DETERMINING YOUR APPLICATION RATE
IMPACT SPRINKLER IRRIGATION

An important part of irrigation water management is replacing the soil water used by the almond tree since the last irrigation. The amount of almond tree water use, often called the almond tree evapotranspiration (ET), is available to you and is provided in inches of water use.

To determine how many hours you should run your sprinkler system during an irrigation, you can compare the tree ET in inches (in) since the last irrigation event with the sprinkler system application rate (in/hr).

$$\text{Irrigation Set Time (hrs)} = \frac{\text{Irrigation Amt. to be Applied (in)}}{\text{Sprinkler Application Rate (in/hr)}}$$

Determining the Sprinkler Application Rate

Determining your sprinkler application rate requires that you know:

1. The spacing between sprinklers in a tree row and the spacing of sprinklers across the tree row.
2. The average discharge rate (gal/min) of the sprinkler nozzles in the orchard.

$$\text{Average Sprinkler Application Rate (in/hr)} = \frac{96.3 \times (\text{Sprinkler Nozzle Discharge Rate — gpm})}{\text{Sprinkler Spacing in the Tree Row (ft)} \times \text{Sprinkler Spacing in the Tree Row (ft)}}$$

In the above formula, the sprinkler nozzle discharge rate must be determined if you do not already know it. Measuring the sprinkler nozzle discharge rate directly is easy. Measure the discharge from 10 to 20 (or more) sprinklers throughout the orchard using the guidance below. Measure some sprinklers at the head of the system, some at the end of the system, some at the head of the lateral lines, and some at the end of the lateral lines. System pressure differences will cause the sprinkler discharges to be different, so gather the measurements and average them.

Using Direct Measurement of Sprinkler Discharge Rate

Using a short (3–5-foot) section of hose (such as a garden hose), place one end of the hose over the sprinkler nozzle, and direct the discharge into a container of known volume. (A 5-gallon bucket, marked in 1-gallon increments, works well). Keep track of the time it takes to collect a known volume of water. Then, calculate the sprinkler discharge rate (gallons per minute).

Example: If it takes 100 seconds to collect 2 gallons of water from a sprinkler head, the discharge rate is 1.2 gpms.

$$100 \text{ seconds} \times \frac{\text{min}}{60 \text{ secs}} = 1.67 \text{ minutes}$$

$$\frac{2 \text{ gallons}}{1.67 \text{ min}} = 1.2 \text{ gpms} \quad \textbf{Sprinkler Discharge Rate}$$

After calculating your sprinkler discharge rate, use that number to calculate your average sprinkler application rate:

$$\text{Average Sprinkler Application Rate (in/hr)} = \frac{96.3 \times (\text{Sprinkler Nozzle Discharge Rate — gpm})}{\text{Sprinkler Spacing in the Tree Row (ft)} \times \text{Sprinkler Spacing in the Tree Row (ft)}}$$

You now have the average sprinkler application rate for the orchard. As long as the pressure does not change in the orchard, this application rate value will remain constant.

Example:
If the average sprinkler nozzle discharge rate is 1.6 gpm, and the sprinkler spacing is 35' x 44", the average sprinkler application rate is 0.1 in/hr.

$$\text{Average Sprinkler Application Rate (in/hr)} = \frac{96.3 \times (1.6 \text{ gpm})}{(36 \text{ ft}) \times (44 \text{ ft})} = 0.1 \text{ Average Sprinkler Application Rate in/hr}$$

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