

Irrigation Performance Quick Test

Worksheet for Centre Pivot Irrigators

Download from: www.claw.net.nz/resources/irrigation

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Measurement Procedure

What equipment will you need?

This guide and field recording sheets

- 24 Collectors of the same diameter (at least 150 mm) – 9 Litre plastic buckets are good
- 1 Measuring cylinder (about 2 Litres)
- 1 5 m tape
- 2 Electric fence standards
- 1 Stop watch
- 1 Pen or pencil

Speed test

- 1 Set two markers (electric fence standards) 5.0m apart beside the end wheel track
- 2 The markers should be in line with the collectors
- 3 Measure the time for the irrigator to travel between markers – they move when the carriage hits them

Application test

- 1 Set your 24 buckets in a row starting a fifth of the way along the length of the irrigator
- 2 Arrange twelve buckets at even spacing from this point to two thirds of the irrigator length
- 3 Arrange ten more buckets at even spacing from two thirds of the irrigator length to the end wheels. The spacing will be different to the first twelve buckets
- 4 Arrange two buckets at even spacing between the end wheel track and the extent of significant wetting.
- 5 Start the irrigator away from (before any water can reach) the line of buckets
- 6 Run the irrigator keeping it going until it is well past wetting the buckets. Measure the irrigator speed as it passes over the test buckets
- 7 Measure the volume of water caught in each bucket and record on the Record Sheet

Test Details		
Farm Name		
Tester's Name		
Test Date		
Test Machine		
Test Position		
Test Pressure [kPa]	At pump	
	At Irrigator Entry	
	At Irrigator End	
Wind conditions		

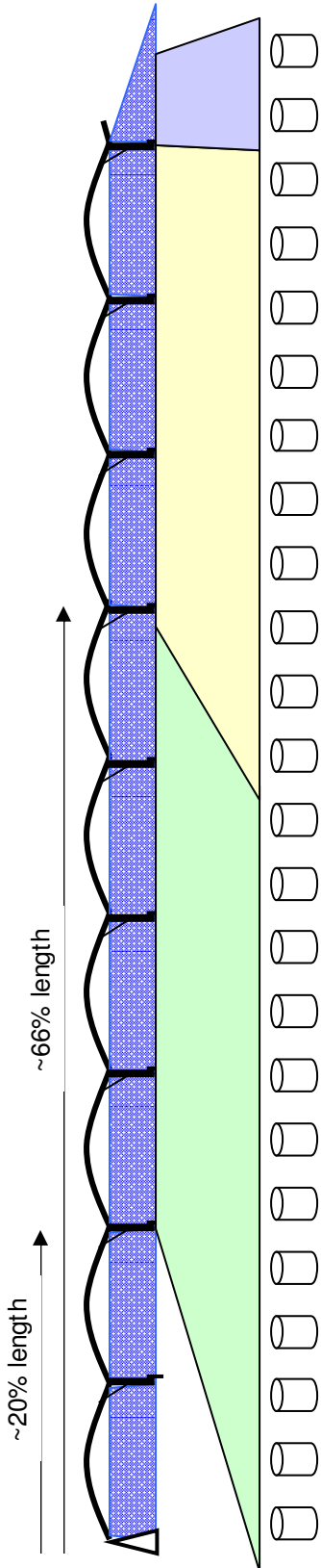
Speed Test (at end wheels)			
Test Distance			
Test time [min]			
Speed [m/min]			

Machine Details		
a	Machine length [m]	
b	End gun extra length [m]	
c	Area $(a + b)^2 \times 3.14 / 10,000$ [ha]	
d	Number of runs	
e	Total Area $(c \times d)$ [ha]	
f	Wetting width [m]	
g	Wetting length [m]	
h	Wetted area $(f \times g)$ [m ²]	

Collector Bucket Details		
i	Bucket diameter [mm]	
j	Open area $(i / 2000)^2 \times 3.14$ [m ²]	

Worksheet for Centre Pivot Irrigator Performance Quick Test

Enter your field measurements from buckets in Column 1.
Complete the calculations in Columns 2 and 3.



Column 1	
Collected Volumes	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	

Column 2	
Calculations	
Calculate Low Quarter Average: Enter the lowest six volumes in boxes below	
Low 1	
Low 2	
Low 3	
Low 4	
Low 5	
Low 6	
SUM of 6	
AVG of 6	
Calculate Overall Average (all twentyfour)	
SUM All 24	
AVG All 24	
Calculate DU: Divide average of lowest six by average of all 24	
AVG of 6	
AVG of 24	
DU	
Calculate average applied depth: Average volume ÷ Bucket Area ÷ 1000	
AVG of 24	
Area m ²	
Depth mm	

Column 3	
Calculate average depth under Sections Average volume ÷ Bucket Area ÷ 1000	
Calculate %'s of machine average depth	
Calculate averages under End Gun	
SUM of 1&2	
AVG of 1&2	
Depth mm	
% of AVG	
Calculate averages under end spans	
SUM 2 - 12	
AVG 2 - 12	
Depth mm	
% of AVG	
Calculate averages under inner spans	
SUM 13-24	
AVG 13-24	
Depth mm	
% of AVG	
Calculate Excess Water Factor EWF% ((Depth ÷ DU) - Depth) ÷ Depth x 100	
Overall Depth	
DU	
EWF	