



Marshall Multispread App MDC Hyd Controller – Static Calibration Procedure

Background

This document outlines a procedure for calibrating the MDC hydraulic controller to accurately determine the fertiliser calibration factor. The default material density values provided within the app are to be used as a guide only and should be fine tuned using a static calibration test.

The static calibration test consists of setting a simulated speed and operating the spreader in a stationary position whilst fertiliser is discharged from the hopper. The material discharged is weighed to determine the actual fertiliser application rate. From the actual application rate a revised material density value can be determined.

Prerequisites

- Marshall Multispread App Version 4.2. Check the App contacts page to determine the current software version. Update to version 4.2 via the App store if required.
- Hydraulic Controller hardware, AUTO SCV or PWM Valve control
- If loadcells are not fitted to the spreader, a set of scales to weight the fertiliser that is discharged during the static calibration test.

Disclaimer

The Marshall Multispread is to be used in the Agricultural and Horticultural industries to apply granulated and non-granulated fertilisers. It is very important that you follow the Calibration procedures and Operating instructions contained within the Marshall Multispread app before use. Calibration and operation of the Marshall Multispread must be in accordance with these instructions. Use of the Marshall Multispread app is subject to the following disclaimer;

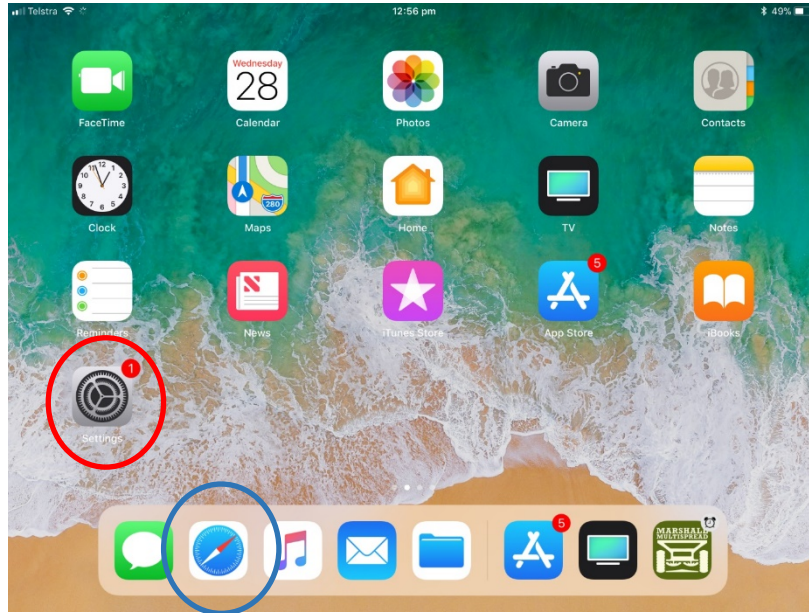
So far as is legally permissible Roesner Pty Ltd, or its distributors, shall not be liable, whatever the cause, for any increased costs, loss of profits, business, contracts, income, or anticipated savings or for any special, indirect or inconsequential damage;

The capabilities and functions of the Marshall Multispread are limited as set out in the specifications within this app and the standard operators manual. Without prejudice to the above it is hereby acknowledged that the Marshall Multispread is not designed nor intended to achieve application rates and spread widths outside the parameters calculated by the Marshall Multispread app.

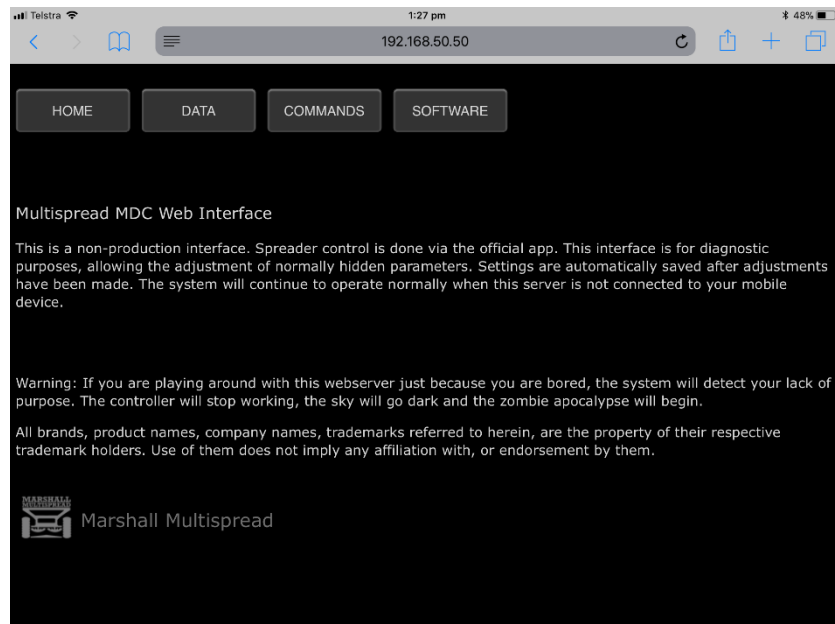
PRELIMINARIES

The iPad must be connected to the WI-FI network, MACHINE WIFI, prior to undertaking the static calibration test. To connect the MACHINE WIFI network, follow the instructions below.

1. From the iPad home screen, tap **Settings (Red Circle)**
2. Tap Wi-Fi
3. Turn on Wi-Fi, choose the network MACHINE WIFI. No password is required to connect to the MACHINE WIFI network.
4. Tap the iPad Home screen, and open the Safari Browser. **(Blue Circle)**

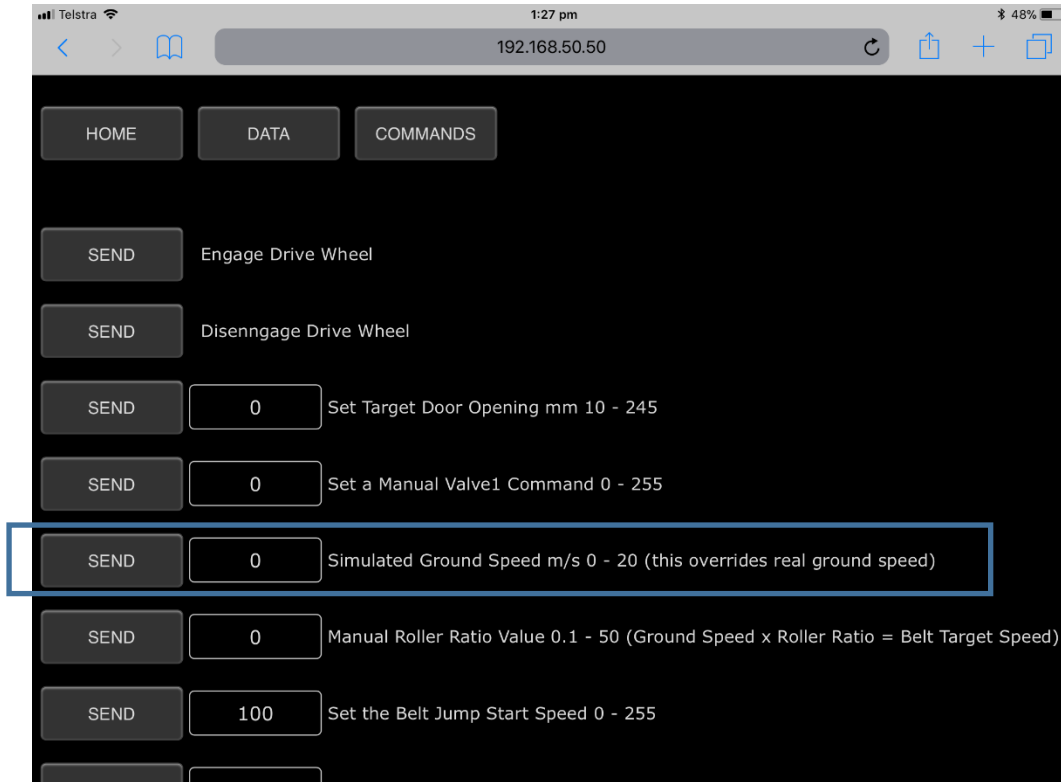


5. On the address bar type, **192.168.50.50**



6. Tap **COMMANDS**

7. On the COMMAND menu, enter the average working speed of the spreader in m/s. The conversion of m/s to km/h is shown in the table below. Press send to send the controller a simulated ground speed.

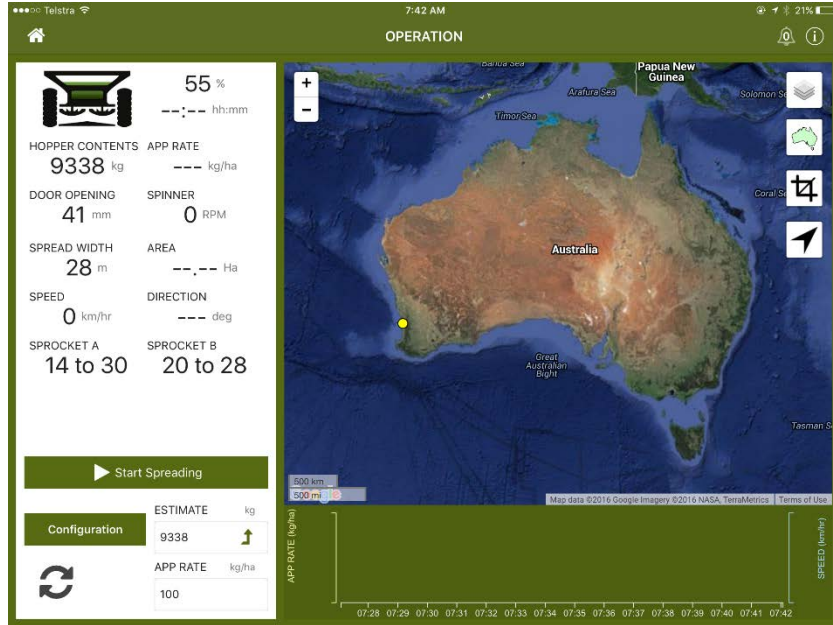


$$\text{Convert km/h to m/s} = \text{Speed (km/h)} * 0.27778$$

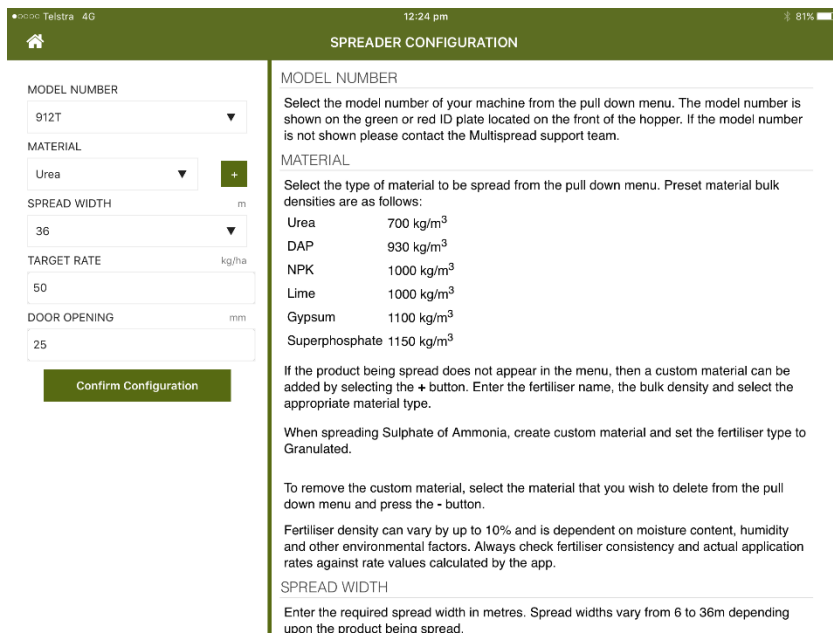
8. Press the iPad home button.

CALIBRATION TEST

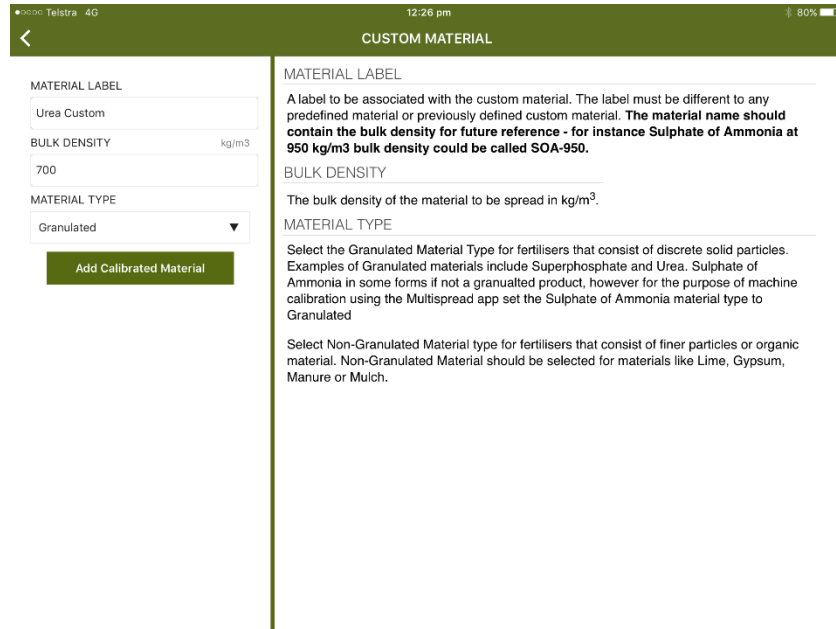
1. Open the Multispread app.
2. From the Operation screen, tap **CONFIGURATION**



3. Select the MODEL NUMBER from the Pull DOWN List



4. Create a new MATERIAL by tapping the **+** key next to the MATERIAL pull down.
5. Enter a label for the new material eg: **Urea Custom**, the bulk density from the fertiliser supplier documentation eg : **700 kg/m³** and the material type eg **Granulated**. Then tap **ADD CALIBRATED MATERIAL**



CUSTOM MATERIAL

MATERIAL LABEL
Urea Custom

BULK DENSITY kg/m³
700

MATERIAL TYPE
Granulated

Add Calibrated Material

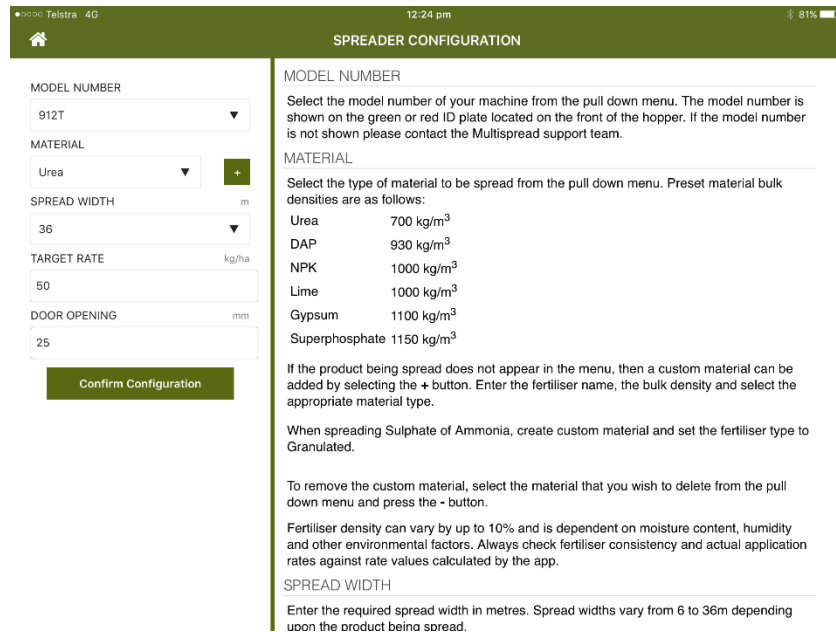
MATERIAL LABEL
A label to be associated with the custom material. The label must be different to any predefined material or previously defined custom material. **The material name should contain the bulk density for future reference - for instance Sulphate of Ammonia at 950 kg/m³ bulk density could be called SOA-950.**

BULK DENSITY
The bulk density of the material to be spread in kg/m³.

MATERIAL TYPE
Select the Granulated Material Type for fertilisers that consist of discrete solid particles. Examples of Granulated materials include Superphosphate and Urea. Sulphate of Ammonia in some forms if not a granulated product, however for the purpose of machine calibration using the Multispread app set the Sulphate of Ammonia material type to Granulated

Select Non-Granulated Material type for fertilisers that consist of finer particles or organic material. Non-Granulated Material should be selected for materials like Lime, Gypsum, Manure or Mulch.

6. Choose Urea Custom from the material pull down menu. Enter the spread width, target application rate and hopper door opening. The table below outlines suggested door openings for different fertiliser types, spread widths and ground speeds.



SPREADER CONFIGURATION

MODEL NUMBER
912T

MATERIAL
Urea

SPREAD WIDTH m
36

TARGET RATE kg/ha
50

DOOR OPENING mm
25

Confirm Configuration

MODEL NUMBER
Select the model number of your machine from the pull down menu. The model number is shown on the green or red ID plate located on the front of the hopper. If the model number is not shown please contact the Multispread support team.

MATERIAL
Select the type of material to be spread from the pull down menu. Preset material bulk densities are as follows:

Urea	700 kg/m ³
DAP	930 kg/m ³
NPK	1000 kg/m ³
Lime	1000 kg/m ³
Gypsum	1100 kg/m ³
Superphosphate	1150 kg/m ³

If the product being spread does not appear in the menu, then a custom material can be added by selecting the + button. Enter the fertiliser name, the bulk density and select the appropriate material type.

When spreading Sulphate of Ammonia, create custom material and set the fertiliser type to Granulated.

To remove the custom material, select the material that you wish to delete from the pull down menu and press the - button.

Fertiliser density can vary by up to 10% and is dependent on moisture content, humidity and other environmental factors. Always check fertiliser consistency and actual application rates against rate values calculated by the app.

SPREAD WIDTH
Enter the required spread width in metres. Spread widths vary from 6 to 36m depending upon the product being spread.

7. **Confirm Configuration** to calculate the target belt speed to achieve the target application rate and to return to the Operation screen. If a door actuator is fitted the door will be driven to the requested opening. If the door actuator is not fitted, **manually set the door to the requested opening.**

SUGGESTED DOOR OPENINGS

Product	Door Opening (mm)	Speed Range (km/h)	Spread Width Range (m)	App Rate Range (kg/ha)
Urea	25	12 – 24	18 – 36	50 – 150
Superphosphate	30	14 – 25	18 – 36	70 - 250
Lime/Gypsum	75	13 – 20	6 – 12	500 - 2100

STARTING THE TEST

ENSURE THE SPINNERS ARE NOT ENGAGED

1. Load the hopper with the fertiliser and record the hopper contents (from the loadcells if fitted). Back the spreader up to the fertiiser pile.
2. It is important to prime the spreader prior to starting the test. Turn on the oil flow to the feedbelt circuit, and press **Start Spreading**. The simulated speed will be shown on the operating screen and the belt will start turning.
3. Allow the belt 15 seconds to prime the spinners. Press **Stop Spreading**
4. Remove any fertiliser that is sitting on the spinners – this can be done by turning the spinners on momentarily at speed less than 100 RPM.

The static calibration procedure can now commence.

5. Position a container or tarpaulin for capturing the fertiliser dispensed under the spinner discs and around the spinner shroud.
6. Ensure the oil flow to the feedbelt circuit is on. From the App operation screen press **Start Spreading**
7. The belt will start turn and the hectares will accumulate on the Operating Screen.
8. Allow the belt to run for 1 Ha. Press **Stop Spreading** when the area meter reaches 1 Ha.
9. Clean any fertiliser of the spinner disc.
10. Weigh the fertiliser collected and determine the actual application rate.

FINE TUNING APPLICATION RATE

To fine tune the application rate the fertiliser density is recalculated. To recalculate the bulk density the following formula is used :

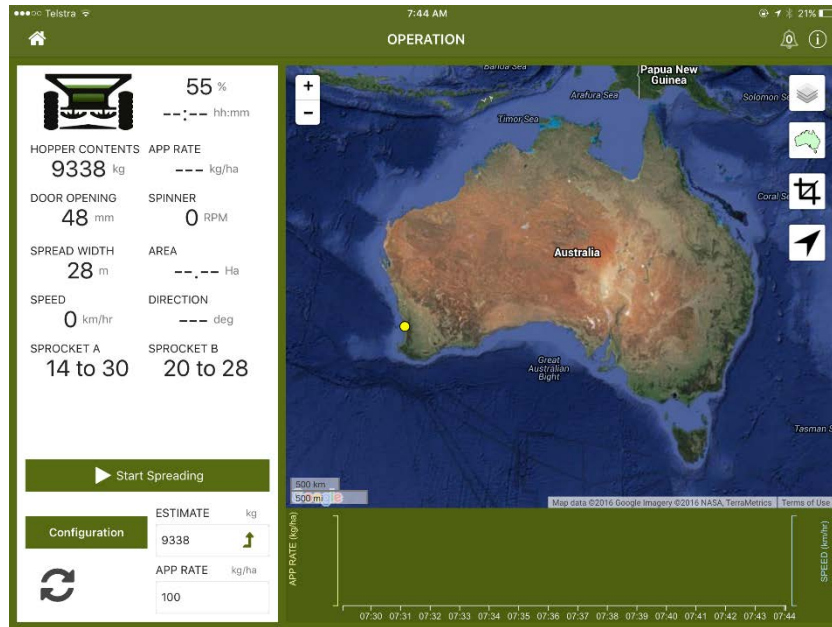
$$\text{New Bulk Density} = \frac{\text{Actual Application Rate}}{\text{Target Application Rate}} \times \text{Initial Bulk Density}$$

Actual Application Rate	55 kg/ha
Target Application Rate	50 kg/ha
Initial Bulk Density**	700 kg/m ³
New Bulk Density	770 kg/m ³

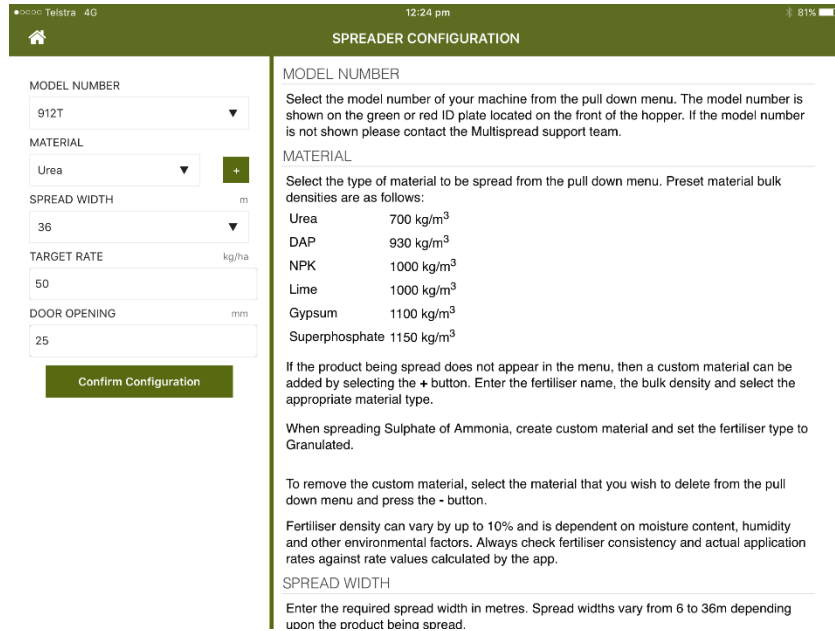
** Initial Bulk Density entered in Custom material (page 4, Step 5)

ENTERING THE NEW BULK DENSITY INTO THE MDC APP

Step 1 : From the Operation screen, tap **CONFIGURATION**

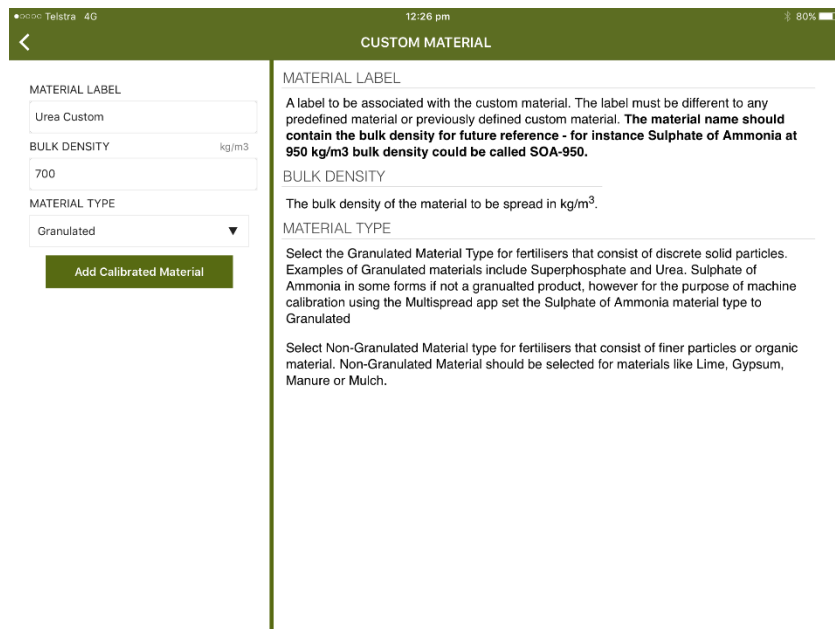


Step 2 : Select the material from the pull down menu, **Urea Custom** and tap the **-** key next to the MATERIAL pull down. This deletes the previous Potash custom material.

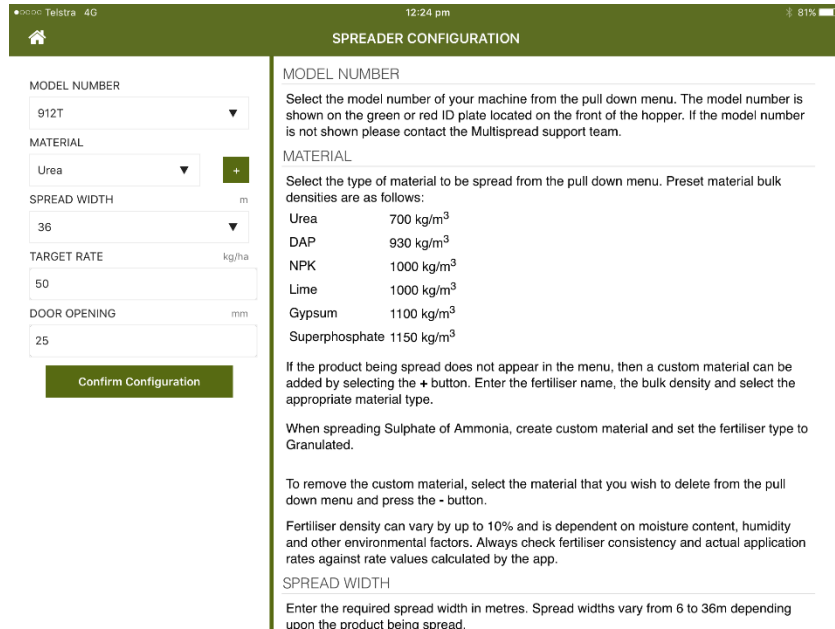


Step 3 : Create a new MATERIAL by tapping the **+** key next to the MATERIAL pull down.

Step 4 : Enter a label for the new material eg: **Urea Recal**, the bulk density eg : **770 kg/m3** and the material type **eg Granulated**. Then tap **ADD CALIBRATED MATERIAL**



Step 5 : The app then returns the Spreader Configuration Screen, Tap **Confirm Configuration**, to return to the Operation Screen.



The app will re-calculate the target belt speed and when starting work the new target belt will be used to control the spreader feedbelt.

Should you wish to refine the material density, re-run the static calibration. Alternatively, you can fine tune the material density over a larger paddock area in a normal spreading situation.

AFTER COMPLETING THE STATIC CALIBRATION PROCEDURE, IT IS RECOMMENDED THAT THE MDC CONTROLLER IS REBOOTED.

NOTES :

To fine tune the default fertiliser types installed in the app including Superphosphate, DAP, NPK, Urea, Lime and Gypsum use the following initial bulk densities :

Fertiliser Type	Bulk Density
Urea	811.3
DAP	1057.7
NPK	1153.8
Super	1201.9
Lime and Gypsum	1051.7

The initial bulk densities are based on a large number of physical tests and they vary from the bulk density values quoted by fertiliser suppliers. These variations are caused by changes fertiliser consistency and how each product flows through the spreader feed door.

It is important that NON-GRANULATED and GRANULATED material types are selected when creating a new material.