Irrigation Performance
Fieldwork and Calculations Sheet

PAGEBLOOMER
making useful things happen

Use this sheet to record measurements made in the field and to calculate basic system performance indicators. The results will be similar to those found using the Code of Practice for Irrigation Evaluation. The calculation methods are slightly different and use a much smaller sample set. Further, this simplified method does not identify the causes of non-performance.

The pump and headworks information should relate to the same block or blocks in which emitter flows are measured. Collect data for the vineyard area within one irrigation station. (A 'station' is an area in which all the emitters are operating, while no emitters are operating elsewhere.)

You can repeat the process for other stations in turn. Finally, combining all measured emitter flows will allow you to calculate an overall uniformity score for the vineyard as a whole.

Handy equipment includes:

This page, a pen, and a watch and a pressure gauge
ice cream containers to collect drips, and a 100mL measuring cylinder to measure them

Pump shed

- Read the power meter and the water meter to determine how much of each is used in a certain time period
- Use the power and water meter data to determine consumption rates and the energy ratio

Amount Used = End - Start

Consumpn = Amnt Used / Test Time x 60

Energy ratio = Power Cons / Water Cons

Meter	Power (kWh)	Water (m3)
Reading END		
Reading START		
Amount Used		
Test time (mins)		
Consumption rate (/hr)		
Energy ratio (kWh / m^3)		

Headworks

- Read the pressures before and after the following components. (You need to have pressure test points to get these readings!)
- If possible, use the same pressure gauge for all readings. A gauge in the 0 - 600 kPa range should suit most systems.
- Determine the percentage pressure change through each component.

Percent change = Difference / Inlet x 100

- Calculate the headworks losses as a percentage of total system pressure

Hwk %loss = Hwk diff / Pump Out x100

Component	Inlet (kPa)	Outlet (kPa)	Diff (kPa)	Change (%)
Pump				X
Headworks				
Filters				
Injector				
Mainline				

Headworks loss as % of Total System Pressure	

Vineyard

- Determine the area/plant and emitter/plant

Area per plant = plant spacing x row spacing

Emitters/plant = plant spacing / emitter spacing

Area per plant (m^2)	
Emitters per plant	

Irrigated area

- Measure the flows from six emitters in each of two blocks. A block is an area with a single manifold or header pipe. If laterals flow both ways, treat each half as a separate block
- Select the first, middle and last emitters on the first and last laterals in each of the blocks. If there is only one block, select two middle laterals to make up four
- Measure the flow for a set time [3 minutes plus], and record to nearest millilitre

Total volume = sum of all volumes read

Number of readings = 12

Mean volume = Total vol / No of readings

Vol collected (millilitres)	First emitter	Middle emitter	Last emitter
Blk1 / First Lat			
Blk1 / Last Lat			
Blk2 / First Lat			
Blk2 / Last Lat			
Total volume			
Number of readings			
Mean total volume			

- Determine Emitter Flow Uniformity.

Identify the lowest quarter of volumes

Calculate the average of the lowest quarter of volumes

Total low vol = sum of lowest volumes read

Number of readings = e.g. 3

Mean volume = Total vol / No of readings

Lowest quarter of readings (Lowest 3 emitters)	
Total of lowest volumes	
Number of readings	
Mean low volume	

- Calculate the low quarter Emitter Uniformity EU_{lq}

EU_{lq} = Average (mean) low volume / Average (mean) volume

- Calculate the mean emitter flow rate

Mean emitter flow rate = Average (mean) volume / (Test time (mins) / 60)

Mean application rate = emitter no. x emitter flow rate / area per plant

Mean low volume	
Mean total volume	
Emitter Uniformity (EU_{lq})	

- Determine the relative flow differences in laterals and blocks

EU Rating	Emission uniformity (EU_{lq})
Excellent	> 0.95
Very Good	0.94 – 0.90
Good	0.89 – 0.80
Fair	0.79 – 0.70
Poor	0.69 – 0.60
Unacceptable	< 0.60

Test time (mins)	
Mean emitter flow rate (L/h)	
Mean application rate (mm / h)	

Biggest volume difference between emitters on a single lateral	
Biggest volume difference between first emitters in a single block	
Biggest difference between first emitters on a first lateral anywhere	
Biggest volume difference between any emitters anywhere	