

Water Use Facts

Volume and weight

1 cu ft = 7.48 gal = 62.4 lbs
 1 gal = 0.13 cu ft = 8.33 lbs
 1 ac inch = 27,154 gal = 3,630 cu ft

Flow

1 cu ft per sec (cfs) = 450 gal/min (gpm)
 1 cfs for 1 hour = 1 ac in
 450 gal/min for 1 hour = 1 ac in

Plant water use*

0.20 inch per day over 1 acre = 3.8 gpm/ac
 0.25 inch per day over 1 acre = 4.7 gpm/ac
 0.30 inch per day over 1 acre = 5.7 gal/ac

*In Michigan, an irrigation system for corn must be able to keep up with a plant water use rate (i.e. evapotranspiration rate) of 0.25 inches/day, therefore plan irrigation water supply or system flow rate at 5 gpm/ac multiplied by hours of operation per day divided by 24.

Power requirements

$$HP = \frac{Q \times H}{3,960 EP}$$

3,960 EP

Q = Flow in gpm

H = Total head in ft (i.e. suction lift plus

pressure at the pump includes

pressure at the sprinkler plus friction
 loss in pump plus elevation change
 from pump to sprinkler).

(H in feet = psi x 2.31)

EP = Efficiency of the pump

HP = Power input to the pump in horsepower

(1 HP = 0.746 KW)

Volume of water applied for Various flow rate and time periods

FLOW RATE gpm	VOLUME APPLIED			
	1 Hr ac-in.	8 Hrs ac-in.	12 Hrs ac-in.	1 Day ac-in.
100	0.22	1.77	2.65	5.3
200	0.44	3.54	5.31	10.6
300	0.66	5.31	7.96	15.9
400	0.88	7.08	10.6	21.2
500	1.11	8.85	13.3	26.5
600	1.33	10.6	15.9	31.9
700	1.55	12.4	18.6	37.2
800	1.77	14.2	21.2	42.5
900	1.99	15.9	23.9	47.8
1,000	2.21	17.7	26.5	53.1

- Two-thirds (66%) of Michigan's irrigated land is located in nine counties.
- Groundwater conflicts in these counties are rare. When they have occurred they have been resolved locally.



Michigan Irrigation Breakdown 1997 Census of Agriculture

County	Millions of Dollars invested	Acres Irrigated	Number of Irrigated Farms
St. Joseph	49.7	91,191	202
Montcalm	24.7	45,345	90
Branch	16.7	30,563	110
Van Buren	10.8	19,805	162
Kalamazoo	9.8	18,144	129
Ottawa	8.1	14,811	263
Cass	8.0	14,599	68
Allegan	7.1	12,948	148
Berrien	5.8	10,635	165

