



Irrigation Application

Author:
Lyndon Kelley,
Extension Irrigation
Educator, MSU
Extension/Purdue
Extension
269/467-5511

Irrigation Fact Sheet # 2

Instantaneous Rates

The soils infiltration rate is the rate water can enter the soils surface. Michigan soils have infiltration rates from a high of 1 inch/2 hour to, as little as 20 minutes per inch. Heavier soils such as clay and clay loam will take water in at a slower rate than sands and sandy loams. Estimates for water infiltration rates into soil types, may be found in the “physical and chemical properties of soils” section of the soil survey for your county.

Increasing the amount of water that may enter the soil in a given period of time

Residue cover and rough soil surfaces will increase the amount of water that may enter the soil in a given time period. Compaction of the soil surface and increased slopes, hillside or row contours, will decrease the amount of water that may enter the soil in a given period of time.

The total application of water will also affect the fraction of the water that may enter the soil in a given time period. Small pockets and depressions in the soil surface will hold a volume of water at that location, until the soil surface can receive the water. Midseason cultivation or in-row soil surface modification (dammer/dikers) will increase the soils surface holding capacities.

Calculating instantaneous irrigation application rate is part of the planning process for new irrigation systems. For a given application, the instantaneous irrigation application rate is the amount of time from the first drop of water landing at a point in the field, to the last water hitting the point. This calculation is often adjusted to minutes for a one-inch application of water.

The instantaneous irrigation application rate will vary throughout the length of a center pivot irrigation system, with the highest instantaneous application rates at the end of the system furthest from the pivot point. Instantaneous irrigation application rate will be uniform for solid set and large gun hose traveler irrigation systems as long as application time or forward travel of system is unchanged.

Instructions for Measuring Instantaneous Irrigation Application Rates

1. Identify the areas of the irrigated system that has the application rate. (Fastest travel or shortest application time, further watered point from center not affected by the end gun on center pivots).
2. With the machine running at a known rate flag the point just ahead of the wetted front.

Continued

- Record the amount of time in minutes and seconds from the first splash of water to hit the flag till the last splash, as the machine passes.
- Convert your application to minute per one inch application
Example -- 20 minute to apply 0.4 inches of water = 50 minute/inch of irrigation

$$\frac{20}{?} = \frac{0.4}{1.0} = 50 \text{ minute / inch of irrigation}$$

