

Irrigation Needs for Fruit Trees Based on Replacing Water Losses

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To calculate irrigation needs based on replacing net water losses, subtract rainfall/week from evaporation/week to determine net water loss/week.

Example: Evaporation/week = 2.2 inches
 Rainfall/week = 0.7 inches
 Net water loss/week = 1.5 inches

If evaporation exceeds rainfall, generally irrigate to replace 75% of net water loss. If rainfall exceeds evaporation, irrigation is unnecessary. Early in the season (pre-bloom), trees require less than 75% of replacement due to minimal foliage. Some of the more dwarfing rootstocks require more than 75% replacement. Irrigate apples on M-9 to 100-120% and on Mark to 150%.

If using a trickle irrigation system, the amount of irrigation water necessary to replace 75% and 100% of net water loss based on the root zone area of the tree is tabulated in the table below.

Trees Age (Yrs)	Sq. Ft of Root Zone	Gals. Water/Tree/Week to Replace 1" Net Water Loss/Week		Gals. Water/Tree/Day to Replace 1" Net Water Loss/Week	
		<u>100%</u>	<u>75%</u>	<u>100%</u>	<u>75%</u>
1	7 (3' circle)	4.4	3.3	0.63	0.47
2	13 (4' circle)	7.8	5.9	1.10	0.80
3	20 (5' circle)	12.4	9.3	1.80	1.35
4	28 (6' circle)	17.5	13.0	2.50	1.90
5	38 (7' circle)	23.8	17.9	3.40	2.55
6	50 (8' circle)	31.1	23.3	4.40	3.30
7	64 (9' circle)	39.4	29.5	5.70	4.30
8	79 (10' circle)	48.7	36.5	7.00	5.25
9	95 (11' circle)	58.9	44.2	8.40	6.30
10+	113 (12' circle)	70.1	52.3	10.10	7.60

1. To calculate rainfall, measure rainfall in a gauge after each rain and calculate weekly totals.

2. To determine pan evaporation, either use the weekly total from the nearest weather station equipped with a NOAA evaporation pan or use your own evaporation pan. Weekly totals from the NWMHRS will be published in CAT Alerts and FaxNet.

3. The chart indicates water needs based on a drip system that delivers water just to the root area. If the system is delivering water to an area larger than the root zone, then adjust your application rate up to offset this difference. This will occur most dramatically when trees are very young and the

irrigation system uses multiple emitting points per tree or micro-sprinklers. In these cases, divide the area irrigated by the area of the root zone, then multiply this times the estimated water needed. For example: to determine the irrigation rate/week for 2 year old trees (4' circle root zone = 13 sq. ft.), irrigated with micro-sprinklers covering 6' circle = 28 sq. ft., to be irrigated at 75% of water loss. Gal/tree/week to replace 1" water loss = sq.ft. irrigated ÷ sq. ft. of root zone x rate from the chart = $28 \div 13 \times 5.9 = 12.4$ gal/tree/week to replace 1" water loss/week

If the root zone is equal to, or larger than, the area being wetted with the irrigation system, then ignore this step and use the chart results directly to indicate water rates to replace 1" net water loss/week.