

Operational Low/High range Example 30/50:

Customer adjusts CV to preference for low pressure setting (30psi for this example)

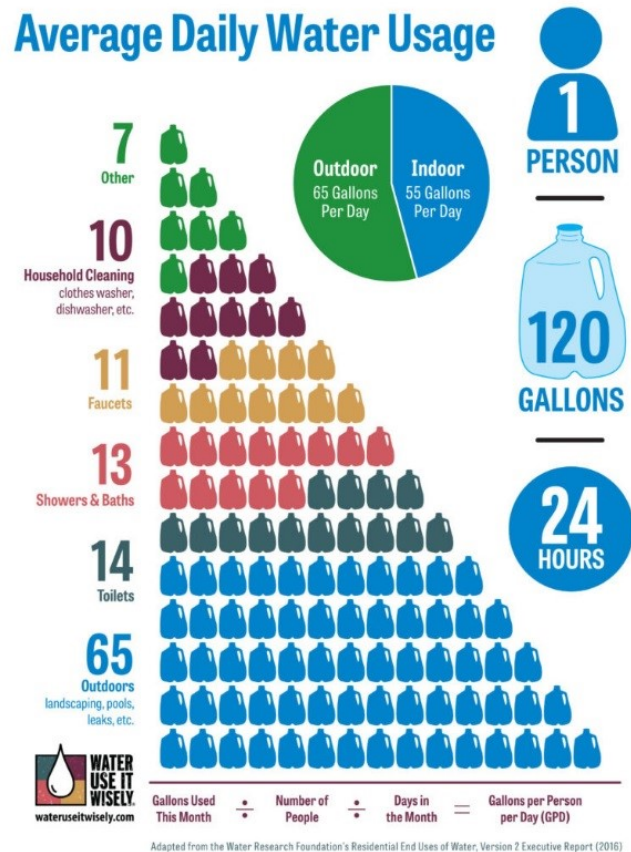
Supply Pressure will determine the high limit (50psi)

The Pressure Tanks air pressure set to match CV setting (customer preference)

This is not the operating pressure, this is the lowest acceptable pressure (customer preference). The operating pressure will always be higher, unless water supply is interrupted or water supply pressure falls below 30psi.

Available water ~50 gallons - pressure will fluctuate during demand (water flow in the home). Toilet flush, sink taps, dishwasher, clothes washer, Shower... Pressure fluctuation minimal unless there is sustained demand for more than 15 minutes.

See: ** **Peak Demand** below.



During an emergency, water use (Demand) should be closely monitored and managed to ensure a long lasting supply of water!

EWS Emergency Water Storage - in Gallons				
Tanks (2) Volume Gallons	Drawdown Operating Pressure Cycle Valve adj. / Supply Pressure			Maximum Drawdown Gal. 60 psi to 2 psi
	40/60	30/50	20/40	
~160 Incl. Air	~45	~50	~60	~80
Gallons Available				
This chart relates to how high you like your Water Pressure in your Home				
If water supply is consistantly 60 Psi or more there is ~80 Gallons available for emergency use				
Less water will be stored while cycling water during non-emergency daily use, refilling tanks, thru the Cycle Valve notch, after each use, during zero flow. No one using water...				



Pressure tanks are filled to full water supply pressure slowly thru a notch in the Cycle Valve (CV) seat. (~ 1 GPM)

~80 gal. cap. Notch = 1 GPM Flow GPM	EWS System Water Cycled				
	Time in Minutes / Gallons Cycled				
	1	2	3	4	5
1	0	0	0	0	0
2	1	2	3	4	5
3	2	4	6	8	10
4	3	6	9	12	15
5	4	8	12	16	20
6	5	10	15	20	25
7	6	12	18	24	30
8	7	14	21	28	35

If you are anticipating an emergency situation, turn off Irrigation System!
If your Auto Pool Fill is connected to EWS, turn Pool Fill off!
If an emergency situation is imminent Isolate household water by turning off the Isolation Valve (contaminated supply?)

** **Peak Demand**—during normal daily use, the cycle valve only allows one gallon per minute flow from Water Supply, while cycling the pressure tanks and supplying water Demand as needed. Each time Demand ends the tanks are refilled in ~50 minutes or less, depending on how much water was used (50 gallons @ ~1 gallon per minute). If Demand uses enough water to lower pressure to less than 30psi downstream of the cycle valve, the cycle valve opens and allows full flow from Water Supply, ensuring that water is always available during normal daily use.

±±±During water service or supply interruptions the amount of water available is approx. 80 gallons (2 std. tanks) as shown above. 80 gallons is an *estimated* amount of water available due to unknown factors such as supply pressure prior to interruption, demand activity immediately before interruption, tank shape (diameter & height), location elevation (atmospheric pressure) and also amount of remaining water/gallons when operating at less than 20 psi.

Table 1. Typical Indoor Household Water Use

Type of Use	Daily Use (gallons/person)	Approximate % of Total Indoor Use
Toilets	18.5	26.7
Clothes Washers	15.0	21.7
Showers	11.6	16.8
Faucets	10.9	15.7
Leaks	9.5	13.7
Other	1.6	2.2
Baths	1.2	1.7
Dishwashers	1.0	1.4
Total	69.3	100.0

Household/Residential daily water use or GPCD (Gallons Per Capita per Day) varies by location and reporting authority, showing a wide range for daily water use amounts. Allowing for differences of reporting it is necessary to decide how much water is used daily, per person. Keeping the numbers/math manageable, 100 gallons seems reasonable.

Household size of 4,3,2,1 persons would use 400,300,200,100 gallons of water per day. Thus during normal, daily operation, EWS (2 std. tanks) would easily keep up with demand. Only during extended water demand would operating pressure fall below 40 psi (30/50 settings); while continuously cycling/refreshing stored water.

Amount of water cycled each day would depend on Demand gpm flow rate minus 1 gpm for the Cycle Valve notch, multiplied by the amount of time flow occurred.

Flow gpm - 1 gpm x Time = Cycled Water

ACCEPTANCE FACTOR CHART

This table incorporates atmospheric pressure (14.7 psi at sea level)
USE GAGE PRESSURE. Example: A system operating between a minimum operating pressure of 20 psig (fill pressure) and a maximum operating (usually 10% below the relief valve setting) of 40 psig has an acceptance factor of 0.366. To find the acceptance factor, start at the top of the table and locate the minimum operating pressure. Next, locate the ~~minimum~~ operating pressure on the left index. Where the two lines intersect is the acceptance factor. *maximum

(Use Gauge Pressure)											
P ₁ MAXIMUM OPERATING PRESSURE PSIG	P ₂ = MINIMUM OPERATING PRESSURE AT TANK (PSIG)										
	5	10	12	15	20	25	30	35	40	45	50
10	0.202										
12	0.262	0.075									
15	0.337	0.168	0.101								
20	0.432	0.288	0.231	0.144							
25	0.504	0.378	0.328	0.252	0.126	-					
27	0.527	0.408	0.360	0.288	0.168	-					
30	0.560	0.447	0.403	0.336	0.224	0.112					
35	0.604	0.503	0.463	0.403	0.302	0.202	0.101				
40	0.640	0.548	0.512	0.457	0.366	0.274	0.183	0.091			
45	0.670	0.586	0.553	0.503	0.419	0.335	0.251	0.168	0.084	-	
50	0.696	0.618	0.587	0.541	0.464	0.386	0.309	0.232	0.155	0.078	
55	0.717	0.646	0.617	0.574	0.502	0.430	0.359	0.287	0.215	0.144	0.072
60	0.736	0.669	0.643	0.602	0.536	0.469	0.402	0.335	0.268	0.201	0.134
65	0.753	0.690	0.665	0.627	0.565	0.502	0.439	0.376	0.314	0.251	0.188
70	0.767	0.708	0.685	0.649	0.590	0.531	0.472	0.413	0.354	0.295	0.236

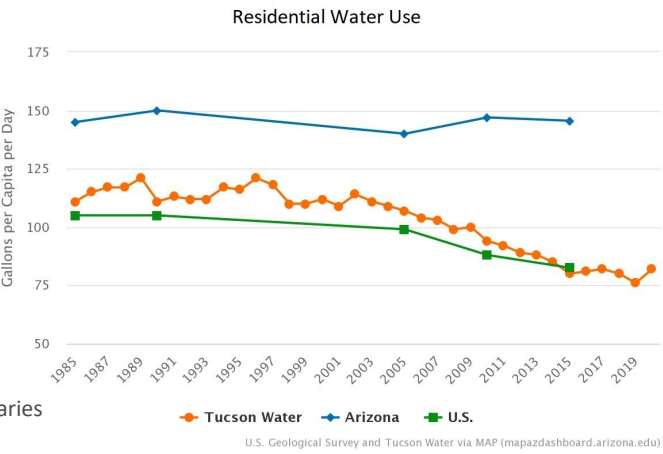
*Remember, there is no adjacent pump or pressure switch when connected to Municipal Water Supply!

Acceptance Factor for 5/50 is .696

Std. Tank Volume is 86 Gallons (per tank)

86 x .696 = 59.856 Gallons

Tanks can be set-up individually. For differing storage options. For example, 2 tank system 1 tank set 30/50 and one tank set 5/50 or any lesser pressure, see chart above. This would require rotating the tanks by installing a ball valve on each tank to prioritize the 5/50 tank for cycling.



Year	Total Potable GPCD	Residential GPCD*	Population
2000	165	112	635,073
2001	165	109	645,780
2002	170	114	655,834
2003	166	111	667,287
2004	163	109	678,418
2005	161	107	686,540
2006	159	104	703,157
2007	157	103	703,157
2008	148	99	705,271
2009	146	100	705,316
2010	139	94	705,817
2011	136	92	706,118
2012	131	89	708,863
2013	127	88	712,698
2014	124	85	715,260
2015	117	80	717,875
2016	117	81	721,205
2017	122	82	725,461
2018	116	80	731,236
2019	111	76	735,610
2020	119	82	739,485
2021	116	77	744,528

Table 2: Annual GPCD (not including reclaimed system deliveries) and estimated Tucson Water service area population from 2000 to 2021. Residential GPCD includes multifamily class water use.

Drawdown				
Model No	Tank Volume (gallons)	Drawdown (gallons)		
		20/40	30/50	40/60
HT-2B	2.0	0.73	0.62	0.54
HT-4B	4.4	1.61	1.36	1.18
HT-8B	7.4	2.78	2.35	2.03
HT-6HB	5.3	1.94	1.64	1.42
HT-14HB	14.0	5.12	4.33	3.75
HT-14B	14.0	5.12	4.33	3.75
HT-20B	20.0	7.31	6.18	5.35
HT-30B	26.0	8.78	7.42	6.43
HT-32B	32.0	-	9.89	8.57
HT-44B	44.0	16.09	13.60	11.78
HT-62B	62.0	22.67	19.17	16.60
HT-86B	86.0	31.44	26.58	23.03
HT-119B	119.0	43.51	36.79	31.86

Acceptance Factor AF x Tank Volume TV = Drawdown

AFxTV=Drawdown .309 x 86 = 26.574

Two tanks... 2 x 26.66 ≈ 53 Gallons total drawdown