

# **FILIP's FOLDING PLATE PASTURE METER**

## **Introduction**

Congratulations on the purchase of your *FILIP's Folding plate pasture meter*. This 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 ).

Learning to operate your *FILIP's Folding Plate Pasture Meter* won't take long. You will soon find it to be 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 meter.

- Your 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 meter using quality materials and manufacturing techniques however if faults do occur please have them corrected before you use the meter.
- Be careful around electric fences. Parts of the meter will conduct electricity.
- Store the plate correctly. Be careful that the wind does not blow a plate away - it could be dangerous. It is not to be thrown.
- Please retain this instruction book for future reference.

## Conditions of Sale and Guarantee

Your *JENQUIP* product is guaranteed to be free from defects in materials and/or workmanship under normal use and service for a period of 6 months from date of initial purchase.

*JENQUIP'S* liability and obligation is limited to problems which *JENQUIP* acknowledges to be defective under the guarantee conditions either to

- the free replacement or repair (where practicable) at the *JENQUIP* premises of any parts returned within the guarantee period

- or shipment of replacement parts to the customer, as mutually agreed to.

Supply of non standard parts or services from other than *JENQUIP* are not covered under the guarantee conditions unless prearranged, in writing, with *JENQUIP*

Shipment of product to *JENQUIP* is the consumers responsibility and cost Guarantee conditions are void for any of the following reasons:-

- Abnormal use of the product
- Accident damage or vandalism
- Modifications or unauthorised repairs to the product or its components
- Where component "seconds" have been supplied
- Normal wear and tear

*JENQUIP* cannot be liable for any damage caused to people or other property during use of the product or as a result of any defect or malfunction of product or components supplied by *JENQUIP*. Use of the product is solely the users responsibility. Other losses such as delays in work, incorrect or misleading information, omissions and errors, *JENQUIP* is not liable for.

This guarantee is expressed in lieu of all other guarantees expressed or implied and all other obligations and liabilities on *JENQUIP's* part and specifically excluding consequential damage. *JENQUIP* makes no guarantee of merchantability or fitness for purpose and is not responsible to any purchaser of its products for any undertaking, representation or guarantee, except those stated in these terms, made by any person, dealer or body corporate selling or dealing with its products in any manner whatsoever.

## Long Models & Extensions

As well as the standard 25 cm travel Filip's meter there is a 40 cm travel model available. For even longer pastures a 40 cm extension can be added.

By removing the bottom screw and washer, the extension can be fitted to the bottom of any Filip's plate meter. **Note:-** Be careful during this procedure—hold the slide tube at the top of it's travel. If the slide tube falls down there is nothing to stop it bottoming out and the gear can “bottom out” upsetting calibration or even causing damage.

Removing the extension is a reverse of the fitting procedure except do not refit the screw and washer. If the extension is regularly going to be used with the meter then the bottom stop of the extension replaces the screw and washer. Hence the bottom stop will always be fitted to either the meter or the extension so it will not be miss placed. Further to example on page 10:-

$$\begin{array}{l} \text{(Y)} \quad \text{(X)} \quad \text{(2 x extension)} \\ \underline{(00720 - 00420)} = 10 (+80) \times 158 + 200 = 14,420 \text{ Kg DM/Ha} \\ 30 \\ \text{(Z)} \end{array}$$

Note that double the extension is used as the meter measures in 1/2 cm increments

## Notes:-

### **C/. SUPPLEMENTARY FEED VALUES (APPROXIMATE)**

1 cubic metre of silage averages 800 kg (0.8 tonne). To estimate DM content of silage, twist the silage in your hand to see how easily the juice is expressed.

- If juice easily expressed by hand, DM below 18%
- If juice expressed with difficulty, 18-22%
- If little or no juice expressed but hands moist, 22-27%

### **Silage - Hay conversions**

- 1 tonne direct cut silage = 9 bales hay
- 1 tonne wilted silage = 15 bales hay
- 1 tonne maize silage = 14-15 bales hay

### **Hay**

Conventional bale of hay weighs 20-25 kg. A 25 kg bale has the approximate equivalent feeding value of:

- Two 14 kg bales of barley straw
- 120 kg direct cut silage
- 70 kg wilted silage and maize silage
- 16 kg barley meal
- 14-16 kg of pasture DM

## **How to Assemble The *Filip's Folding Plate Pasture Meter***

Your meter is supplied in three parts :

### **-The Mounting Bracket** for the plate.

Put this to one side. We will come back to it soon.

### **-The Plate.**

This light-weight circle of anodised aluminium sits on the top of the pasture to establish average height 1 density. The area of the circle and weight of the plate have been carefully calibrated to research data.

### **-The Folding Handle.**

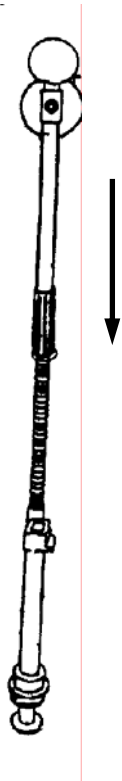
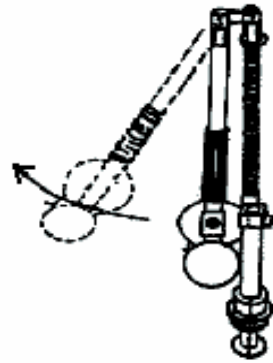
Also generally referred to as "the meter". A unique design allows this handle to fold into an easily carried tool.

The grooved part allows pasture to be measured in ½ centimetre intervals.

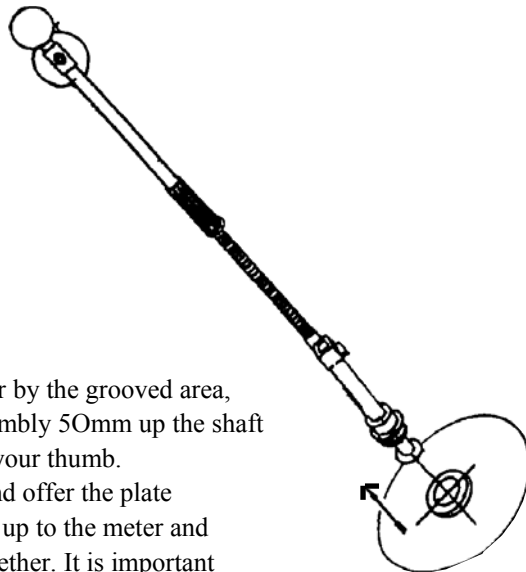
The lower counter accumulates centimetres, while the upper counter is for counting the number of samples taken in a specific area.

## To Assemble

- Hinge the handle to an upright position



- Slide the hinge lock tube over the hinge assembly



-Holding the meter by the grooved area, slide the tube assembly 50mm up the shaft and retain it with your thumb.

With the other hand offer the plate (printed side first) up to the meter and thread the two together. It is important that the printed side of the plate is upper most or incorrect readings will result.

Over drying is a possibility so be consistent with your procedure. Alternatively a microwave oven can be used. They have limited capacity so only small samples can be dried at a time. Leave a glass of water inside the oven to prevent arcing which otherwise could occur as the sample dries out. Drying time depends on the size of the sample but is usually less than 15 minutes.

- Once the sample is dry it is then weighed. If your sample area was 0.1 m<sup>2</sup> then

$$\text{Weight (gms)} \times 100 = \text{Kg DM / ha}$$

The more quadrats you cut in a paddock the better will be your result. Typically 3 to 5 samples per paddock are taken.

## DERIVING THE FORMULA

Although a long hand mathematical calculation can be used to derive the formula, the easiest method is to use a programmable calculator capable of regression analysis. The "average" pasture height reading is graphed against actual dry matter measured.

## B/. CONVERSION FACTORS

- Hectares x 2.471 = Acres
- Acres ÷ 2.471 = Hectares
- 1 Hectare = 10,000 square meters
- Kilograms x 2.205 = Pounds
- Kg DM / ha x 0.892 = lbs DM / Acre

$$(\text{lbs DM / Acre / day}) = \frac{\text{Final lbs DM / Acre} - \text{Initial lbs DM / Acre}}{\text{Number of days between Samples}}$$

## Addendum

### A/. CUTTING QUADRATS

To calibrate the meter you must first know exactly how much pasture is in the paddock. Cutting quadrats is the traditional scientific method of measuring dry matter, used almost universally for decades. Once the amount of Kilograms of Dry Matter (KgDM) are known then this can be compared with the readings obtained from the *Filip's Folding Plate Pasture Meter*. A formula converting the meter readings to actual KgDM / hectare can then be arrived at.

#### Cutting Quadrats

This involves sampling a number of quadrates (small areas) per paddock. There are variations of this method but a common version is described here :

- Make a template out of ½ steel rod, plywood sheet or similar stiff material. For longer pastures a "box" with no bottom works well. This can be any shape but the area of the hole in the template must be known. We recommend a template with a hole measuring 20cm x 50cm (ie. 0.1 m<sup>2</sup>).
- Place the template in the paddock where the pasture is typical of the rest of the paddock.
- Using shears or clippers, cut and collect all the pasture within the template right down to the soil level.
- Wash the sample to remove any soil or dung contamination. (Place the sample in a 20 litre bucket, turn a high pressure hose on it until the bucket is ¾ full. Pick any floating dung out of the bucket by hand and pour the water through a sieve or colander, catching the grass in the process but taking care to leave any lumps of soil in the bottom of the bucket. Repeat with a second rinse if necessary, and leave the colander to drain for a few minutes.
- Drying the sample. This can be done in a standard oven provided it is set on the lowest setting, 60 to 80 °C, and the oven door left open to let the moisture escape. Check with the cook first as this will generate a smell in the kitchen ! Drying time is overnight.

Adjust the top sample counter by loosening the grub screw with the Allen key provided. Move the counter until the push button is in a comfortable position , then retighten the grub screw. It may be necessary to rotate the counter around the shaft so that it does not obstruct the meter during folding and so that it does not protrude excessively.

### To Disassemble and Transport

This is the reverse of the assembly process, leaving the sample counter in position.

A Mounting Bracket for the plate is supplied with your meter. This may be bolted or welded to your farm bike or utility.

**Note:** Before welding on vehicles consult the owners manual for instructions and disconnect the battery! The galvanising should also be removed from the weld area. Protect all plastics etc from the welding.

When looking at various mounting positions for the bracket consider protection for the plate from dirt and damage, also a position where it does not obstruct other parts of the bike or its payload. Depending on the make and model of farm bike some positions are above the headlight, on the side or rear of the rear carrier or on the rear edge of the front carrier - virtually laying on top of the front mudguard.

When your pasture meter is not in use, the plate can be mounted securely to the bracket, while the handle folds down for easy storage.

## Optional Extras

- A **Storage Tube** which can be mounted on your farm bike or utility is available to safely store the handle. This ensures the meter is protected yet always available to use. The storage tube is particularly useful where the meter needs to be transported between farms.
- **Pasture Management Software.** Not essential but if you have a computer the software simplifies the feed budgeting process. This is a very simple easy to use programme. It takes the information from your farm walk and produces ready to use reports - no calculator required. Computer requirements: Windows 3.1 or later versions
- **All Weather Note Books.** A notebook is supplied with your meter but others can be ordered. These are pre printed for recording your farm walk readings. Biro pen or pencil can be used. We recommend pencil in wet weather. Pages are perforated so they can be removed and used or filed in the office. The reverse of each page can be used for general notes - a great asset to carry in your pocket for any purpose!

**Note:** If you are having problems, require assistance or spare parts please contact :

**JENQUIP**  
**REID LINE EAST, R.D. 5, FEILDING**  
**Ph (06) 323 6146 : FAX (06)323 6116**

We trust your meter will give you many years of valuable service and we are sure you will find feed budgeting to be very beneficial.

Regards  
*Merv George*

**Hints.-** It is possible to get a read out of Kg.DM/hHa in the paddock without using a calculator.

Step 1 - Using a felt tip pen, copy the relevant parts of the following table onto the plate.

Step 2. Move the plate up and down until an easily remembered figure is on the bottom counter i.e. 11,300

Step 3. Take 30 samples in the paddock. Note final reading and subtract it from initial reading. Round reading difference to the nearest on the chart and read off Kg.DM/Ha.

30 Plate Readings	x 158 + 200	KgDM/ha			Before	After
		Winter	Spring	Summer	Autumn rain	Autumn rain
50	465	850	1205	1755	1445	1230
100	730	1060	1425	2030	1710	1490
150	990	1265	1640	2305	1975	1755
200	1255	1475	1860	2580	2240	2015
250	1520	1680	2075	2855	2505	2280
300	1780	1890	2290	3130	2770	2540
350	2045	2100	2505	3405	3035	2800
400	2310	2310	2720	3680	3300	3060
450	2570	2515	2940	3955	3565	3325
500	2835	2725	3155	4230	3830	3590
550	3095	2930	3370	4505	4095	3848
600	3360	3140	3590	4780	4360	4110
650	3625	3350	3810	5055	4625	4370
700	3887	3560	4020	5330	4890	4630

## Maintenance

Your 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 meter.

### BEFORE USE

After unfolding the meter and assembling the plate onto it ; move the plate up and down a few times to ensure no binding occurs. If its movement is restricted the reason must be found and cured before the meter is used.

### AFTER USE

Remove the plate and wash it clean.

Wash and dry the area around the bottom of the meter. Move the sliding tube assembly so that all dirt and accumulated grass can be washed away.

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

This is a precision meter - look after it.

## Fault Finding

- Abnormally high or inconsistent results:-

Activate the top sample counter a few times to ensure it counts only 1 each time it is pushed. Over a period of time the top counter can dry out and record several counts at each activation. If this is the case some CRC light penetrating oil should be applied to the counter, either through the hole in the casing or preferably by stripping the counter apart (It maybe safer to return the counter to Jenquip for this servicing!). After several activation's the counter should again count correctly.

- High results:-

Check your technique to ensure you are not "rolling" the meter

-Low results:-

Ensure the bottom slide tube assembly is not binding during its travel up and down the grooved shaft.

## Using Your Filip's Folding Plate Pasture Meter

### PRINCIPAL OF USE

Place the 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 interrupted slow walking pace, taking care not to "roll" the meter. This is where the plate is not square to the ground and it will provide a false HIGH reading. Go ahead: try "rolling" and compare the results with placing the meter squarely on the ground. See what we mean?

### 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 5 to 10 paces 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. This allows each walk to be compared with another.

## RECORDING

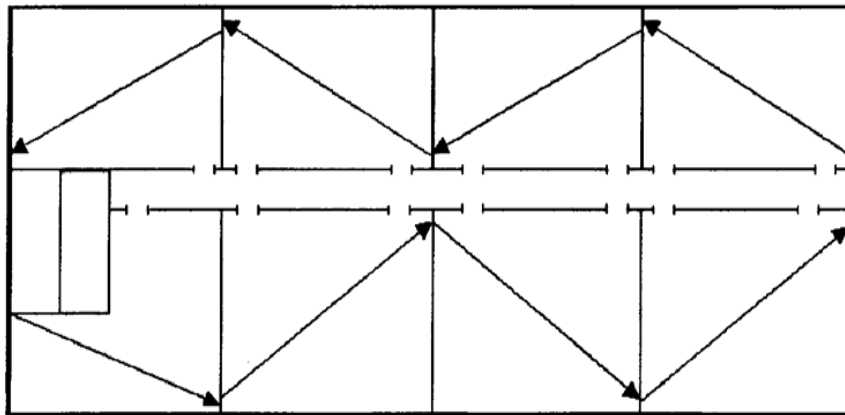
On starting each paddock, record the bottom counter opening (initial) reading onto your *Filip's Folding Plate Pasture Meter* record sheets or "All Weather" note book. Zero your top sample counter and commence your walk. Click the sample counter each time a sample is taken.

On the last sample for the paddock, leave the meter squarely on the ground and record the bottom counter reading and number of samples taken; zero the sample counter.

**Hint:** Lift the meter up and grasp it by the grooved shaft, with your thumb placed on the sliding tube assembly to stop it moving.

When you start your recording in the next paddock there will be no need to record the opening reading as it will be the same as the closing reading in the previous paddock (only 2 recordings per paddock!).

Before starting the next paddock ensure the sample counter is zeroed and your bottom counter recording and reading are the same.



**Ready Reckoner:** Take 50 measurements per paddock and determine total difference between end and start readings.

Read off RPM height and KgDM/ha for that period.

Source: DEXCEL 1999.

As manufacturers, we can only give broad guidelines with regard to the equation to use.

### So which equation should you use?

We say if you are comparing notes with a neighbour, a discussion group or an adviser then you are probably best to use a similar equation to them. A lot of Farmers don't compare with others and only use the dry matter values for their own use. In this case select an equation relevant to the pasture growth stage.

Still unsure as to which equation to use, suspicious of your findings or having a disagreement with others? The answer is to cut, dry and weigh a pasture sample. We have heard of disagreements with grazing contracts based around meter readings where each party thinks a different equation should be used. The answer is unbiased - for the most accurate equation, cut dry and weigh a sample (see "Cutting Quadrats" in the Addendum). This weight is then compared with a meter reading for the same sample, using the various equations, to see which one most closely matches the weight of the sample.

Remember - be **Consistent** with your farm walk and equations and you will end up with records which are meaningful, comparable and very useable.

## DEXCEL Standardised Equations

These equations were derived to overcome regional differences throughout New Zealand. They should be used when comparing results with others

50 RPM readings Total	Ave RPM height (half cm)	Winter = X 140 + 500	Oct = X 115 + 850	Nov = X 120 + 1000	Dec = X 140 + 1200	Jan = X 165 + 1250	Feb = X 185 + 1200	March = X 170 + 1100
900	18	3020	2920	3160	3720	4220	4530	4160
850	17	2880	2805	3040	3580	4055	4345	3990
800	16	2740	2690	2920	3440	3890	4160	3820
750	15	2600	2575	2800	3300	3725	3975	3650
700	14	2460	2460	2680	3160	3560	3790	3480
650	13	2320	2345	2560	3020	3395	3605	3310
600	12	2180	2230	2440	2880	3230	3420	3140
550	11	2040	2115	2320	2740	3065	3235	2970
500	10	1900	2000	2200	2600	2900	3050	2800
450	9	1760	1885	2080	2460	2735	2865	2630
400	8	1620	1770	1960	2320	2570	2680	2460
350	7	1480	1655	1840	2180	2405	2495	2290
300	6	1340	1540	1720	2040	2240	2310	2120
250	5	1200	1425	1600	1900	2075	2125	1950
200	4	1060	1310	1480	1760	1910	1940	1780
150	3	920	1195	1360	1620	1745	1755	1610

## Analysing Recordings From The Farm Walk

A calculator can be used however if you have a computer, the optional PASTURE MANAGEMENT SOFTWARE (programme) simplifies the procedure We will describe the procedure for using a calculator as the software programme fully explains the procedure to be used with it. On your recording sheet fill in :

- The date of the farm walk
- For each paddock the initial and final readings and the number of samples taken.
- Write down the area of each paddock

Now you must select an equation (formula) to use. The equation will vary depending on pasture type (clover, rye grass etc), pasture condition 1 time of year (leafy growth / stem growth / seed head stage ), local conditions etc.

However the important factor for achieving meaningful results is to be **CONSISTENT** with an equation throughout a feed budgeting programme. If you need to change your equations, try to change at the same time each year so your results can be compared.

Before selecting an equation, have a talk with your local discussion group, farm adviser to see what they are using. You may wish to do a full calibration. This is very involved and requires cutting of quadrates : please consult the relevant section in the addendum.

Remember; you are feed budgeting your property for your benefit. (Problems can arise when comparing results with other properties due to different pasture types , techniques used etc.).

Results from your feed budgeting will assist you 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

Various equations are shown on the following pages. Follow the example below and then using the appropriate equation calculate the Kilograms of Dry Matter per Hectare (Kg DM /Ha); multiply this by the paddock areas to get total Kg DM per paddock.

**EXAMPLE:** Initial Reading = (X) Final Reading = (Y)  
Number of samples taken in paddock = (Z)

$$\frac{(Y) - (X)}{(Z)} = \frac{(00720 - 00420)}{30} = 10 \times 158 + 200 = 1780 \text{ Kg DM/Ha}$$

$$1780 \text{ Kg Dm/Ha} \times 3 \text{ (paddock area)} = 5340 \text{ KGDM}$$

(Total Dry Matter in paddock)

### STANDARD EQUATIONS

#### **DAIRY PASTURE**

Manawatu & Surrounding Districts - Moderate rainless periods

$$\frac{(Y-X)}{Z} \times 158 + 200 = \text{Kg Dry Matter per Hectare}$$

#### **DAIRY PASTURE**

Taranaki District- Reasonably consistent rainfall

$$\frac{(Y-X)}{Z} \times 158 + 1000 = \text{Kg Dry Matter per Hectare}$$

#### **SHEEP PASTURE** Nationwide

$$\frac{(Y-X)}{Z} \times 200 = \text{Kg Dry Matter per Hectare}$$

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

$$\text{Growth Rate of Pasture} = \frac{\text{Final Kg DM / ha} - \text{Initial Kg DM / ha}}{\text{Number of days Between Samples}}$$

(Kg DM / Ha / day)

### SEASONAL VARIATIONS OF EQUATION

Depending on the time of year, the following equations can be used instead of the standard equation ( x 158 + 200 )

- |   |  |              |
|---|--|--------------|
| 1 | Winter and early Spring<br>- before stem growth      | x 125 + 640  |
| 2 | Late Spring and early Summer<br>- during stem growth | x 130 + 990  |
| 3 | Mid Summer   | x 165 + 1480 |
| 4 | Early Autumn<br>- before Autumn rain                 | x 159 + 1180 |
| 5 | Late Autumn<br>- after rain                          | x 157 + 970  |