spreading unit checks and calibrations.

d. Groundspread spreaders should be checked annually. There are a number of different ways that this can be done. Options could include any of the following:

- Using Approved Spreadmark Pattern Testers annually. The list of Approved Spreadmark Pattern Testers can be found here https://fertqual.co.nz/resources/
- Using Approved Spreadmark Pattern Testers on a two-yearly basis and a competent person checking the performance of the spreader between Approved Tests, or
- Using the 'Quick Test' guidelines described in section 5.

e. Helicopter underslung bucket spreaders shall be re-tested every two years by both self-testing and by an Approved Spreadmark Pattern Tester as follows:

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Spread-mark	Self	Spread-mark	Self	Self	Self
			Auditor Discretion	Auditor Discretion	Auditor Discretion

f. Fixed wing aircraft shall be tested by an approved Spreadmark Pattern Tester. A retest shall be undertaken if the spreader or aircraft changes in any way. If there are no changes an annual declaration shall be provided, stating no change.

Note: unlike spreading units used by groundspread and helicopter operators, units on fixed wing aircraft have no moving parts, have an approved manufacturer's MOD or STC and are maintained as required in accordance with the aircraft's maintenance programme carried out at regular intervals, hence there is no need for additional inspections.

These inspections result in comprehensive records hence additional documentation is not required.

g. Application units must operate at a bout width that is within the limits defined by its Spreadmark Test Certificate for the nutrient being spread, except when the customer requests a different bout width. The operator shall record the customers' request using a form such as the one found here https://fertqual.co.nz/resources/

h. All Spreadmark Certified Applicators shall have a tracking system (e.g. GPS) installed with the capability to demonstrate and record that spreaders operate within their certified bout widths.

i. Operators should be provided with a suitable sieve box https://fertqual.co.nz/resources/ for testing product or shall have access to a sieve box at the fertiliser depot.

j. All Groundspread application units shall have a Spreader Maintenance Diary or other document/s which records significant maintenance and repair work which could affect the unit's nutrient spreading capability. It should also record the results of the subsequent spreading pattern checks on that unit.

k. Where the nutrient spreading company has an acceptable system in place for the regular checking of nutrient spreading capability, the Auditor shall review this.

3.5 Operators

a. All nutrient application unit operators shall be competent for the tasks required of them. Companies shall hold training records for each person, signed by a person competent in the application tasks, recording that the person assigned a task is trained to do it.

b. All pilots and UAV operators shall be competent in relation to their understanding and application of the Approved Aerial Pattern Test Certificate and Spreadmark Certification.

c. The substantial majority of groundspread operators in a Spreadmark registered company shall hold a Spreadmark training certificate. This shall generally represent 75% of operators. When auditing this requirement due recognition shall be made of operators when it is reasonable that they have not been trained (e.g. new drivers or drivers who are enrolled in an approved training course).

Note: Pilots of manned aircraft are required to hold an agricultural rating with a topdressing endorsement in accordance with CAA Rule Part 61 and Advisory Circular AC61-15 https://www.aviation.govt.nz/rules/advisory-circulars/show/AC61-15

UAV operators undertaking topdressing are required to be appropriately trained in accordance with their CAA Rule Part 102 Operating Certicifate and Advisory Circular 102-1 https://www.aviation.govt.nz/rules/advisory-circulars/show/AC102-1

d. In addition, there shall be a system in place to ensure operators who do not hold Spreadmark certification are not used for jobs where Spreadmark certification has been requested or offered.

3.6 Work instructions

a. Nutrient spreader operators must be provided with appropriate, documented work Instructions which detail how all significant facets of the standard tasks involved in nutrient spreading are done.

b. Operator Work Instructions may include information on product testing with a sieve box, interpretation of the resulting information, using this information to decide on the optimal settings for the spreader and on adjusting spreading units.

3.7 Managing complaints

a. The company must have a written procedure for investigating and resolving complaints from customers and neighbours that pertain to application and/or off-target application issues so as to identify the real cause of any problem. This procedure shall include a provision requiring the company to advise the complainant of the Complaints Procedure managed by the Fertiliser Quality Council.

b. The company must follow its customer complaints procedure and keep a record of complaints made and responses. Refer also to the complaints procedure in Section 10 of Booklet One

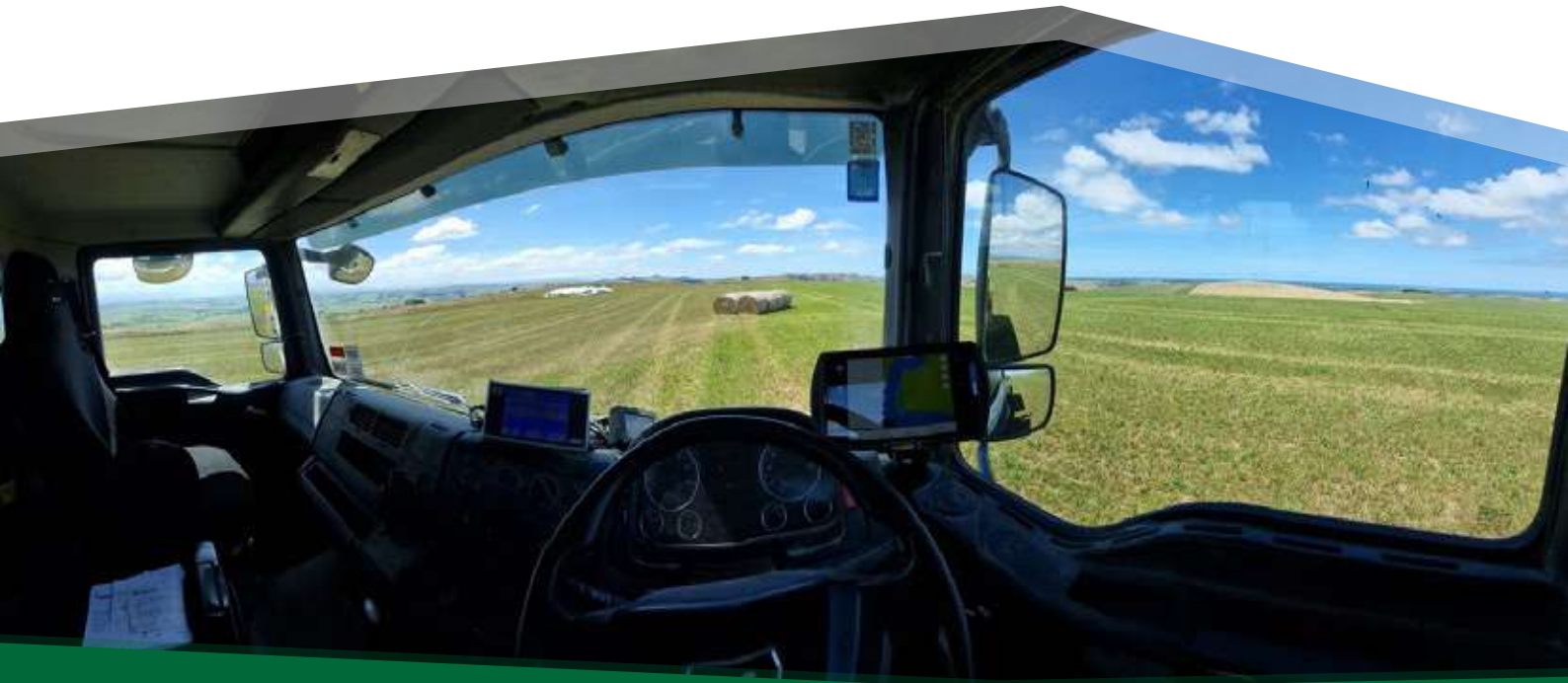
3.8 Internal audit

a. The company shall conduct an internal audit of its systems to ensure that they remain sound. This audit shall be done in the interval between Spreadmark audits. An acceptable internal audit checklist for Groundspread can be found here https://fertqual.co.nz/resources/

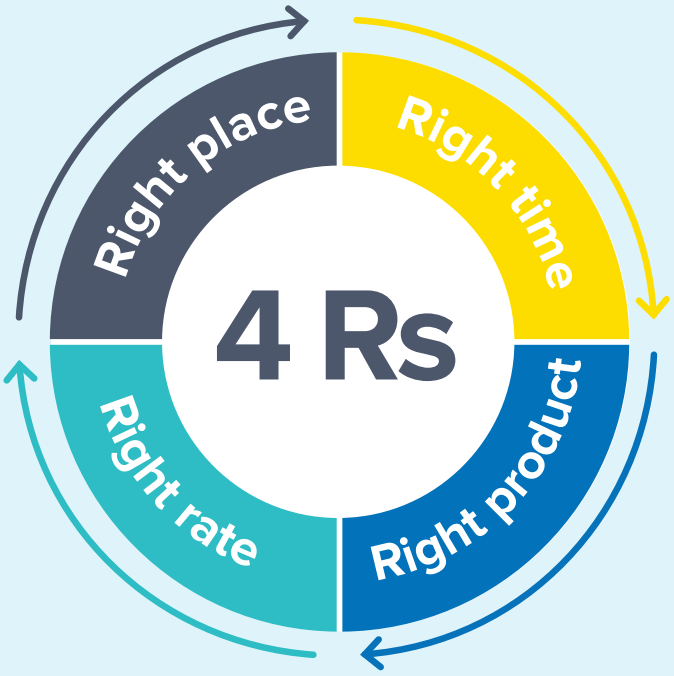
b. Records shall be kept of internal audits.

3.9 Sub-contracting work

a. When spreading work is subcontracted, then these operators and their application unit shall be considered on the same basis as the operators and application unit of the Spreadmark registered company.



3. THE 4R's
Nutrient Stewardship



4 Rs nutrient stewardship is an internationally recognised framework to achieve goals such as increased production, increased farmer profitability, enhanced environmental protection and improved sustainability.

The 4 R's framework refers to the right product placed at the right rate, at the right place, at the right time.

4 Rs nutrient stewrdship can also assist with:

- Achieving farmer outcomes not related to increased production or profitability;
- Compliance with regulations https://www.groundrules.mpi.govt.nz/
- Minimising or avoiding corrosion of components;
- Avoiding the risk of incompatible product formulation leading to segregation or adverse reaction of mixtures either in the hopper or before loading;
- Avoiding placement of nutrients on sensitive areas including buffer areas;
- Avoiding cost overrun from application to the wrong place; and
- Avoiding noise, dust, or other third-party hazards (e.g. power line corrosion).

Note: the requirements listed under the 4 Rs provide international context and information in support of the Spreadmark System Standard but are not to be used when auditing.

Where 4 Rs requirements are additional to the Spreadmark System Standard they should be treated as information to be discussed when the Code is next reviewed.

This applies particularly to the spreading of products which are mixed after manufacture. Such mixes are not covered by the Code but this needs to be addressed given the prevalence of spreading mixed products.

RIGHT PRODUCT

1. Responsibility:

1.1 Operator - note that responsibility can be delegated but a system that records that delegation shall be maintained.

a. Collection of correct products (as applicable);

b. Assessment of spreadability of product received (as applicable);

c. Ensure information related to product safety issues and any precautions required including level of dust are received and understood.

1.2 Product Owner

a. Nutrient budget;

b. Nutrient Management Plans (adheres to regulatory requirements);

c. Soil test results and adviser recommendations;

d. Understand spreadability of product;

e. Suitable on-farm storage

1.3 Product Supplier

a. Recipe of all components in a mix and the ratio or percentage of inclusion. Where appropriate, this shall include a Safety Data Sheet;

b. Advice on nutrient compatibility;

c. Identify product precautions, storage life and any special requirements;

d. Ensure all the above are clearly communicated to the operator or product owner.

2. Information required:

2.1 Recipe of all components in a mix and the ratio or percentage of inclusion. Where appropriate, this shall include a Safety Data Sheet;

2.2 Recommended storage life or any special requirements.

3. Actions:

3.1 Before commencing, confirm with the client the product application specification, any safety issues (e.g. corrosion) and the application rate and evenness of application requirements.

3.2 Where practicable best endeavours should be used to apply products that are Fertmark registered. https://fertqual.co.nz/fertmark/ . A list of certified products can be found here https://fertqual.co.nz/download/fertmark-certified-companies-and-fertilisers/.

3.3 Information that should be provided, or available on request includes.

a. Nutrient content

- Size guide number, SGN (the mean particle size);
- Uniformity Index, UI (the particle size range)
- Bulk Density BD (weight per volume)

b. Blends and mixtures

- Physical compatibility of blend components (SGN, UI)
- Chemical compatibility

c. Suspension and liquid product

- Specific gravity

4. Documentation:

4.1 Product applied (for aerial - operator daily record and statistical return to CAA).

5. Competency:

5.1 The operator shall hold any qualifications required by regulation.

RIGHT RATE

1. Responsibility:

1.1 Operator

a. Maintained and calibrated application unit;
b. Product flowability and physical form;
c. Spread pattern/evenness of application (CV%) using best endeavours.

1.2 Product Owner

a. Nutrient Management Plans;
b. Agronomic benefits of evenness of application (CV%);
c. Soil/herbage test results and adviser recommendations;
d. Understand spreadability of product;
e. Pass on advice received on nutrient compatibility.

2. Information required:

2.1 Spread pattern data for the application unit used, where required;

2.2 Specification of the application rate (kg/ha or l/ha) for the product to be applied;

2.3 Confirmation of flowability/consistency of the product to be applied (solid product). For suspension product confirm the specific gravity (weight per volume).

3. Actions:

3.1 Check the condition of product to be applied, (moisture content, flowability, incompatibility for mixtures) and if necessary, measure mean particle size (SGN) and size range (Uniformity Index, UI);

3.2 Confirm that a spread pattern is available for the application unit used, where required;

3.3 Select appropriate spreading system/device;

3.4 Check/verify that the application system has been calibrated (e.g. hopper flow rate, track spacing) taking into account the information collected under 3.1 above.

4. Documentation:

4.1 Spread pattern data shall be available on request;

4.2 Application rate recorded (operator daily record);

4.3 Application unit or method used including spreader type, unique identifier, MOD number (aerial only), suspension system and nozzles as appropriate.

5. Competency:

5.1 The operator shall hold any qualifications required by regulation.

5.2 All pilots and UAV operators shall be competent in relation to their understanding and application of the Approved Aerial Pattern Test Certificate and Spreadmark Certification.

RIGHT PLACE

1. Responsibility:

1.1 Operator

a. Verify application area including exclusion areas;
b. Electronic proof of application via GPS tracking;
c. Tracks/flight paths including buffer zones;
d. Liaise with the product owner or supplier to ensure environmental risks are understood;
e. Operating site conditions for ground spreaders;
f. Establish an appropriate bout width without exceeding the CV% for the product being applied.

1.2 Product Owner

a. Electronic file or farm map of application area;
b. Identification of environmental risks, mapping of sensitive areas, hazards, plus any other relevant site information;

2. Information required:

2.1 Verification of application site – hard copy map or GIS data of the application site and any exclusion areas;

2.2 Track spacings (GPS data).

3. Actions:

3.1 Where necessary, set appropriate buffer zones around non-target areas;

3.2 Log target areas onto GPS system or otherwise verify the location of the target site;

3.3 Consider whether measures are sufficient to manage the risk of off-target drift at the site. This may include measures such as working with the product owners to increase buffers, or instigate traffic management etc;

3.4 Advise the product owner if it is too risky to spread a particular product considering the site and circumstances;

3.5 Consider spreading units that restrict off-target drift;

3.6 Check weather prior to and during application (wind direction, speed etc);

3.7 Measure or estimate wind speed and direction using tools such as weather forecasting apps, anemometer, or wind vane/sock; or visual indicators such as smoke, trees, and water;

3.8 Where practicable ensure the wind is blowing away from areas at risk of off-target drift and delay spreading until conditions are more suitable. Reassess the spreading of product if the wind picks up or changes direction.

4. Documentation:

4.1 Buffer zones set (where required);

4.2 GPS plots for the application site;

4.3 The type of product applied and the rate of application;

4.4 Measures taken to minimise or avoid off target drift.

5. Competency:

5.1 The operator shall be appropriately trained.

5.2 The operator shall hold any qualification required by regulation.

5.3 The operator shall know council requirements for the district and region relating to landspreading activities.

RIGHT TIME

1. Responsibility:

1.1 Operator

a. Assessment of application site conditions e.g. severe wind, rain, ground conditions;
b. Application unit/staff availability;

1.2 Product Owner

a. Nutrient Management Plans;
b. Environmental regulations;
c. Production requirements
d. Soil conditions e.g. temperature, saturation;
e. Nutrient availability;
f. Communicate relevant details before and at time of application.

2. Information required:

2.1 The required or preferred application date;

2.2 Weather – particularly wind direction and wind speed.

3. Actions:

3.1 Communicate with client to confirm arrangements.

4. Documentation:

4.1 Communication with client to confirm arrangement;

4.2 Date of application noted (operator daily record);

4.3 Adverse events, if any, including jettison or off target application (aerial);

4.4 Application units used;

4.5 Amount applied – statistical returns to CAA (aerial);

4.6 Weather conditions (wind speed and direction).

5. Competency:

5.1 The operator shall hold any qualification required by regulation.

The Risk Management Table in Appendix A provides a useful and succinct summary of the risks outlined above, along with their appropriate management response. It is a useful quick reference guide as well as promotional material that is easy for stakeholders to understand.

4. APPLICATOR Unit Testing

Spreadmark places limits on the variability of evenness of application that are deemed acceptable. The coefficient of variation (CV%) is obtained from sample trays used in a single transverse test of the spread pattern. The CV% is calculated by taking the standard deviation of the overlapped distribution and dividing by the respective mean and expressing as a percentage. A low CV% means more even spreading. The evenness of distribution is affected by the shape of the individual spread pattern and by the accuracy with which the required bout width or track spacing can be maintained.

Scope

In order to ensure that products are spread according to the requirements of the Spreadmark programme the following principles shall be followed with regard to the testing of nutrient applicator units.

5.1 Principles

a. The spreader test procedure allows each spreader to be characterised so it can be set to accommodate variable product characteristics. The test procedure has been linked to international methods and practice, adapted to New Zealand conditions.

b. Both indoor and outdoor testing is permitted for ground spreading units. For outdoor testing, requirements for wind speed and direction, angle of slope and nature of surface shall be set. Outdoor testing shall be carried out in a way that does not cause environmental contamination by overloading the test site. For indoor testing the test facility shall be of such a size as to not interfere with the test result.

c. The evenness of product spreading shall be expressed as a Coefficient of Variation. 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 shall be recorded.

d. To be Spreadmark Registered, application units must satisfy the performance standard for transverse CV% of 15% for nitrogenous nutrients and 25% for all other products.

e. The spreadability of product depends on its physical characteristics, usually described by their bulk density (BD); uniformity index (UI); and size guide number (SGN). Spreading units shall be tested on a sufficiently wide range of products to provide a guide to the maximum safe bout width for the range of products the spreader distributes.

f. Spreader certification testing shall be done at frequencies described Section 3.4 of this Code. Testing shall be done in accordance with Spreadmark Technical Specifications for testing spreaders (refer Booklets 2-4). Testers shall prepare Spreader Performance Certificates and forward them to the company and to the Auditor.

g. Spreader operators should use simple field tools (sieve box and bulk density measure) to estimate these parameters in the field and adjust the spreading units accordingly.

h. Every certified spreader shall have, a unique identification number. For Groundspread vehicles spreader certification lapses if the bin changes to another vehicle.

5.2 Technical specifications for the testing and certification of groundspread solid nutrient units

- Refer **Booklet 2** https://fertqual.co.nz/resources/

5.3 Technical specification for the testing and certification of Liquid Nutrient from Nozzles and for Nutrient Spread as a Slurry

- Refer **Booklet 3** https://fertqual.co.nz/resources/

5.4 Spread pattern testing and certification for fixed wing aerial application of solid nutrients

- Refer **Booklet 4** https://fertqual.co.nz/resources/

5. GUIDELINES for checking spread patterns ("The quick test")

The purpose of these guidelines is to assist companies wishing to check the spread pattern of their nutrient spreaders.

6.1 Introduction

a. Spread pattern checks should be carried out:
   - After damage or a major service of the spreading mechanism,
   - Between checks required to meet the system annual spreader checking requirement standard,
   - To prepare application units for testing by Spreadmark Approved Spreader Testers,
   - To demonstrate a checking history to substantiate a request for the extension of a Spreadmark Spreader Performance Certificate.

b. The quick test procedure for checking the spread pattern of spreading units is based on the process used by Spreadmark Approved Spreading Unit Testers but is considerably simpler.

c. Note that there is a considerable amount of information and background material available to spreader testers in Booklets One to Four. Testers are referred to the Principles set out in each of these Booklets.

6.2 Procedure

a. **Test site:** Select a suitable site for checking the spreaders. This shall 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.

b. Not be so high as to distort the spread pattern (generally up to about 15 kph).

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

d. 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.

6.3 Participation

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

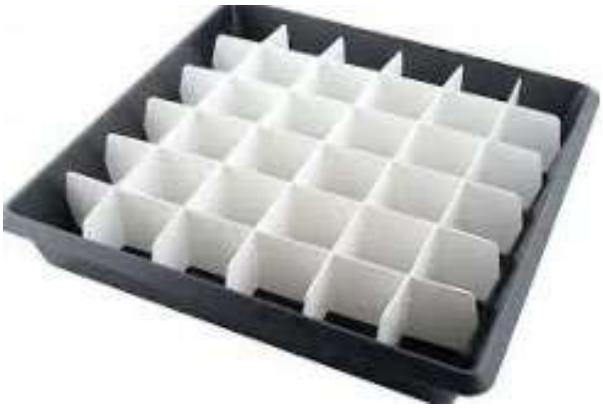
6.4 Test products

a. Applicators should be checked with more than one product. The products used for testing should be typical of those normally spread with that unit.

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

6.5 Collectors

a. 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-metre spacings – depending on the number of trays available.



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

6.6 Material collected

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

6.7 Graphs

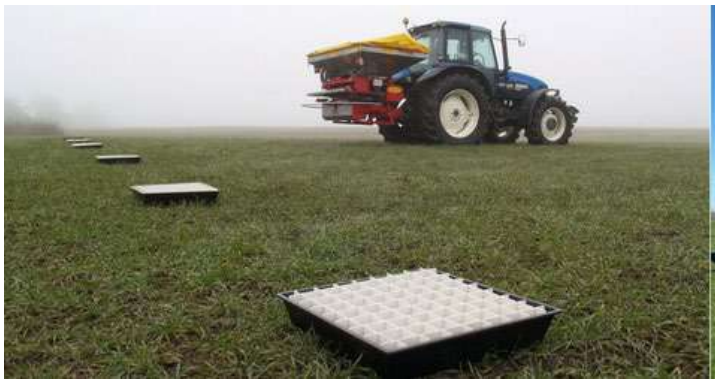
a. The test information gathered should then be graphed to produce a spread pattern graph which can be compared with the original test pattern.

b. In order to demonstrate that the Certified Bout Width remains valid the test information (tray placement vs weight or volume collected) should be loaded into the appropriate computer software which can be obtained from the Executive Director of the Fertiliser Quality Council director@fertqual.co.nz. Alternatively, this service may be available from one of the Spreadmark Approved Testers found here https://fertqual.co.nz/resources/.

6.8 Collectors approved for use with Spreadmark testing

a. The list of collector and collector insert designs approved by the Fertiliser Quality Council for use in Spreadmark testing can be found here https://fertqual.co.nz/resources/

b. Organisations wishing to have an additional collector and collector insert designs approved should advise the Executive Director, Fertiliser Quality Council at director@fertqual.co.nz with an appropriate comparative test report.



6. SPREADMARK
Procedures, Protocols and Policies

These form part of the Code but are listed separately in Booklet One for ease of access. Booklet One along with the other three Booklets mentioned on page 2 can be found on the Fertiliser Quality Council website www.fertqual.co.nz Booklet One has the following Sections:

1. Procedure for Spreadmark Company Registration
2. Spreadmark Approved Unit Testers Protocol
3. Training for Nutrient Applicators
4. Operator Training Syllabus
5. Spreadmark Auditor Protocol
6. Spreadmark Confidentiality Protocol
7. Policy for Advertising and Promotion
8. Promotional & Administrative Levy Policy
9. Policy on Company Mergers
10. Spreadmark Complaints Procedure
11. Disciplinary and Decertification Procedure
12. Transitional Arrangements

APPENDIX A

Risk management table

FACTOR	HIGH RISK	LOW RISK	COMMENT
Wind speed	Product drifts off application area Potential to cause 3rd party or environmental risk	Product remains within application area Unlikely to cause 3rdparty or environmental risk	Measure or estimate using anemometer or visual indicators such as smoke, trees, and water
Wind direction	Unpredictable	Predictable and away from sensitive areas	Use wind vane/sock or visual indicators such as smoke, trees, and water
Granule size	Proportion less than 1mm	Proportion greater than 1mm	Larger granules reduce the risk of drift
Sensitive area	Potential to cause contamination	Unlikely to cause contamination	Identify sensitive areas and buffer zone on work plan and site map or GPS electronic file
Buffer zone	No buffer zone identified	Appropriate buffer zone identified	Guideline only. Identify appropriate buffer zone on work plan or on-site risk assessment
Shelter belts	No shelter	Effectively minimises product drift	Applies to ground spread methods
Product quality	High granule variability or blends	Low granule variability or uniform granules	Affects eveness of spread within CV specifications
Product flowability	High moisture content and/or lumpy product	Low moisture content free flowing product	Safely jettisons from and aircraft hopper Evenness of spread within CV specifications.

NOTE

1. The potential drift risk scale is given as high or low, and intermediate situations should be rated accordingly.
2. All the weather-related factors are to be assessed on-site at the time of application.
3. CAA Rule Part 137 requires that the operation of aeroplanes above the MCTOW have a minimum jettison capability of at least 80% of the maximum permitted load within 5 seconds for the configuration being used.

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