## Sprinkler Pattern Analysis

### Materials:

Pressure regulator with Gauge or Pressure Gauge with Pitot tube

Catchments

Graduated Cylinder

Tape

Flow Meter (optional)

Sprinkler stand

### Terms:

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| Catchment | A cup used to catch water in sprinkler testing or irrigation auditing. These can be almost any type of container. Ideally they should have a sharp edge. Utah State and Cal Poly SLO sell catchments. Plastic cups and freezer containers available at “dollar” stores work well. Metal cans also work. All catchments must be the same. |
| Distribution Uniformity (DULQ) | The standard measure of uniformity. 100% is perfect. The minimum standard for sprinklers is 75%. DU compares the average PR to the PR of the lowest 25%. |
| Overlap | The overlap of the sprinkler pattern (determined by the spacing). |
| Pattern | A sprinkler pattern shows the distribution of water for a given spacing of sprinklers. |
| Precipitation Rate (PR) | The rate at which water is applied. Commonly expressed as inches/hour. |
| Profile | The deposition of water along the radius of the sprinkler stream. |
| Spacing | The spacing between sprinklers in a landscape of field. Rectangular (square) patterns are common. Offset spacing will shift every other row ½ of the spacing. |

### Tests

Note: If sprinkler can be run using a pressure regulator with a flow meter, then tests can be performed at a variety of pressures. If no regulator is available, then pressure can be controlled using a valve, but be aware of any pressure changes. Tests should be run indoors or in a no wind situation.

**Setup:**

1. Setup the sprinkler so the pressure can be regulated or measure the pressure.
2. Mark a radius line from the sprinkler every 2 feet.
3. Run the sprinkler at briefly to determine the actual radius of throw.
4. Setup catchments (cups) on 2 foot intervals starting 2 feet from the sprinkler and extending 2 feet past the radius.

**Procedure for each test:**

1. Run the sprinkler long enough to collect a measurable amount of precipitation (typically 20-40 minutes) in all catchments. Be sure to record the time.
2. While waiting during the test to complete:
   1. Observe the sprinkler performance. How fine are the droplets? What does the profile look
   2. Determine the area of the catchment (sq. in.) opening. For round containers measure the diameter in inches and use the formula 3.1416 X (diameter/2)2. For square/rectangular containers use the formula width X length. Note if the container has rounded corners you will need to subtract for this. Tip: Trace the opening on graph paper and count the squares to determine the area.
   3. Determine how to calculate the precipitation rate (in/hr) from the ml of water collected. Use ml, time (min), and the catchment area. OR use the online calculator.
   4. Review the specification sheet for the sprinkler.
   5. Determine the spacing (see below) you will use to analyze the data. The rule of thumb is to space the sprinklers using the radius.
3. Carefully pour the water into the graduated cylinder and record the amount of water collected. Complete the datasheet below. Convert to in/hour of precipitation.

### Sprinkler Test Data

|  |  |
| --- | --- |
| Sprinkler Manufacturer: | |
| Sprinkler Model: | |
| Nozzle: | |
| Pressure (psi): | Riser Height (in. above catchment): |
| Flow (GPM): | Minutes/Rev: |
| Test Duration (min): | Rotation Arc (deg): |
| Test Date: |  |
| Comment: | |
| Number of Catchments: | Catchment Spacing (ft): |
| Catchment Area |  |

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| Catchment | Milliliters | In/hr |
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| Catchment | Milliliters | In/hr |
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