ADDITIONAL IRRIGATION INFORMATION

- Record the operating pressure. (psi): *
- Record the manufacturer, nozzle size, arc and trajectory of each head (below).
- Record which valves operate which heads (below).
- Record operating problems (broken heads, blocked heads, etc.) below.

*Note: The operating pressure of an irrigation system should fall within the ranges recommended by the manufacturer. These ranges can be found in their irrigation product catalogs. If pressure is too high, pressure regulators should be installed. If too low, a booster pump or redesign of the system should be considered. Correcting problems such as sunken or blocked heads, replacing leaking heads and switching out heads and nozzles so that the heads are uniform and matched in precipitation should be done before testing.

**RECORD WHICH HEADS (NUMBER FROM ABOVE) ARE OPERATED BY VALVES 1 THROUGH 6**

Valve 1: Valve 3: Valve 5:
Valve 2: Valve 4: Valve 6:

**NOTES ON OPERATING PROBLEMS:**


**SCHEDULING TURFGRASS IRRIGATIONS**

**WORKSHEET #2: IRRIGATION EFFICIENCY AND LEACHING FRACTION**

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Whenever water is applied to a lawn as an irrigation, some of it is wasted due to the degree of uniformity of the system, irrigation system design and how it is maintained and operated. Water losses due to nonuniformity of an irrigation system must be considered when determining how much water must be applied. Another water loss that may occur during the operation of an irrigation system is runoff or puddling. This fact sheet will help you:

- Determine the time to water runoff or puddling.
- Determine the precipitation rate.
- Determine the uniformity of the irrigation system.

1. **DETERMINE THE UNIFORMITY TEST AREA.**

During a uniformity test, irrigation heads are operated in a test area to determine how evenly water is applied. You will record the amount of water captured in catch cans on page 2. More extensive information about the heads and valves (optional) may be recorded on page 4. Do not perform this test if the wind is high enough to cause leaf movement in trees (two to three miles per hour) and disrupt the uniformity.

Open valves that operate irrigation heads in the test area. While the system is operating, flag the irrigation heads on the perimeter of the area to be tested. This outlines the test area where catch cans will be placed for the uniformity test. Determine how many valves must be opened to run a uniformity test. Remember that any valve that operates irrigation heads that throw water into the test area must be opened during the uniformity test. Assign each valve a number for recording purposes (see Pages 2 and 4).

Next, place identical, straight-sided cups or cans (catch-cans) evenly in a grid throughout the test area between the flags. These catch cans will be used to capture water from the irrigation heads during the uniformity test. A test may require from ten to over 50 catch-cans in the test area, depending on its size. Generally speaking, more catch cans means more accuracy in the uniformity test. Once the catch cans have been placed in a grid in the test area, begin the test by opening the valves operating irrigation heads that throw water into the test area. The valves must be opened long enough so that catch-cans contain a measurable amount of water. If you are unsure how long to operate a valve, try opening the valve(s) use a minimum of 15 minutes for stationary spray heads and 30 minutes or more for rotating heads. Valves should be opened sequentially and separately to minimize pressure losses. Record the run times (length of time the valves are open) below.

**RECORD VALVE RUN TIMES IN THE TEST AREA**

Valve 1 min. Valve 2 min. Valve 3 min. Valve 4 min.

*Matched Precipitation Heads. Valves operating the same kind of matched precipitation heads should be operated the same number of minutes (irrigation run time). Heads Without Matched Precipitation. If heads are not matched- precipitation, adjust the run times according to manufacturer's recommendations to achieve a matched precipitation. Contact your sprinkler distributor for assistance.
2. WHAT IS THE TIME TO RUNOFF OR PUDDLING?

During the uniformity test watch for runoff or puddling to occur on slopes. Note how many minutes this occurs after the irrigation has begun. This will be the maximum length of time you can irrigate without instituting any major cultural practices such as aeration.

2. TIME TO RUNOFF OR PUDDLING _____min.

3. RECORD CATCH CAN VOLUMES IN A GRID.

After all the valves have been opened for the time recorded above, measure the volume of water in each can, using a metric, graduated cup or cylinder marked in milliliters (ml) or cubic centimeters (cc). Record the volume of water contained in each can on the grid below. It would be best to record catch can volumes in the same pattern as the way the catch cans are arranged in the test area.

3. Record Catch-Can Volumes (ml or cc)

4. WHAT IS THE TOTAL CATCH CAN VOLUME?

Add all of the catch-can volumes together and record the total catch can volume.

4. TOTAL CATCH CAN VOLUME _____ ml or cc

5. WHAT IS THE AVERAGE CATCH CAN VOLUME?

Calculate the average catch-can volume by dividing the total catch-can volume by the number of cans you used.

\[
\text{AVERAGE CATCH CAN VOLUME} = \frac{\text{TOTAL CATCH CAN VOLUME}}{\text{NUMBER OF CANS USED}}
\]

5. AVERAGE CATCH-CAN VOLUME: _____ ml or cc

6. WHAT IS THE AVERAGE CATCH CAN VOLUME PER HOUR?

Convert the average catch-can volume to average catch-can volume per hour.

\[
\text{AVERAGE CATCH CAN VOLUME /HR} = \frac{\text{AVERAGE CATCH CAN VOLUME}}{\text{60 MIN. VALVE RUN TIME (MINUTES)}}
\]

6. AVERAGE CATCH-CAN VOLUME PER HOUR: _____ ml or cc/hr

7. WHAT IS THE PRECIPITATION RATE?

Using the table below, find the precipitation rate.

<table>
<thead>
<tr>
<th>Diam. (in)</th>
<th>Average Catch-Can Volume per Hour (ml or cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 3/4</td>
<td>0.21 0.41 0.62 0.82 1.03 1.54 2.06 3.09 4.12</td>
</tr>
<tr>
<td>3</td>
<td>0.17 0.35 0.52 0.69 0.86 1.29 1.72 2.58 3.44</td>
</tr>
<tr>
<td>3 1/4</td>
<td>0.15 0.29 0.44 0.59 0.74 1.10 1.48 2.20 2.96</td>
</tr>
<tr>
<td>3 1/2</td>
<td>0.12 0.25 0.38 0.51 0.63 0.95 1.26 1.90 2.52</td>
</tr>
<tr>
<td>3 3/4</td>
<td>0.11 0.22 0.33 0.44 0.55 0.83 1.10 1.66 2.20</td>
</tr>
<tr>
<td>4</td>
<td>0.09 0.19 0.29 0.39 0.49 0.73 0.98 1.46 1.96</td>
</tr>
</tbody>
</table>

7. PRECIPITATION RATE: _____ in/hr

8. DETERMINE THE AVERAGE OF THE LOWER ONE QUARTER CATCH CAN VOLUMES.

In the space provided below, rank catch-can volumes from the grid on page 2 from lowest to highest. In most cases, uniformity can be estimated as the average low quarter volume divided by the average volume Identify one-fourth of the cans having the smallest volumes. Add these volumes together and find the average

8. AVERAGE CATCH-CAN VOLUME: _____ (low one-fourth)

9. DETERMINE THE DISTRIBUTION UNIFORMITY (DU).

Ideally, an irrigation system should apply water uniformly over a lawn. They do not. How evenly water is applied to a lawn is influenced by the design, installation and maintenance of an irrigation system. It is called the irrigation system’s uniformity or uniformity of application. One measurement of uniformity is the Distribution Uniformity (DU). An irrigation system is considered to have a poor uniformity if the DU is below 60% for pop-ups and 85% for rotating heads. Divide the average catch can volume (lower one quarter) (8) by the average catch-can volume (5) to determine the distribution uniformity (DU). We will call this the system’s uniformity.

Uniformity = average catch-can volume (low one-fourth) (8) / average catch-can volume (5)

9. DISTRIBUTION UNIFORMITY (DU) : _____ (decimal value)