A SIMPLIFIED METHOD OF ASSESSING APPLICATION

LOSSES ON CENTRE PIVOTS SYSTEMS

(After Pudney, DWLBC)

This methodology should not be used to match pivot performance against design specifications. For that purpose a full FAO 56 procedure is required.

Estimating Application Losses Under Centre Pivots— Record Sheet

Pivot Name: _____ **Date:** _____ **Time:** _____

Catch Can Data

A	B	C	D	E	A	B	C	D	E
Can Number	Span Number	Distance from centre of pivot	mm of water caught in can #	Weighted Catch (C x D)	Can Number	Span Number	Distance from centre of pivot	mm of water caught in can #	Weighted Catch (C x D)
1					21				
2					22				
3					23				
4					24				
5					25				
6					26				
7					27				
8					28				
9					29				
10					30				
11					31				
12					32				
13					33				
14					34				
15					35				
16					36				
17					37				
18					38				
19					39				
20					40				
	Subtotal C		Subtotal E			Total C		Total E	

#Corrected for rainfall

Catch Can—Average Application Depth Per Pass (AD mm) = $\frac{\text{Sum of Weighted Catch (Total E)}}{\text{Sum of Distance (Total C)}}$ = _____ mm

Water Meter Data

Start Meter Reading: _____ KL **Final Meter Reading (1 Revolution):** _____ KL

Water Meter—Application Depth per Pass (AD mm) = $\frac{\text{Final minus Start Meter Reading}}{\text{Area (ha) - see reverse}}$ + 10 = _____ mm

Estimated Application Loss

Estimated Application Loss = $\frac{\text{Water Meter AD (mm) minus Catch Can AD (mm)}}{\text{Water Meter AD (mm)}}$ x 100 = _____ %

Catch Can Data Plot

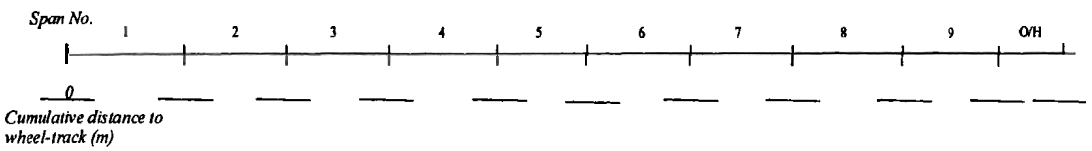
Use this grid to plot the depth of water (mm) caught in each catch can.

0

Distance (m)

Tips: (1) It is useful to draw a horizontal line to represent the average depth (mm) of water caught.
(2) Use a '?' to mark the position of towers.
Where catch can values are greater than ± 10% average catch, further investigation should be conducted.

Pivot Information



Total Pivot Length (including overhang): _____

Area Watered by pivot (ha) = 3.14 x [*Total Pivot Length (m)*] x [*Total Pivot Length (m)*] = _____ / 10000 = _____ ha

Type of sprinkler fitted: _____ **Operating Speed (during test):** _____

If an end gun is fitted was it operational during the test? _____

Weather Information (Optional)

Windspeed during test (Average): _____ **Wind Direction:** _____

Temperature: _____ **Humidity:** _____

Other Comments

_____

_____

_____

_____

Government of South Australia
Department of Water, Land and Biodiversity Conservation

INSTRUCTIONS AND DATA SHEET FOR ESTIMATING APPLICATION LOSSES

Estimating Application Losses Under Centre Pivots
White Clover Group Pivot Workshop 21st September 2006

The following instructions have been put together to allow irrigators to perform a simple test that will provide an estimate of application losses under centre pivots. If the test results show that application losses are high, further investigation (inspection of sprinklers, pipes, pumps etc.) should be conducted, and a distribution uniformity test should also be considered (ISO 11545 – see below for full reference).

1. Calculate the area watered by your pivot. To accurately calculate the area watered by your pivot you will need to measure the total length of the pivot (spans plus overhang). It is easiest to measure each span individually (there is provision on the data sheet for recording individual span lengths). You will need to estimate how much area (how many metres) is watered by the overhang – the edge of the pivot circle is not always obvious. Take care when doing this as a few extra metres at the pivot extremity can equate to many additional hectares of irrigated area. Refer to the data sheet for calculating the area watered by the pivot.
2. Record the water meter reading (take note of the units the meter reads in – it is preferable to read to the nearest KL).
3. Place a stake in the ground to mark pivot starting position.
4. Record the pivot operating speed (100%, 50% etc.).
5. Place catch cans in field:
    a. Cans are to be placed in a straight line extending radially from the pivot centre. The cans should be located so that water will not fall into them until the pivot starts moving (is operating at full pressure). It is undesirable to have the pivot start or stop in the vicinity of the cans.
    b. In each span place the same number of cans as the span number i.e. place 2 cans in span 2, 3 cans in span 3 etc? To work out how many cans to put in the overhang, place cans at the same interval as the outermost span. Within each span the cans should be evenly spaced. It is not necessary to place a can in span 1.
    c. Ensure the catch can is straight and not obstructed by foliage etc.
    d. Place a can outside the pivot area (to gauge rainfall).
6. Note weather conditions, wind speed, direction, temperature, humidity
    a. Estimate the time the pivot will pass over cans – this is important if you are going to relate results to weather station data.
7. Wait for pivot to pass over cans.
8. Measure the depth (mm) of water caught in each catch can **as soon as possible**. If applicable correct for rainfall. Record on data sheet.
9. Once the pivot has completed one full revolution (compare position against stake), record the final water meter reading. It is important that one full revolution is completed.
10. Complete calculations as per data sheet.

Note: If you have insufficient cans to cover the entire length of your pivot, remove inner cans in preference to outer cans.

Reference: ISO 11545 Agricultural Irrigation Equipment – Centre Pivot and Moving Lateral Irrigation Machines with Sprayer or Sprinkler Nozzles – Determination of Uniformity of Water Distribution

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