

QWEL Field Audit Exercise Instructions



This assignment requires the student to determine the distribution uniformity, precipitation rate, weekly watering budget, weekly run time, daily run time, cycles per day and minutes per cycle for a single turf station.

Instructions for completing the QWEL Field Audit exercise.

- 1 Record site data information onto the assignment sheet.
- 2 Draw a small diagram of the test area. The diagram does not need to be to scale but should include distances along each edge and indicate general shape as well as sprinkler head and catch can locations.
- 3 Collect catch can data. **Use straight sided containers.** If you are using your own catch cans refer to the manufacturers instructions for determining precipitation rate (PR) and distribution uniformity (DU_{lq}) and record onto the data sheets.

How to Perform a Simplified Catch-Can Test

1. Place containers in the area being irrigated.
 2. Run your sprinkler system for a sufficient amount of time to collect a quarter inch or so of water. Record the run time on the data sheet.
 3. Measure the depth of water (in inches) in each container with a ruler and record on the data sheet.
 4. Add up the depth of water in the 25% of the cans that had the least amount of water then divide by the number of cans measured. For example, if 20 cans were used, the 5 cans with the least amount would be the lowest 25%. This is the Average Low Quarter CC used to calculate DU_{lq} .
 5. Add up the depth of water in all cans then divide the total by the number of containers to get the average amount of water. This is the Average Total CC used to calculate DU_{lq} and PR.
 6. Calculate DU_{lq} using the formula on the assignment sheet.
- 4 Calculate precipitation rate using formula on the assignment sheet.
 - 5 Determine the Plant Water Requirement by obtaining 1 week of ET data from a nearby CIMIS station. You may need to create an account to get the data. The City of Santa Rosa (www.srcity.org/turfetime) and MMWD (www.marinwater.org) provide local CIMIS data.
 - 6 Determine the Run Time Multiplier using the formula on the assignment sheet.
 - 7 Determine the Irrigation Water Requirement using the formula on the assignment sheet.
 - 8 Determine the Irrigation Run Time for the week using the formula on the assignment sheet.
 - 9 Determine the Daily Run Time using the formula on the assignment sheet and the Days per Week to Irrigate chart provided.
 - 10 Determine the Cycles per Day using the formula on the assignment sheet. Round up to the nearest whole minute. The Time to Runoff is determined by observing or estimating the minutes it takes for water to begin to pond and run off the test area.
 - 11 Determine the Station Run Time using the formula on the assignment sheet.

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NAME _____

DATE _____

Site Data

Irrigation Type _____
 Soil Type _____
 Plant Material _____
 Root zone Depth _____ Inches

Pace _____ feet / pace
 Station Irrigated Area _____ ft²

Catch Can Data -- Use a ruler to measure water depth in each straight-sided, flat bottomed catch device.

Can #	Depth (in.)	Can #	Depth (in.)	Can #	Depth (in.)	Can #	Depth (in.)

Uniformity Calculation

$$\text{Average Low Quarter CC} = \frac{\text{Sum of water depth in lowest 25\%}}{\text{Number of cans}} = \underline{\hspace{2cm}} \text{ Inches}$$

$$\text{Average Total CC} = \frac{\text{Sum of water depth in all cans}}{\text{Number of all cans}} = \underline{\hspace{2cm}} \text{ Inches}$$

$$\text{DU}_{\text{iq}} = \frac{\text{Avg. CC}_{\text{iq}}}{\text{Avg. Total CC}} = \underline{\hspace{2cm}}$$

Precipitation Rate Calculation

Test Time _____ Minutes

$$\text{Precipitation Rate (PR)} = \frac{(\text{Avg. Total CC}) (60)}{\text{Test Time}} = \underline{\hspace{2cm}} \text{ Inches / Hr.}$$

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NAME _____

DATE _____

Site Map -- Use this page to map audit area(s). Include sprinkler layout and catch can placement.

Ways to Improve Uniformity	Notes and Site Observations
1 _____	

2 _____	

3 _____	

4 _____	

5 _____	

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NAME _____

DATE _____

Plant Water Requirement (PWR) -- Assume time frame of 1 week. Use weekly ETo CIMIS data.

$$\begin{array}{rcl} \text{ETo} & \times & \text{KL} = \text{PWR} \\ \hline \text{_____} & \times & \text{_____} = \text{_____ inches/wk} \end{array}$$

Run Time Multiplier (RTM) -- Adjusts the number of minutes to compensate for a lack of perfect uniformity.

$$\begin{array}{rcl} 1.0 & \div & (.4 + (.6 \times \text{Du}_{(q)})) = \text{RTM} \\ \hline 1.0 & \div & (.4 + (.6 \times \text{_____})) = \text{_____ inches/wk} \end{array}$$

Irrigation Water Requirement (IWR) -- Total inches required to apply PWR.

$$\begin{array}{rcl} \text{PWR} & \times & \text{RTM} = \text{IWR} \\ \hline \text{_____} & \times & \text{_____} = \text{_____ inches/wk} \end{array}$$

Irrigation Run Time -- Number of minutes to run per week.

$$\begin{array}{rcl} \text{IWR} & \div & \text{PR} \times 60 = \text{IRT} \\ \hline \text{_____} & \div & \text{_____} \times 60 = \text{_____ mins/wk} \end{array}$$

Daily Run Time

$$\begin{array}{rcl} \text{IRT} & \div & \text{Number of Days to Irrigate (see chart)} = \text{Daily Run Time} \\ \hline \text{_____} & \div & \text{_____} = \text{_____ minutes} \end{array}$$

	Days per Week to Irrigate		
	Cool 0 - 0.5"	Warm 0.6 - 1"	Hot 1.1 - 1.5+"
ETo			
Turf	1 - 2 days	2 - 3 days	3 to 7 days
Annuals	2 - 3 days	3 to 5 days	4 to 7 days
Shrub	Every 2 weeks	1 per week	1 - 2 days
Trees	None	Once in Apr/May and Once in Sept/Oct	Once each in June, July and August

Cycles per Day -- Use multiple start times to reduce runoff.

$$\begin{array}{rcl} \text{Daily Run Time (minutes)} & \div & \text{Time to Runoff (minutes)} = \text{Cycles per Day} \\ \hline \text{_____} & \div & \text{_____} = \text{_____ cycles (round up to next whole minute)} \end{array}$$

Station Run Time

$$\begin{array}{rcl} \text{Daily Run Time (minutes)} & \div & \text{Cycles per Day (whole minute)} = \text{Run Time per Cycle} \\ \hline \text{_____} & \div & \text{_____} = \text{_____ minutes (round up to next whole minute)} \end{array}$$