

How Much Water Are You Using?

How much water you are using in the absence of meter readings can be estimated by referring to averages of uses and data similar to your own uses. For interior domestic uses, refer to the Department of Health Design Manual Appendix D (See quote below) which finds that 200 gallons per day is average. Clearly, larger homes with big families or vacation homes may not conform to the average.

Washington Department of Health Water System Design Manual (2009) Appendix D page 224:

“...From the data, the single valued level for average annual household demands (internal uses), which would appear to apply statewide independent of rainfall, is about 200 gpd/ERU. Logic dictates that this demand may be consistent on an average annual basis, but cannot be expected to be uniform on a day to day basis. Residential households would be expected to experience peak demand days for internal uses associated with a number of factors. Peak day uses could be expected with increased water demands for showering in the summer, or when visitors or relatives are entertained. The actual levels associated with the peaking demand days would be dependent upon many variables. There were no known relational studies, or anecdotal accounts, that could be found which would assist in development of design parameters for internal household peaking uses. Nonetheless, in order to maintain consistency with stipulations of the state’s Group B water system design criteria, and with the Department of Ecology, who in some instances provides estimates of peak day internal uses for water rights issues, a reasonable level for a Maximum Daily Residential Demand for internal uses can be established at 350 gpd/ERU (a value which can be seen is marginally less than double the average annual internal demand of 200 gpd/ERU previously discussed)....”

For irrigation first figure out how many acres you are irrigating. Then look at something like the Washington Irrigator’s Guide crop requirements for your area to estimate how much your plants need. A sample is included below and the entire WIG appendix is also available on the P&M web site. Multiply the inches of crop requirement by the acres irrigated and divide by 12 to get a volume measurement called “acre feet”. An acre foot is equal to roughly 325,800 gallons or a foot of water over an acre of land. You are not done yet. Divide the crop requirement by the application efficiency of your system to get the total irrigation requirement which is probably close to what you are using to irrigate. The application efficiency depends on your irrigation system. The table below provides some guidance in that estimate.

Department of Ecology GUID 1210 table

Table 1: Summary of Application Efficiency Ranges, Consumptive Use, and Return Flows¹

Method	Application Efficiency, Ea (%) ²		% Total Evaporated	% Total Use Consumed	Return Flow	
	Range	Average, Ea _{avg}	%Evap	%CU, Average ³	%RF, Average ⁴	
Surface:	Graded Furrow	50 – 80	65	5	70	30
	w/ tailwater reuse	60 – 90	75	5	80	20
	Level Furrow	65 – 95	80	5	85	15
	Graded Border	50 – 80	65	5	70	30
	Level Basins	80 – 95	85	5	90	10
Sprinkler:	Flood	35 – 60	50	5	55	45
	Periodic Move (Handline)	60 – 85	75	10	85	15
	Side Roll (Wheelline)	60 – 85	75	10	85	15
	Moving Big Gun	55 – 75	65	10	75	25
	Solid-Set--Overtree	55 – 80	70	15	85	15
	Solid Set--Undertree	60 – 85	75	10	85	15
	Pop-Up Impact	60 – 85	75	10	85	15
Center-Pivot	Impact heads w/end gun	75 – 90	80	15	95	5
	Spray heads w/o end gun	75 – 95	90	10	100	0
	LEPA ⁵ w/o end gun	80 – 98	92	5	97	3
Lateral-Move	Spray heads w/hose feed	75 – 95	90	10	100	0
	Spray heads w/canal feed	70 – 95	85	10	95	5
Microirrigation:	Trickle/Drip	70 – 95	88	5	93	7
	Subsurface Drip	75 – 95	90	0	90	10
	Microspray	70 – 95	85	10	95	5

1. Calculate the actual water use from water meter data, power meter, or run-time data. In the absence of such data, the TIR (total irrigation requirement) = CIR / Ea, where CIR is the crop irrigation requirement from the WIG (Appendix B) and Ea is the case-specific application efficiency above.
2. %Evap is the portion of the total irrigation requirement that is evaporated due to factors other than crop ET.
3. Select appropriate %CU based on type of irrigation system. If calculated Ea is greater or less than Ea_{avg}, then %CU = Ea + %Evap. CU = TIR x %CU.
4. Select appropriate %RF based on type of irrigation system. If calculated Ea is greater or less than Ea_{avg}, then %RF = 100 - %CU. RF = TIR x %RF
5. Low Energy Precision Application.

Washington Irrigator's Guide, Wenatchee Station

WENATCHEE

MENATCHEE	47.42 LATITUDE													TOTAL
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
MEAN TEMPERATURE (F)	27.7	35.0	42.7	51.7	60.2	67.4	73.8	72.3	63.7	51.2	38.8	31.6		
TOTAL PRECIPITATION (IN)	1.37	.85	.60	.62	.55	.53	.15	.66	.35	.57	1.15	1.45	8.85	
EFFECTIVE PRECIP (IN)	.00	.10	.37	.44	.45	.47	.14	.54	.26	.36	.14	.00	3.28	
ALFALFA	BEG 5/7 END 10/10													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SEASON	
MONTHLY NET IRRIG REQUIRE(IN)	.00	.00	.00	.00	3.82	6.71	7.98	5.59	3.91	.47	.00	.00	28.48	
AV. PAN FACTOR	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76	.76		
CLOVER	BEG 5/7 END 10/10													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SEASON	
MONTHLY NET IRRIG REQUIRE(IN)	.00	.00	.00	.00	4.26	7.47	8.84	6.23	4.34	.54	.00	.00	31.68	
AV. PAN FACTOR	.84	.84	.84	.84	.84	.84	.84	.84	.84	.84	.84	.84		
PASTURE/TURF	BEG 5/7 END 10/10													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SEASON	
MONTHLY NET IRRIG REQUIRE(IN)	.00	.00	.00	.00	4.04	7.09	8.41	5.91	4.12	.51	.00	.00	30.08	
AV. PAN FACTOR	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80	.80		
APPLES W/COVER	BEG 5/7 END 10/10													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SEASON	
MONTHLY NET IRRIG REQUIRE(IN)	.00	.00	.00	.00	3.37	8.23	10.55	7.52	5.00	.47	.00	.00	35.14	
AV. PAN FACTOR	.36	.36	.36	.36	.68	.92	1.00	1.00	.96	.76	.36	.36		