

Guidelines for use of FertSpread

www.fertspread.nz

An on-line fertiliser spread
analysis and calibration tool

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What is FertSpread?

FertSpread is an on-line calculator and reporting tool to support on-farm calibration of fertiliser spreading equipment. It can be used on any internet connected device: computer, tablet or smartphone.

Access FertSpread at www.fertspread.nz

FertSpread uses field test results to calculate fertiliser product Size Guide Number (SGN) and Uniformity Index (UI) ensuring that evenness of application is within the recommended ranges.

Other calculations include fertiliser flow rate, required spreader speed, and actual application rate (kg/ha).

Finally and most importantly the tool allows you to analyse your Broadcast spreader configuration and based on your test results allows you to optimise your bout widths and ensure that you're laying consistent, cost effective fertiliser spread patterns where ever possible.

FertSpread should be used in conjunction with the On-Farm Fertiliser Calibration Guidelines.

NOTE: Different types of collection trays show varying levels of capture during testing. Some can lose a significant amount of fertiliser through “bounce-out”. Experience suggests the uniformity calculations are reasonably accurate, but the application rate may be under reported. Check the application rate by dividing the quantity of fertiliser discharged by the area covered.

Using the Calculator

Accessing FertSpread

Access the tool at www.fertspread.nz



Register to Use FertSpread.NZ

Users must register to access the calculator, enter data and generate reports.

- On the Home Page, click the [REGISTER] tab
- Enter a user name
- Enter a valid email
- Answer the Captcha Request
- Click the [REGISTER] button
- A verification email will be sent to the email address you registered
- Click the verification link in the email to get underway!

LOGIN

Once registered, log in for subsequent visits

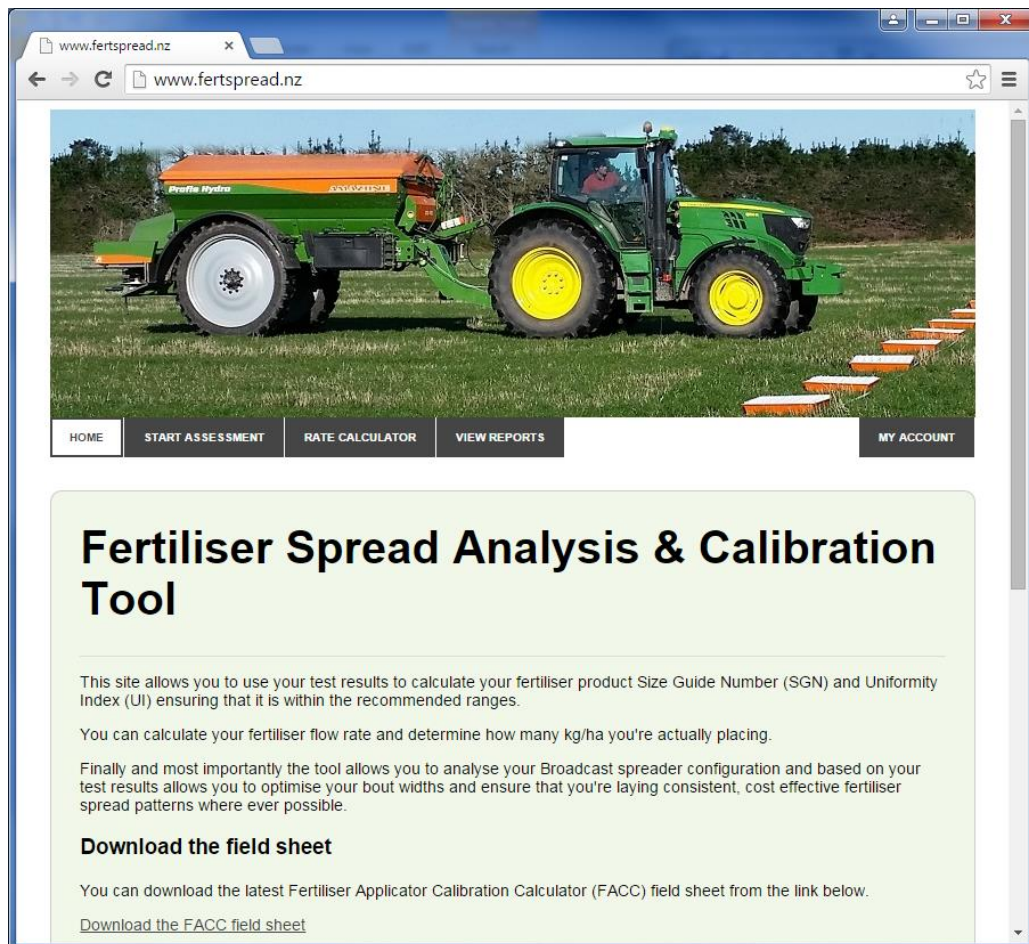
- On the Home Page, click the [LOGIN] tab
- Enter your username or email address
- Enter your password
- Click the [LOGIN] button
- If necessary, request a new password which will be emailed to your registered address

Once logged in, you will be able to:

- start a new assessment
- calculate a fertiliser rate
- view preloaded reports
- change your account information

Calculator Features

Once logged in, tool options are made available. Separate tabs link to different functions.



The [HOME] tab will return the user to the opening home page where basic information of completing tests and calculations is found.

The [START ASSESSMENT] tab opens the main calculator. This is the place for:

- Recording basic test information
- Determining fertiliser product Size Guide Number (SGN) and Uniformity Index (UI)
- Entering field test catch tray and operational data
- Calculating Application Rate and Coefficient of Variation

The [RATE CALCULATOR] tab links to a stand-alone calculator that will calculate the spreader travel speed needed to achieve the target application rate.

The [VIEW REPORTS] tab links to previously entered tests and allows preview and export of printable reports or for an existing report to be edited. Changed data will replace that already stored and save a new version of the same report. Old information will be lost. Start a new Assessment if the old data is to be retained.





The [MY ACCOUNT] tab displays the user's account information and profile. It allows for User Names, Email Addresses and Avatar images to be changed. It is also the place to log out of the site.

Field Data Collection

FertSpread calculates fertiliser application rates and application uniformity based on data collected in the field.

A field recording sheet can be downloaded from the website.

- Click on the [Download the FACC field sheet](#) link

   			
Fertiliser Applicator Calibration: Calculator Field Sheet			
TEST DETAILS		FERTILISER	
Date		Fertiliser Type	Nitrogen Non-Nitrogen
Assessor		Fertiliser	
Site		Target Rate	kg/ha
Test Number		Fertiliser Density	kg/L
Client		Sieve Size (mm)	% of Particles
Address 1		Pan	
Address 2		0.5	
Address 3		1.0	
		1.9	
		2.9	
		3.7	
		4.7	
		5.8	
		7	
		Sum	
		Size Guide Number	
		Uniformity Index	
VEHICLE DETAILS		RATE CALCULATION	
Vehicle		Target fert/m run	Target rate x bout width 10000
Registration #		Fertiliser caught	kg
Engine speed	rpm	Time catching	sec
PTO speed	rpm	Fertiliser Flow rate	kg/min
Travel Distance	m	Target travel speed	km/h
Travel Time	sec		
Travel Speed	km/h		
SPREADER DETAILS		MISCELLANEOUS	
Brand		Wind Speed	m/s
Model		Wind Angle to Travel	deg
Spreader type		Tray Size	m ²
Condition		Tray Spacing	m
Age			
Discharge height	m		
Spinner Revs			
Door			
Vanes			
Bout width	m		
Spread Width	m		
Adjacent bouts	Round+Round To+Pro		

Prepared with support of MPI Sustainable Farming Fund, Foundation for Arable Research and Fertiliser Association

CATCH DETAILS Run Number:		
Tray	Dist from Centre	Weight
-20		
-19		
-18		
-17		
-16		
-15		
-14		
-13		
-12		
-11		
-10		
-9		
-8		
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Prepared with support of MPI Sustainable Farming Fund, Foundation for Arable Research and Fertiliser Association

The sheet is formatted to ensure you collect the data needed for analysis. It has space for up to 41 collector trays; 1 in the centre and 20 left and right.

When you have collected the data in your FACC field sheet, login and use the Start Assessment tab to understand your current configuration and run simulations by adjusting the bout widths.

Fertiliser Rate Calculation

The Rate Calculator calculates the spreader travel speed needed to achieve the target application rate. You can use this to help ensure the correct amount of fertiliser is applied to the paddock.

NOTE: This page does not save your data – it is only a calculator.

NOTE: Yellow boxes are required info, grey calculated values.

Calculating Rates

- On the Home Page, click the [RATE CALCULATOR] tab
- Enter the Target Application Rate (kg/ha)
- Enter the proposed Spreader Bout Width (m centre to centre)

The amount of fertiliser discharge per metre of spreader travel will be calculated

Measure the amount of fertiliser being discharged in a certain time

- Enter the amount of fertiliser caught
- Enter the time taken
- The Spreader Discharge (Flow) Rate will be calculated

Field	Value	Type
Target Rate	250	Required
Bout Width	22	Required
Fertiliser/m Travelled	0.55	Calculated
Fertiliser Caught	65	Required
Time Catching	35	Required
Flow Rate	111.43	Calculated
Target Travel Speed	12.16	Calculated
Actual Travel Speed	11	Required
Actual Rate (kg/ha)	276.27	Calculated
Actual / Target (%)	110.51	Calculated

The Target Travel Speed required to obtain the Target Application Rate will be calculated

Measure the Actual Travel Speed

- Enter the Actual Travel Speed
- The Actual Application Rate will be calculated
- The percentage of Actual to Target Application Rate will be calculated

Make speed adjustments to correct the error and obtain the desired Application Rate

Fertiliser Spread Analysis

Spread analysis uses data from field tests to calculate the uniformity of application by broadcast spreaders. Fertiliser collected from catch trays across a pass of the spreader is weighed, and data entered in FertSpread. The Application Rate and Coefficient of Variation for the actual and alternative bout widths is calculated for both round-and-round and to-and-fro applications.

Assess application rate and uniformity

To start a new analysis,

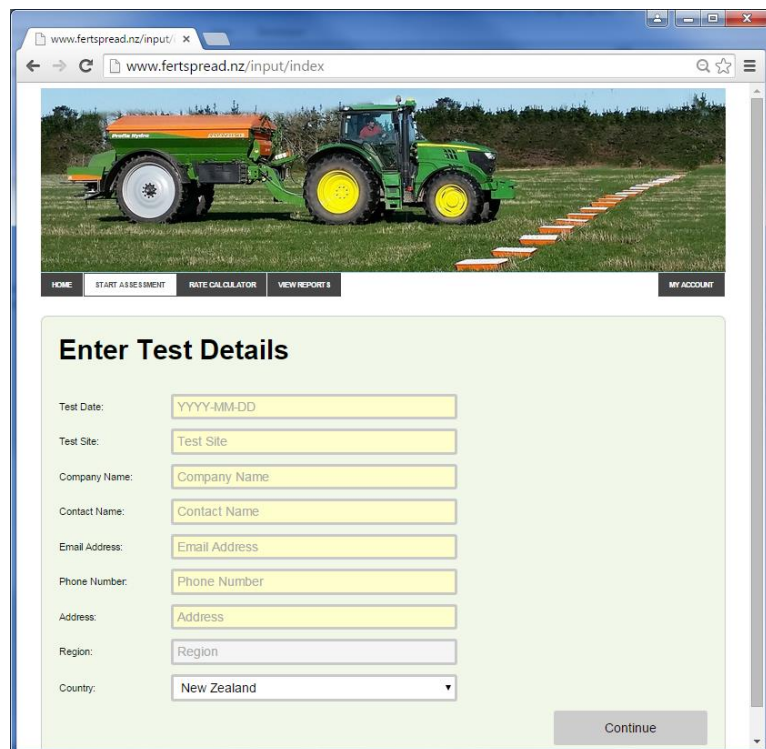
- Click the [START ASSESSMENT] tab to access the **Test Details** form

NOTE: Yellow boxes must be filled in to progress to further Forms. This data is essential for calculations

NOTE: A new test will label this form "Enter Test Details". When editing an existing test, this form will be labelled "Edit Test Details".

Test Details

- Enter the Test Date (format shown)
- Enter a name for the Test Site
- Enter the Company Name
- Enter the Contact Name
- Enter the contact's email address
- Enter the Contact's phone number
- Enter the Contact's postal or physical address
- Optionally, enter the region
- Optionally change the country (default is New Zealand)
- Click the [CONTINUE] button



The screenshot shows a web browser window with the URL www.fertspread.nz/input/index. The page features a header image of a green tractor with a fertilizer spreader in a field. Below the image is a navigation bar with links: HOME, START ASSESSMENT, RATE CALCULATOR, VIEW REPORTS, and MY ACCOUNT. The main content area is titled "Enter Test Details" and contains a form with the following fields:

- Test Date: YYYY-MM-DD
- Test Site: Test Site
- Company Name: Company Name
- Contact Name: Contact Name
- Email Address: Email Address
- Phone Number: Phone Number
- Address: Address
- Region: Region
- Country: New Zealand (dropdown menu)

A "Continue" button is located at the bottom right of the form.

Vehicle Details

No fields in this form are used for calculations. They are used to identify the tractor or other spreader carrier being used and to record data about the test, and that may be used in the Rate calculator.

- Enter a vehicle description
- Enter vehicle registration number
- Enter operating engine speed
- Enter operating PTO speed
- Enter the travel distance for a speed test
- Enter the travel time taken
- Travel Speed will be calculated
- Alternatively, enter only the Travel Speed
- Click the [CONTINUE] button

www.fertspread.nz/report/editVehicleDetails

HOME START ASSESSMENT RATE CALCULATOR VIEW REPORTS MY ACCOUNT

Update Vehicle Details

Vehicle: JCB

Registration #: Registration #

Engine Speed: 0

PTO Speed: 1250

Travel Distance: 50

Travel Time: 35

Travel Speed: 5.14

Continue

Spreader Details

This form contains optional fields to record details about the spreader whose performance is being assessed and operating settings and three compulsory fields for data used in calculations.

- Enter the spreader make
- Enter the spreader model
- Enter an assessment of the spreader's condition
- Enter the spreader age
- Enter the discharge height - the height of the disc or spout above ground level when spreading
- Enter spinner revs
- Enter discharge door/trap settings
- Enter vane settings
- Enter the test Bout Width
- Enter the fertiliser Spread Width
- Specify if adjacent bouts are "To and Fro" or "Round and Round"
- Click the [CONTINUE] button

www.fertspread.nz/report/editSpreaderDetails

HOME START ASSESSMENT RATE CALCULATOR VIEW REPORTS MY ACCOUNT

Update Spreader Details

Make: Vicon

Model: GeoSpread

Condition: Good

Age: 3

Discharge Height: 2

Spinner Revs: 540

Door: Auto

Vanes: Vanes

Bout Width: 24.00

Spread Width: 40.00

Adjacent Bouts: TF

Continue

Fertiliser Details

This form is used to record details for the fertiliser product used for the spreader assessment. It includes fields that are used to calculate product Size Guide Number (SGN) and Uniformity Index (UI).

- Enter the fertiliser name/type
- Specify whether the fertiliser is Nitrogenous
- Enter the Target Application Rate (kg/ha)
- Enter product density (kg/L)
- Enter the percent of product captured in each sieve tray. (Enter 0 for any sieve tray with no product captured)
- The percent sum will be calculated as a check
- The Size Guide Number will be calculated
- The Uniformity Index will be calculated
- Click the [CONTINUE] button

Update Fertiliser Details

Fertiliser Product:

Nitrogen Based:

Target Rate (kg/ha):

Bulk Density (kg/L):

Sieve Sizes (mm):

Pan:

0.5 Aperture Size:

1.0 Aperture Size:

1.5 Aperture Size:

2.5 Aperture Size:

3.7 Aperture Size:

4.7 Aperture Size:

5.5 Aperture Size:

7.0 Aperture Size:

Sum:

Size Guide Number:

Uniformity Index:

Catch Details

This form records information about the layout of catch trays and the amount of product caught in each.

- Enter the number of trays used
- Enter the tray size
- Enter the tray spacing
- Optionally enter the Wind Speed
- Optionally enter the Wind Direction (0° is direction of travel, 90° is directly from the right side looking in the direction of travel)
- Enter the catch data for each tray. (Zero is the tray under the spreader, Left is trays to the left when looking in the direction of travel)
- Click the [CONTINUE] button

Update Catch Details

Tray Count:

Tray Size:

Tray Spacing:

Wind Speed:

Wind Direction:

Tray	Distance from Centre (m)	Weight (g)
-16	-10.00	0.14
-15	-10.00	0.48
-14	-10.00	0.82
-13	-10.00	1.44
-12	-10.00	2.27
-11	-10.00	4.03
-10	-10.00	3.88
-9	-10.00	3.54
-8	-10.00	4.9
-7	-10.00	4.99
-6	0.0	4.98
-5	0.0	5.03
-4	4.00	3.77
-3	8.00	4.29
-2	8.00	5.05
-1	10.00	3.79
0	10.00	1.54
1	14.00	0.63
2	18.00	0.28
3	18.00	0.1
4	20.00	0

NOTE: Clicking the [CONTINUE] button saves the project in a database so reports can be created. Exiting before this stage will result in data being discarded.

View Reports

To view results (reports) or edit data in a test, access the View Reports page.

- Click the [VIEW REPORTS] tab
- Select a report from the DropDown list

View a report

To preview the results as a report

- Click the [VIEW REPORT] button
- A report preview will be displayed

Print a Report

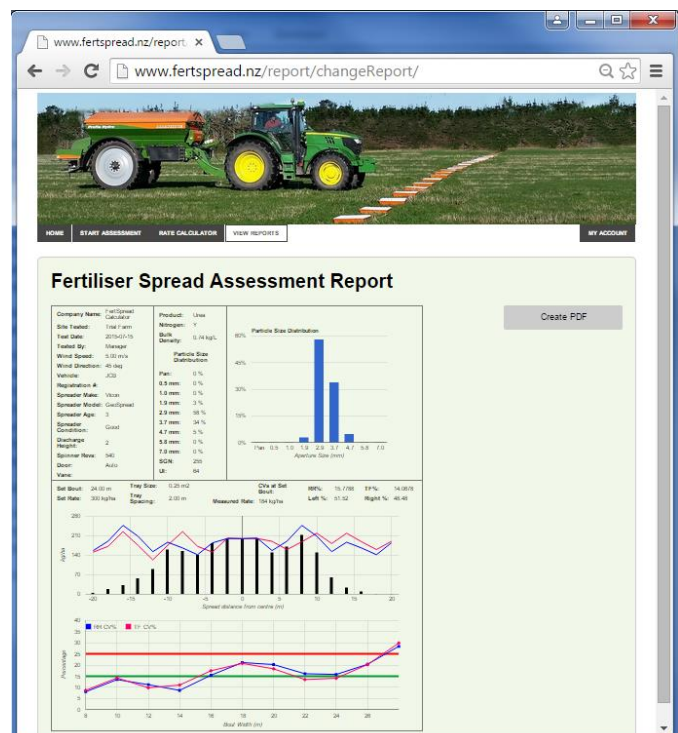
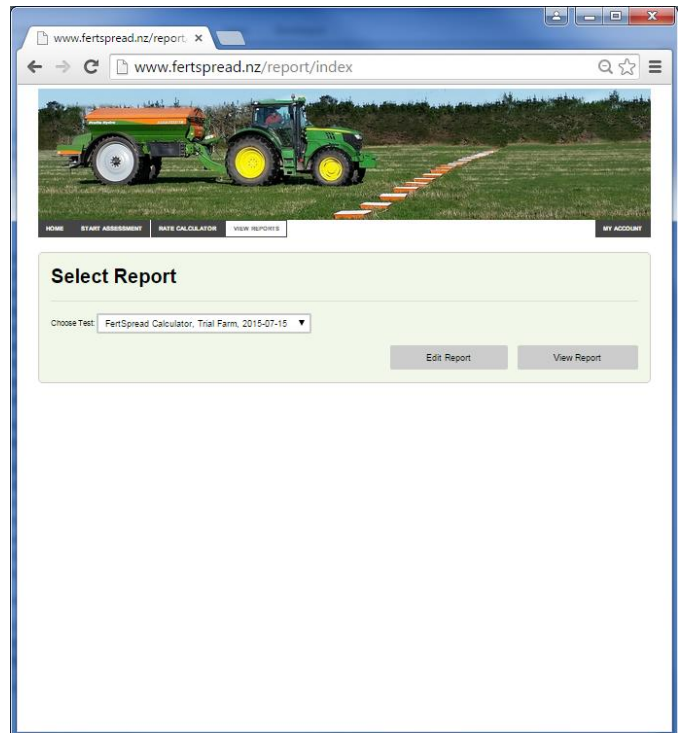
To generate a report for printing or sending electronically

- Click the [Create PDF] button
- A PDF format file will be downloaded to your device
- Save the file as appropriate

Edit a Report

To edit an existing report

- Click the [EDIT REPORT] button
- The test will open at the first form in the Assessment Page
- Click through the forms making desired changes



Why FertSpread?

The Sustainable Farming Fund “On-Farm Fertiliser Applicator Calibration” project arose from repeated requests by farmers for a quick and simple way to check performance of fertiliser spreading by themselves or contractors. They wanted to know that spreading was acceptable.

Fertiliser applicator manufacturers provide guidelines to calibrate equipment but usually only the bulk application per hectare is determined, not the uniformity of application. This is a critical omission, as poor distribution significantly impacts yield and increases risk of leaching losses.

A calibration check includes assessment and correcting of both application rate (kg/ha) and uniformity (CV). Farmers indicated that checking the paddock application rate is reasonably easy and commonly done. Very few reported completing any form of uniformity assessment.

Fertiliser application calibration procedures suitable for farmers applying nutrients with their own equipment allow on-farm checks to ensure and demonstrate application equipment is performing to expectations.

Uniformity requires collection of samples from a spreading event and calculation of a uniformity value. It will involve either physical or theoretical over-lapping of adjacent swaths. Use of standard test trays is strongly advised, given the need for baffling to stop fertiliser bouncing out.

Weighing samples is complicated by the very small quantities involved – often a single prill in the outer containers. Scales weighing to 0.01g are required, but satisfactory options are readily available at reasonable price. If a larger sample is wanted, two or more runs at the chosen application rate should be made rather than applying some higher rate.

FertSpread was developed to process collected field data and generate statistical reports. Key outputs are measured application rate, the CV at the specified bout width and the bout width range at which CV is within accepted limits.

The results of the uniformity test are given as the bout width where the coefficient of variation (CV) does not exceed a specified level. The maximum accepted CV is 15% for nitrogenous fertilisers and 25% for low analysis fertilisers.

The SFF project was co-funded by the Foundation for Arable Research and the Fertiliser Association.