

USER GUIDE
EC-10 Plate Meter



Tru-Test recommends the use of Jenquip Pasture Management Software. This software is required in order to download data from the plate meter. It takes the information from your farm walk and produces ready-to-use reports. Jenquip Pasture Management Software is supplied with your plate meter on a USB stick. For all support, phone 0800 AGDATA (0800 243282).

Computer requirements: Windows XP or later.

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Introduction

Congratulations on the purchase of your Tru-Test EC-10 Plate Meter (plate meter). This plate meter is a high precision engineered device for measuring the average height of pasture relative to density of the pasture.

This is directly relative to the quantity of dry matter present (kilograms of dry matter – kg DM/ha).

Your plate meter will become an invaluable tool in your farming operation for day-to-day feeding decisions and long term feed budgeting.

Important safety note

Read and understand all the instructions before using the plate meter. A copy of this user guide can be downloaded from www.livestock.tru-test.com

Your plate meter is designed only for measuring pastures. Use it for no other purpose (e.g. it is not a walking stick). We have manufactured the plate meter using quality materials and manufacturing techniques, however, if faults do occur, have them corrected before you use the plate meter.



Be careful around electric fences. Parts of the plate meter will conduct electricity!

Store the plate correctly. Be careful that the wind does not blow the plate away - it could be dangerous. It is not to be thrown.



Water blasting or submerging the unit will void the warranty.

Assembly instructions

The plate meter is supplied in three parts:

The plate

The heavy duty plastic plate sits on top of the pasture to establish average height and density. The area of the circle and weight of the plate have been carefully calibrated.

The rod and shaft with meter

The grooved rod allows pasture to be measured in 0.5 cm intervals (clicks). The yellow shaft includes the electronic meter.

The handle

The black handle can be adjusted to suit the height of the user.

To assemble the plate meter:

- 1 With one hand, hold the yellow shaft vertically with the counter towards the ground. The grooved rod will slide down through the shaft.



- 2 With your other hand, screw on the plate, making sure that the smooth side of the plate is uppermost (ribbed side closest to the meter).



- 3 Turn the plate meter the correct way up (plate down) and place it on the ground. The grooved rod will protrude out of the shaft. With one hand hold the grooved rod and with the other hand, screw on the black plastic handle. Be careful not to displace the small rubber O-ring on the top of the rod.

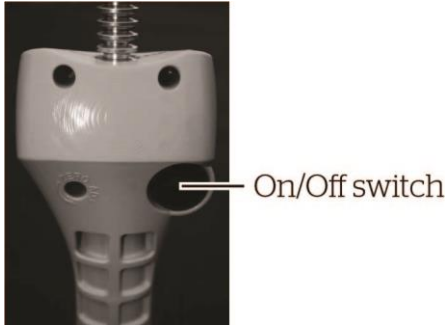


- 4 Use the buttons on the handle to adjust the handle so that it is a comfortable height.

Operating the plate meter

Switching the unit on and off

The plate meter is switched on and off using the black switch at the back of the unit. Off is in the 'down' position. When the unit is off, there are no numbers displayed on the LCD screen.



Front display buttons

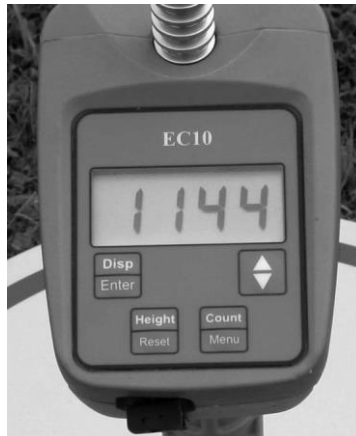
The functions of the plate meter are defined by the four buttons on the front of the unit:

Disp/Enter

Height/Reset

Count/Menu

Up/down arrows



(The words in **BOLD** type are the primary functions). Activate by pressing the button briefly. Activate the secondary functions (in normal type) by holding the button down until the function operates.



Press **Display** to show the current paddock number selected (1-100).

Press **Enter** to show the current paddock number selected (1-100).



Up/Down arrows used to scroll back and forth in some options.



When the **Count** button is pressed the number of readings is displayed. A "C" will show on the left side and count on the right.

Hold the button down to view **menu** of further options.



Height displays the average height of readings in clicks (0.5 cm).

Pressing **Reset** will save the average height to memory and reset all data ready for the next paddock.

Zero calibration

To ensure that the plate meter accurately measures the compressed height of pasture, the plate meter must be calibrated. This requires setting a base level of zero so measurements can be benchmarked against this. If the plate meter does not return to zero after each reading, it will not record the measurement - hence the plate meter will not beep.

If, for any reason, the plate meter is out of calibration, it will need to be recalibrated.

To calibrate the plate meter:

- 1 Hold the plate meter at the bottom of travel and ensure that the plate meter is switched off.
- 2 Locate the zero adjustment screw (beside the On/Off switch).
- 3 Remove the protective rubber bung by levering it out gently using a flat-bladed screwdriver.
- 4 Hold down the "Count" button while switching the unit on. The display will change to "CAL" briefly and display a colon (:) followed by a number. The colon (:) signifies that it is in fine calibration mode.

As an example, you might see ":5" when you switch on.

- 5 Using the flat bladed screw driver, turn the yellow plastic or steel shaft within the cog, anticlockwise, until the display reads "0".



The cog and steel shaft must remain stationary.



Do not turn the shaft beyond this point or you may damage the plate meter and void the warranty.



- 6 Once the counter reads zero, move the plate meter up the full length of the shaft. The colon will disappear once it passes 9 and enters "clicks" mode. At the full height the display should read approximately "50" which is 50 half centimetres. The plate meter has now been calibrated.
- 7 Switch off when you have finished, and then back on again without pressing any buttons.
- 8 Test the zero calibration by raising and lowering the plate all the way to the bottom several times. A beep should sound and the kg DM/ha displayed as the plate falls. If it does not, repeat the steps above and retest.
- 9 When you have finished calibrating the plate meter, replace the rubber bung over the zero adjustment screw.

If the calibration fails to hold, then the potentiometer, which the cog drives, is probably faulty and will need replacing. This can occur with excessive wear often compounded by dust and dirt entering the dry bearing of the potentiometer.

Start up/self test

Switch the unit on. It will beep and show "EC10" in the display panel. If the battery needs recharging it will beep 3 times and "lo" will display on the panel. The current formula in use will be displayed next with the "+" part of the equation first (default 500) and then the "x" part second (default 140).

The kg DM/ha calculation will be displayed based on that formula and any other readings stored in the memory.

The unit has one default plate equation (built into the chip and cannot be replaced or edited) and one custom (user editable) equation. This equation is typically used in New Zealand between April and September.

2001 research provided new formula options more relevant to regions, pasture types and management techniques, i.e. irrigated pasture. This research also provided equations which more accurately reflect the physiological state of pasture - e.g. vegetative versus reproductive state.

Examples: Cover (kg DM/ha) = 158 x height
 Cover (kg DM/ha) = 158 x height + 1000
 Cover (kg DM/ha) = 158 x height + 200

The plate meter also provides an option for selecting your own equation or those recommended by consultants, such as Dairy NZ or Beef + Lamb NZ. Your plate meter will be set up for the Dairy NZ recommended equation for the autumn/winter months. See *Dairy NZ formulas* on page 9.

Entering the factory default formula

While the plate meter is switched on, hold down the "Menu" button. The display shows 'F_ _ d' Press "Enter". The display will then show (500) and then (140). The default formula has now been loaded and saved to memory.

To enter your own formula, see *Entering your own formula* on page 10.

Other formulas

To better reflect the growth stages of pastures these formulas were derived:

Seasonal variations of formulas

- 1 Winter & early spring - before stem growth $\times 125 + 640$
- 2 Late spring & early summer - during stem growth $\times 130 + 990$
- 3 Mid summer $\times 165 + 1480$
- 4 Early autumn - before autumn rain $\times 159 + 1180$
- 5 Late autumn - after rain $\times 157 + 970$

Dairy NZ formulas

Dairy NZ also developed these month based formulas:

<u>Months (Southern hemisphere)</u>	<u>Plate meter equations (Dairy pastures)</u>
Winter (April/September)	Plate meter reading $\times 140 + 500$ (factory default)
October	Plate meter reading $\times 115 + 850$
November	Plate meter reading $\times 120 + 1000$
December	Plate meter reading $\times 140 + 1200$
January	Plate meter reading $\times 140 + 1200$
February	Plate meter reading $\times 185 + 1200$
March	Plate meter reading $\times 170 + 1100$

<u>Months (Northern hemisphere)</u>	<u>Plate meter equations (Dairy pastures)</u>
Winter (October/March)	Plate meter reading x 140 + 500 (factory default)
April	Plate meter reading x 115 + 850
May	Plate meter reading x 120 + 1000
June	Plate meter reading x 140 + 1200
July	Plate meter reading x 140 + 1200
August	Plate meter reading x 185 + 1200
September	Plate meter reading x 170 + 1100



Some equations may change without notice and are influenced by seasonal differences. If you are unsure of the current equation contact Dairy NZ or your local consultant.

Entering your own formula

To enter your own cover equation or one that may have been recommended by a third party, such as your consultant or Dairy NZ or Beef + Lamb NZ, please do the following:

- 1 While the plate meter is switched on, hold down the "MENU" button. The display looks like this: "F--d". Press the UP arrow once to change the "d" (default to "c" (custom). Press "Enter" and the display will show the first figure of the current "add" equation and may look like this: "0_ _ _". This is the first of two numbers you will enter. The first number is the equation "add" number and the second the "multiply" number. e.g. in the equation above, the number (115) is the "multiply" number and (850) is the "add" number.

- 2 The "add" number is 4 digits long and can range from 0-9999. This must be entered first. Starting with the first digit, press the "Up" arrow to change this digit to a value from 0-9. Press the "Enter" button when this is correct. Repeat the process until all four digits have been entered. The display then changes to the "multiply" number, which has only 3 figures.
- 3 The "multiply" number can range from 0-199. The first digit will appear as 0 or 1. Press the "Up" arrow button to change this digit to the desired value from 0 - 9. Press the "Enter" button when it is correct. *Note:* 850 for example would be entered as 0850. The next digit displayed will be whatever figure is part of the old formula. Use the "Up" arrow to change it, or just press "Enter" if it is correct. Repeat this process until all 4 digits have been entered. The display then changes to the "multiply" number, which has only 3 figures.
- 4 The "multiply" number can range from 0-199. The first digit will appear as 0 or 1. Press the "Up" arrow button to change this digit to the desired value of 0 or 1. Press the "Enter" button when it is correct and the next digit will appear. The last two digits can have values from 0-9. Repeat this process until all digits are entered and press the "Enter" button for the display to return to its normal state. Your new formula is now active and saved to memory.

As manufacturers we can only give broad guidelines with regard to the formula to use. For advice on creating custom formulas optimised for your particular farm and circumstances, contact 0800 AGDATA (0800 243282).

Using your plate meter

Principal of use

Place the plate meter squarely on the ground. The plate will "rise" as it rests on the grass, giving a reading of grass height ($\frac{1}{2}$ cm increments) on the bottom counter. At each measurement, click the top (sample) counter to record the total number of samples taken.

Technique

Practice the technique of an uninterrupted slow walking pace, taking care not to “roll” the plate meter. This is where the plate is not square to the ground and it will provide a false HIGH reading.



Lowering the plate meter consistently rather than rolling it, will provide a more accurate reading.

Farm walk

The more regularly you take readings the better. Astute farmers will take readings weekly, sometimes more often during critical times of the year and less frequently during times of static conditions.

The more samples taken per paddock the less margin of error. We recommend 20 to 40 samples per paddock but if you have bad conditions ie. pugged paddocks, then more samples should be taken.

Most paddocks will have areas of good growth and areas of poor growth. If recently grazed, the pasture may be clumpy. Ensure that your walk includes representative samples of both areas. Avoid tracks, stock camp sites and other uncharacteristic areas.

Take samples every 3 paces or so, rather than choosing by eye the spot to sample. This removes operator preference for long or short patches.



Be consistent. Plan the same walk every time although it can be done in reverse. This allows each walk to be compared with another.

Taking paddock readings (the pasture walk)

The plate meter can save recorded average height readings to a specific paddock number which can be selected on the plate meter. Via the mini USB cable these readings can then be downloaded from the plate meter and aligned with your

paddocks in “walk order” which will need to be defined in the Jenquip Pasture Management Software program.

How to take paddock readings:

- 1 Switch the unit on via the on/off switch at the back of the plate meter.
- 2 If starting the first paddock, ensure that the plate meter does not contain any old data. Press and hold the “Reset” button until display changes to 0. (There will be two short beeps.) Press and hold the “Menu” button. Press the arrow button twice until “P CL” appears (paddock clear). Press “Enter”. All recorded paddock data will be set to 0.
- 3 Press and hold the “Enter” button. You will see “E_ _ 1.” Scroll the numbers upwards using the arrow button. If you want to scroll back, hold the “Count” button while briefly pressing the “Arrow” button. The screen will go blank. The arrow (on its own) will scroll the numbers backwards. Press “Enter” at the paddock number you want to record. The paddock number will now be set. Check any time by pressing “Disp”.



The paddock number needs to match up with the paddock walk order number you have already defined in P-Plus.

- 4 Walk across the paddock taking readings every few paces. Every time a reading is stored a beep will sound. The kg/DM/ha is immediately recalculated and displayed.

Depending on the variance existing in the cover, the number of samples (readings) taken should range between 20 and 40 per paddock.

There will be 3 short beeps after completion of 29 readings, and one long beep at 30 readings. This is recommended as the minimum number of readings to be taken. Readings should be taken on a regular basis - say every five paces - to even out any variations. Avoid stock camp areas, tracks or uncharacteristic areas. The greater the variability of your paddocks, the higher number of readings you should take.

- 5 Switch the unit off whilst negotiating obstacles - fences or creeks so that no readings are taken if the plate moves. (All data recorded so far is saved.) Once

on the other side of the obstacle switch the unit back on and continue taking readings.



Undo Feature: If you make a mistake while taking readings, simply turn the unit off and hold down the reset button as you turn it back on. The word "UNDO" will display in the LCD window and the previous DM/kg reading will be displayed. The count will also be one less. Carry on taking readings from this point.

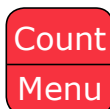
- 6 Once the paddock walk is completed hold the "Reset" button. Average height of the paddocks will display first, which is then saved to memory under that paddock number. A small triangle icon will appear in the top left hand corner indicating that paddock now contains data. The plate meter will also be reset to zero ready for the next paddock.
- 7 Repeat steps 3 to 6 until all the paddocks are complete.
- 8 Saved paddock data and paddock numbers can be viewed at any time by pressing the arrow key. The display will first show the paddock number and the average height that was recorded. Pressing the arrow key again will show the next paddock with data in it. Once the last recorded paddock is displayed, the plate meter will beep and return to the normal display.

You can escape the paddock display function at any time by pressing "Disp".

How to take paddock readings (step-by-step instructions)



Press & hold "Reset" button to clear any old data.



Press & hold the "Menu" button.



Press the arrow button twice until P CL (paddock clear) shows on the display.



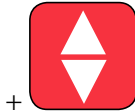
Press "Enter" and all data will be deleted.



Press & hold the "Enter" button.
E _ _ 1 will show on the display.



Press the arrow button to scroll upwards.



To scroll backwards hold the "Count" button and briefly press the arrow button.



To select the paddock press "Enter".



Start taking sample readings.

To save the data hold the "Reset" button. An arrow will show up on the top left corner indicating that the paddock has data stored in it.

Results from feed budgeting will assist in making important management decisions such as:

- Stocking rates
- Quantity of feed supplements to feed
- When to apply nitrogen fertiliser
- Predicting future shortages or surpluses of pasture
- Planning silage and hay making

- Drying off times
- Stock sale decisions
- Highlighting poor performing pastures or paddocks

Software

Tru-Test recommends the use of Jenquip Pasture Management Software. This software is required in order to download data from the plate meter. It takes the information from your farm walk and produces ready-to-use reports. Jenquip Pasture Management Software is supplied with your plate meter on a USB stick.

Use the Jenquip Pasture Management software to further process the plate meter readings and do your feed wedge:

Total Dry Matter = Kg Dry Matter per Hectare x Paddock Area

Growth Rate of Pasture

$$\frac{\text{Final kg DM/ha} - \text{Initial kg DM/ha}}{\text{Number of days between samples}} \text{ (kg DM/ha/day)}$$

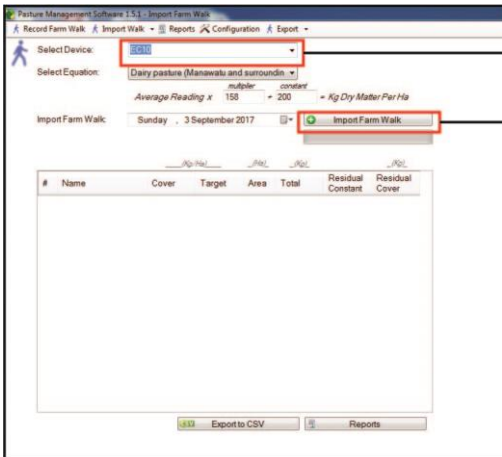
Using the Jenquip Pasture Management Software

Connecting the plate meter to the computer



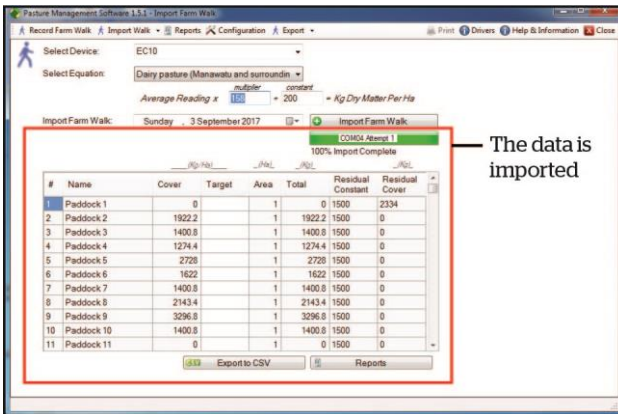
Load software onto computer
Connect USB cable to computer
and to the EC10. Attach cable to
the counter.

Downloading data from the plate meter



1. Select EC10.

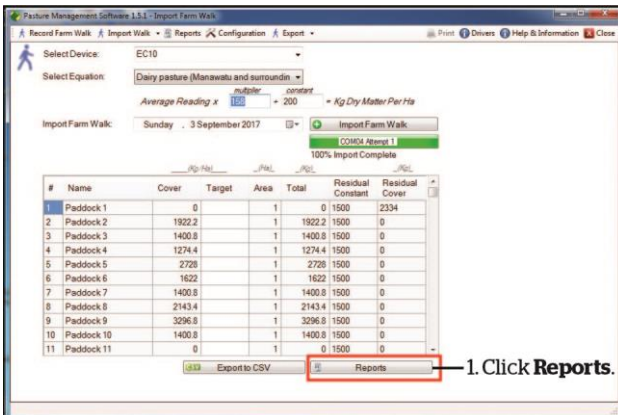
2. Click **Import Farm Walk**.

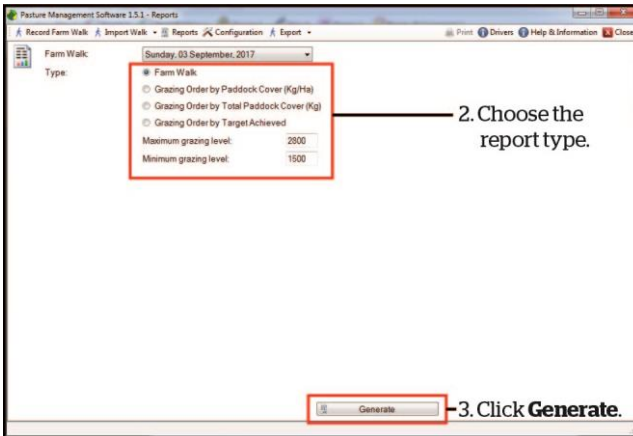


After you have downloaded the data from the plate meter, you can use the software to generate reports OR export the data as a CSV file.

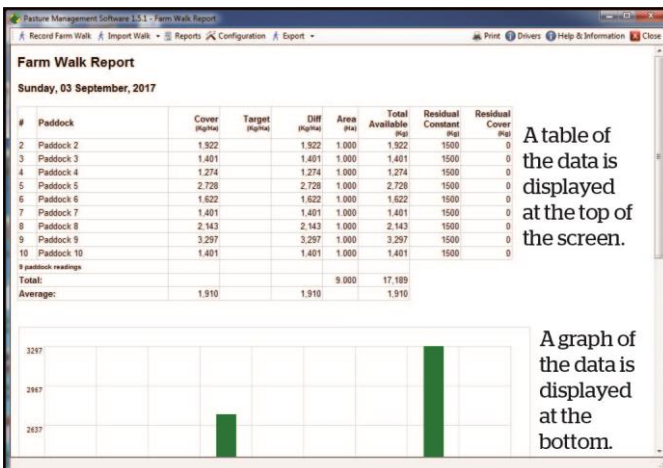
Generating a report

You need to import a farm walk before you can generate a report. See *Downloading data from the plate meter* on page 17.





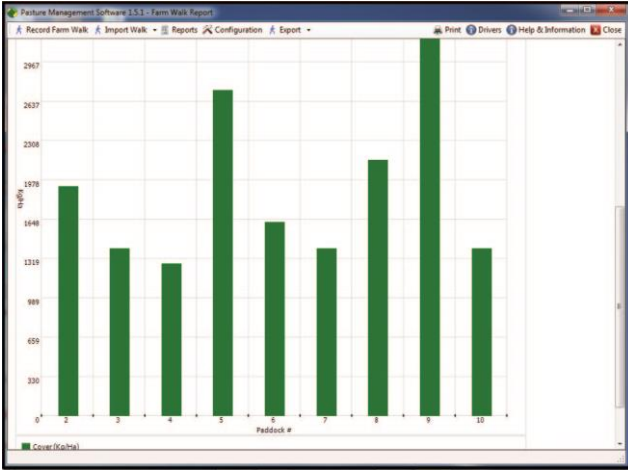
If you are generating a “Grazing Order by Paddock Cover” report, you can modify the figures for maximum and minimum grazing levels in order to adjust your feed wedge. For more detailed information about the various report types and using a feed wedge, click on **Help & Information** in the top, right-hand corner of the screen.



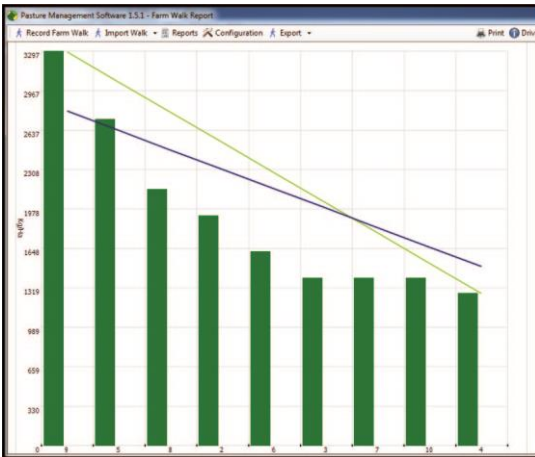
Example reports



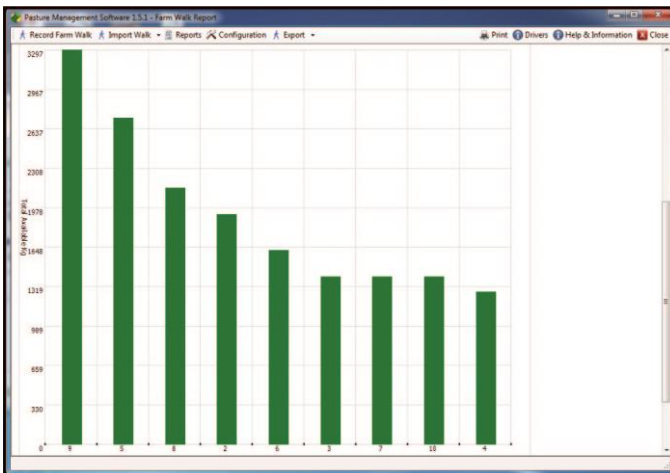
For information about the various report types, click **Help & Information** in the top, right-hand corner of the screen.



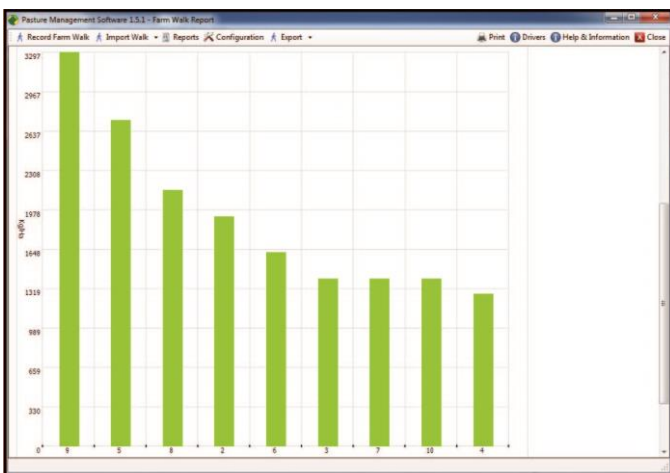
Farm Walk report



Grazing Order By Paddock Cover report



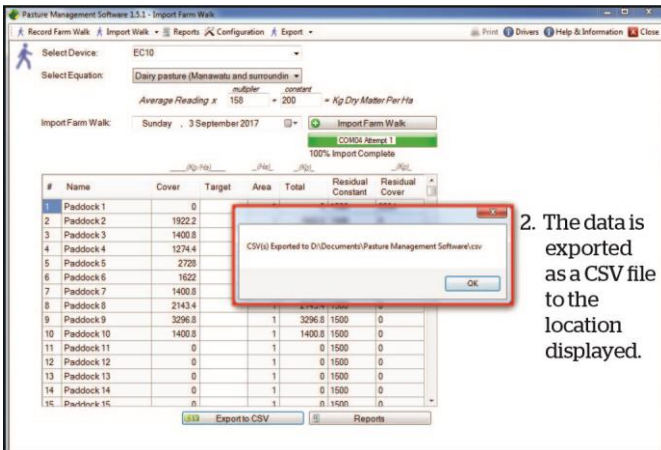
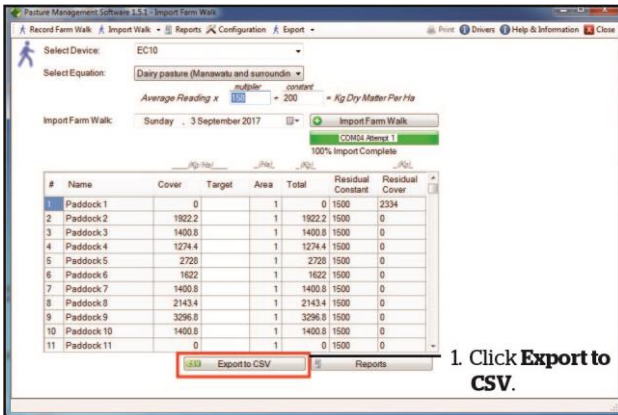
Grazing Order By Total Paddock Cover report



Grazing Order By Target Achieved report

Exporting data to CSV

You need to import a farm walk before you can export data as a CSV (comma separated values) file. See *Downloading data from the plate meter* on page 17.



The resulting CSV file can be opened by MS Excel or another third party software application.

Maintenance

Your plate meter has been developed over a number of years to be simple, effective, yet reliable. However, a little maintenance will ensure many years of trouble-free use from this plate meter.

Before use

After assembling the plate onto the meter, move the plate up and down a few times to ensure that no binding occurs. If its movement is restricted, the reason must be identified and resolved before the plate meter is used.

After use

Remove the plate and wash it clean.

Wash/wipe and dry the area around the bottom of the plate meter. Move the plate meter up or down the shaft so that all dirt and accumulated grass can be washed away.

Apply some dry lubricant or light oil to the hinge assembly and to the inside of the hinge lock tube. Store the plate meter in its folded position.



This is a precision instrument - look after it.

Water blasting or submerging the unit will void the warranty.

Replacing the battery

On start up if you get a "Lo" battery warning then the battery will need replacing over the next farm walk or two. A triangle icon in the top left hand corner also indicates a low battery. The plate meter is powered by a single 9 V battery. The use of an alkaline battery is recommended though a standard heavy duty battery will still work well. An alkaline battery should give 40-50 hours continuous use. A NiCad rechargeable battery may also be used.

Before you replace the battery, ensure that the plate meter is switched off. Remove the screw on the front of the plate meter. The battery retainer will slide out towards you.

Remove the battery and gently remove the battery snap connections (lever off with a screwdriver). Fitting the new battery is the reverse of the removal procedure.

If your battery is near the end of its life, it is a good idea to carry a spare with you.

Fault finding

There is no visual display:

Check	Resolution
The plate meter is not turned on	Turn on
The battery is flat	Replace the battery
If you have just changed a battery you may have damaged the battery snap clip to top of the battery.	Service: Send the plate meter to your service agent.

The plate meter continuously beeps and eventually turns off:

Check	Resolution
This is normally due to a low battery. The plate meter requires a given level of power to operate correctly. If the battery doesn't have sufficient power it may continuously beep to warn you.	Change the battery Battery may be due for replacement.
Remember if you turn the plate meter off for a few minutes it may recover slightly but the problem will not go away.	Requires electronic service.



Most problems are due to the plate meter being out of calibration (see following points as to why. If in doubt it is worth Zero Calibrating just to make sure it is correct (see page 6).

Check	Resolution
The cog has wound off.	Replace - Request a spare cog from your service agent.
Potentiometer damaged. The Potentiometer is the shaft part that drives the cog. NB: Under no circumstances should you apply CRC or a light oil to the potentiometer. It is a dry bearing and any lubricant will render the potentiometer useless).	Send the plate meter to your service agent for repair.
Check the metal shaft is coming right back into the base of the tube. Ensure that there is no grass or soil build-up preventing it from doing so. Also check the washer at the bottom of the shaft is not catching on the bottom of the plate.	Clean the plate meter.

The plate meter does not "beep" when taking a reading:

This means that the plate meter does not know where the bottom is - therefore does not record the reading.

Readings do not seem accurate:

Check

The counter is like a calculator - it does not give false readings under normal circumstances.

Cover Equations

In New Zealand there are a number of standard equations published by various organisations. These reflect regional pasture types. If you wish to change an equation or select alternative species you will need to contact your consultant. Traditionally the equation of height X 158 plus 200 was used however there has been a series of equations produced to reflect changes in pasture types and physiological state (vegetative, flowering, seed head) which can alter DM levels in the paddock.

A more accurate calibration can be achieved by taking cuttings or your consultant may be able to advise you on the most appropriate equation for your situation. This particularly applies to pastures under irrigation.

Resolution

Check the equation being used is correct and the calibration has been correctly set. (Zeroed).

Check what equation you are using.

Plate meter not running freely (low results):

<u>Check</u>	<u>Resolution</u>
Metal shaft is bent.	Straighten or request a replacement part from your service agent.
Grass or soil build-up inside case.	Clean the plate meter.
Flutes on steel shaft have become filled with grass or soil.	Clean the plate meter.

Front panel (membrane) problems:

<u>Check</u>	<u>Resolution</u>
Buttons not clicking or activating.	Service - membrane needs replacing. Send the plate meter to your service agent.

How do I change a formula?

<u>Check</u>	<u>Resolution</u>
The plate meter is switched on. If you wish to select the inbuilt default formula.	Hold down the 'Formula' button until the display changes to 'F__d'. While the 'd' is displayed, press the 'Reset' button. The following equation is used: $\text{Cover (kg DM/ha)} = 140 \times \text{height} + 500$

Warranty and servicing

For warranty and servicing information, see www.livestock.tru-test.com/en-nz/product-warranty

For all support, phone
0800 AGDATA (0800 243282)