Tank Sizing and Installation

Use these tanks with domestic water well systems

Information required:

1. Pump capacity in liters per minute (LPM) or storage volume required _____ liters/gal
2. Pump cut-in pressure _____ BAR/psig
3. Pump cut-out pressure _____ BAR/psig

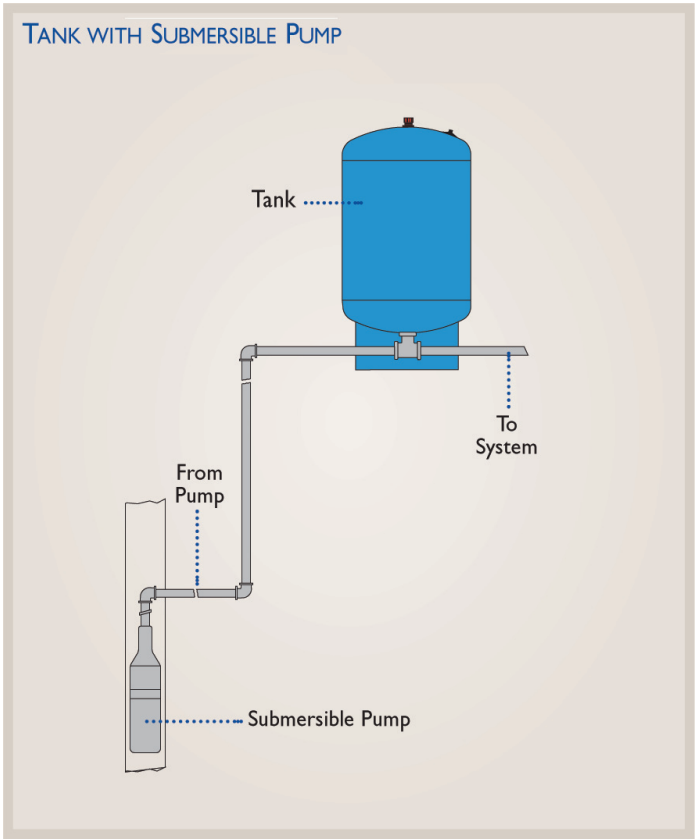
Tank selection

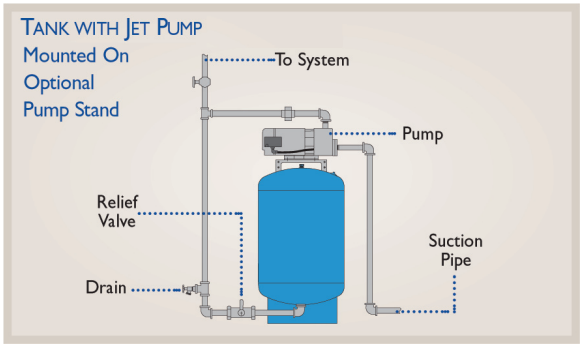
4. Enter drawdown factor from Table 1 _____
5. Divide storage column (line1) by drawdown factor (line 4) _____

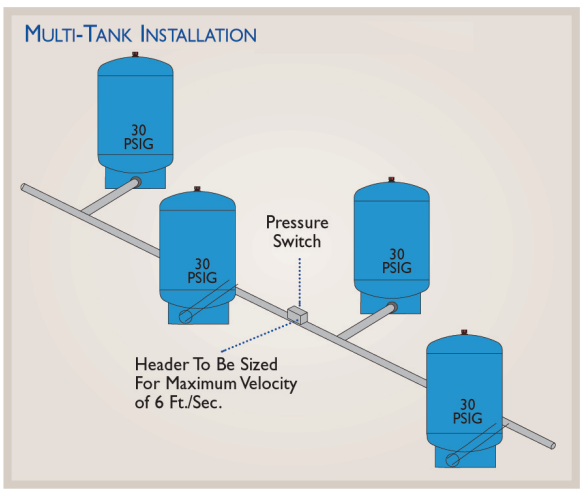
Select Challenge or PressureWave model which satisfies the total volume determined in line 5 or use the sizing chart on the reverse side.

Table 1
Drawdown Factors

Cut-out or final tank Pressure (BAR/PSIG)	Cut-in or Initial Tank Pressure (BAR/PSIG)			
	1.4/20	2.1/30	2.7/40	3.4/50
2.7/40	.366	.183		
3.4/50	.464	.309	.155	
4.1/60	.535	.402	.268	.134
4.8/70	.590	.472	.354	.236
5.5/80	.634	.528	.422	.317







For larger systems, multiple tanks may be manifolded together to meet system requirements
A relief valve is required for all system installations

Tank Sizing and Installation

Boyles Law

All diaphragm tank sizing begins with a basic law of physics known as Boyle's Law. When applied to Hydronic and Thermal expansion tanks it will determine the *acceptance* factor of the tank. When applied to pressure tanks, it will determine the *drawdown* factor. Boyle's Law is experessed as an equation where;

(Pa divided by Po) - (Pa divided by Po) + acceptance or drawdown factor

Boyle's Law as applied to hydronic and thermal expansion tanks;

When: Pa = pressure in tank before system is filled (plus 14.7 PSI atmospheric)
Pf = minimum operating or fill pressure (plus 14.7 PSI atmospheric)
Po = maximum operating pressure (plus 14.7 PSI atmospheric)

For pre-pressurized diaphragm type expansion tanks, Pa is equal to Pf so the formula becomes;

1 minus (Pf divided by Po) = *Acceptance* Factor

Boyle's Law as applied to water well storage tanks;
What is called the *acceptance* factor in hydronic applications is called the *drawdown* factor in water pump applications.

When: Pa = pressure in tank before system is filled (plus 14.7 PSI atmospheric)
Pf = pump cut-in pressure (plus 14.7 PSI atmospheric)
Po = pump cut-out pressure (plus 14.7 PSI atmospheric)

With all pre-pressurized diaphragm tanks, Pa is equal to Pf, so the formula is;

1 minus (Pf divided by Po) = *Drawdown* Factor

Sizing Chart

Challenger™ Model #'s		Total Tank Volume		Drawdown					
				@1.4/2.7-20/40		@2.1/3.4-30/50		@2.7/4.1-40/60	
NPT	BSP	liter	gal	liter	gal	liter	gal	liter	gal
115	GC60	60	14	19.68	5.2	16.28	4.3	14.38	3.8
120	GC80	80	20	28	7.4	23.47	6.2	20.44	5.4
125	GC100	100	26	36.34	9.6	30.66	8.1	26.5	7
135	GC130	130	33	46.56	12.3	38.99	10.3	34.06	9
145	GC170	170	44	61.7	16.3	51.48	13.6	45.05	11.9
160	GC240	240	62	86.68	22.9	72.67	19.2	63.21	16.7
180	GC310	310	81	113.55	30	95	25.1	82.89	21.9
185	GC325	325	85	119.23	31.5	99.92	26.4	87.05	23
1120	GC400	450	119	165.03	43.6	139.29	36.8	121.5	32.1
PressureWave™ Model #'s		Total Tank Volume		Drawdown					
				@1.4/2.7-20/40		@2.1/3.4-30/50		@2.7/4.1-40/60	
NPT	BSP	liter	gal	liter	gal	liter	gal	liter	gal
PW2	PWB-2	2	0.5	0.7	0.2	0.6	0.2	0.5	0.1
PW8	PWB-8	8	2.1	2.9	0.8	2.5	0.7	2.1	0.6
PW12	PWB-12	12	3.2	4.5	1.2	3.6	1	3.3	0.9
PW18	PWB-18	18	4.8	6.6	1.7	5.6	1.5	4.87	1.3
PW24	PWB-24	24	6	8.4	2.2	7	1.8	6.1	1.6
PW40	PWB-40	40	10.6	14.6	3.9	12.4	3.3	10.7	2.8
PW60	PWB-60	60	14	19.7	5.2	16.3	4.3	14.4	3.8
PW20H	PWB-20H	21	5.3	7.3	1.9	6.2	1.6	5.4	1.4
PW60H	PWB-60H	60	14	19.7	5.2	16.3	4.3	14.4	3.8
PW80H	PWB-80H	80	20	28.8	7.6	24.8	6.5	20.8	5.5
PW60V	PWB-60V	60	14	19.7	5.2	16.3	4.3	14.4	3.8
PW80V	PWB-80V	80	20	28.8	7.6	24.8	6.5	20.8	5.5