

Guide to Kegging Beer

So you have now invested no small sum in purchasing a draft beer system. This guide will help you setup this system and keep it running in a smooth and efficient manner. Many homebrewers have no end of problems with their draft system: overcarbonation, undercarbonation, beer that flies out of the tap like a fire extinguisher or foams like crazy. Up until recently most homebrewers have had all these problems, myself included. However, you never see these problems in the bars and brewpubs. That is because they understand the basics of draft systems; and after reading this you will as well.

Now lets get right to setting up the perfect draft system. One that delivers beer at the correct temperature, properly carbonated, with a moderate flow rate which allows you to get as much head into your glass as you desire. This only takes a few minutes and a pocket calculator.

Carbonation

The best way to get properly carbonated draft beer is to let it ferment out then transfer it into a carboy for a short cold conditioning. You only need a few days to allow the yeast to drop out of solution. Then cool the beer as cold as possible, above freezing however. Look on the chart below and follow across the temperature to the carbonation level that is desired (british style beers: 2.00 to 2.40, Most other beers: 2.40 to 2.85, Highly carbonated beers: 2.85 to 2.95) and then up to the pressure required. Hook up the beer to the CO₂ tank with the regulator set at this pressure. This is a good time to make the following suggestion: Always vent the keg before hooking up to the CO₂ tank. This will prevent beer or foam from flowing into the regulator and damaging it. Vent the keg a few times to remove excess oxygen from the head space. Gently rock the keg back

and forth for a few minutes to help the CO₂ dissolve. Finally, leave the beer under pressure for several days at this low temp to allow the carbonation to complete and dissolve thoroughly. Using this method will allow you to draw off the beer with little to no sediment whatsoever.

Dispensing

This is where it gets a little tricky and where most homebrewers go wrong. Remember that when you set the carbonation that you adjusted the pressure according the beer temperature. Now, if you change the temp, warmer for drinking as an example, you will need to change the head pressure to account for this. For example, suppose you carbonated a lager beer at 33 degrees F to 2.6 volumes CO₂. You will have 10 psi of pressure in the headspace. Now, however, you want to serve it at 45 degrees F. As the beer temp rises it won't hold as much CO₂. Looking at the chart, you will now need 16 psi to keep 2.6 volumes in solution. If you only apply 10 psi, gas will come out of solution until the pressure equalizes and you will loose carbonation. Moreover, if you try to dispense the beer at 10 psi, the beer will lose carbonation as it passes through the line and you will

dispense mostly foam.

So, you set the head pressure according to the dispensing temp. However, if you try to dispense with 16 psi in most home draft systems you will get a flow strength more suited to washing the car than dispensing beer. The beer will hit the bottom of the glass so hard that almost all the gas will escape and again you end up with a glass of foam.

So, both low head pressure and high flow rate give us the same problem--A glass full of foam, not beer. In fact, it is entirely possible that a pressure low enough to cause foaming will be high enough to cause a high flow rate. It only takes 2 or 3 psi to push beer through a normal bar tap at a rate of one gallon a minute, an ideal rate according to bartenders. It takes almost no pressure to push beer through a cobra head tap at that same rate.

The reason for these problems are simple. It only takes a little pressure to push the beer through the line; however, 10-15 psi might be needed to keep the gas in solution. How do we get out of this predicament? Restriction! Pub draft systems are designed so that the restriction in the beer line yields a gentle flow of beer from the tap.

There are two sources of restriction. The first is lift. It takes one psi of pressure to lift the beer two vertical feet. So, first you need to figure the restriction placed by lift. The second source is the beer line itself. Vinyl tubing of 3/16" diameter gives 3 psi of restriction per ft. of hose. 1/4" hose gives .85 psi of restriction per foot.

With this information we can now set up our draft system correctly. First we find out what pressure we require to maintain carbonation. Next we set up our liquid line so that the total resistance is equal to this pressure, or two psi higher if using a cobra head tap. Then we hook up our gas line and set the

regulator to 2 psi extra for the bar tap.. The beer should now flow out at one gallon per minute. So here it is again step by step:

Step 1

Figure the head pressure in your keg.

Step 2

Figure the total lift in your beer line. Measure from the middle of the keg to the bottom of your tap. Use the formula:
 $R(\text{restriction in psi}) = 0.5 L(\text{lift in feet})$.

Step 3

Subtract lift from head pressure. If using a cobra head tap, add 2 psi to the figure. The result is the required restriction that your line should give.

Step 4

If using 3/16" hose take the resistance and divide by 3 to get the line length required. If using 1/4" hose divide by .85 to get the length.

Step 5

Install the system and set your regulator to deliver keg pressure plus 2 psi. Check that your flow rate is approximately one gallon per minute (a 12-ounce glass in 6 seconds or a 42-ounce pitcher in 20 seconds).

Practical considerations

We now have a draft system that is perfectly balanced when the tap is open. However, when the tap is closed we have an additional 2 psi of pressure on the

headspace. This can gradually lead to increased carbonation and possibly gas break-out and foaming when you dispense a beer. There are several ways to solve this dilemma. First is to drink your kegs quickly; a noble purpose if not completely practical for many of us. Second is to shut off the flow of gas into the keg when not dispensing. However, you might still pick up some additional carbonation. In order to avoid foaming and gas break-out you will have to gradually increase the head pressure to compensate for the dissolution of CO₂. Or, you can keep the pressure on the headspace to that required to keep the beer carbonated and increase it two psi only when dispensing. After an evening of drawing beer simply turn the pressure back down. This method is impractical for pubs but workable for homebrewers.

Volumes of Carbon Dioxide

Pounds per square inch (psi)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
30	1.82	1.92	2.03	2.14	2.23	2.36	2.48	2.60	2.70	2.82	2.93																		
31	1.78	1.88	2.00	2.10	2.20	2.31	2.42	2.54	2.65	2.76	2.86																		
32	1.75	1.85	1.95	2.05	2.16	2.27	2.38	2.48	2.59	2.70	2.80	2.90																	
33		1.81	1.91	2.01	2.12	2.23	2.33	2.43	2.53	2.63	2.74	2.84																	
34		1.78	1.86	1.97	2.07	2.18	2.28	2.38	2.48	2.58	2.68	2.79	2.89																
35			1.83	1.93	2.03	2.14	2.24	2.36	2.43	2.52	2.62	2.73	2.83	2.93															
36			1.79	1.88	1.99	2.09	2.20	2.29	2.37	2.47	2.57	2.67	2.77	2.86															
37				1.84	1.94	2.04	2.15	2.24	2.34	2.42	2.52	2.62	2.72	2.80	2.90														
38				1.80	1.90	2.00	2.10	2.20	2.29	2.38	2.47	2.57	2.67	2.75	2.85														
39					1.86	1.96	2.05	2.15	2.25	2.34	2.43	2.52	2.61	2.70	2.80	2.89													
40					1.82	1.92	2.01	2.10	2.20	2.30	2.39	2.47	2.56	2.65	2.75	2.84	2.93												
41						1.87	1.97	2.06	2.16	2.25	2.35	2.43	2.52	2.60	2.70	2.79	2.87												
42							1.83	1.93	2.02	2.12	2.21	2.30	2.39	2.47	2.56	2.65	2.74	2.82	2.91										
43								1.80	1.90	1.99	2.08	2.17	2.25	2.35	2.43	2.52	2.60	2.69	2.78	2.86									
44									1.86	1.95	2.04	2.13	2.21	2.30	2.39	2.47	2.56	2.64	2.73	2.81	2.90								
45									1.82	1.91	2.00	2.08	2.17	2.26	2.34	2.42	2.51	2.60	2.68	2.77	2.85	2.94							
46										1.88	1.96	2.04	2.13	2.22	2.30	2.38	2.47	2.55	2.63	2.72	2.80	2.89							
47											1.84	1.92	2.00	2.09	2.18	2.25	2.34	2.42	2.50	2.59	2.67	2.75	2.84	2.93					
48												1.80	1.88	1.96	2.05	2.14	2.21	2.30	2.38	2.46	2.55	2.62	2.70	2.79	2.87				
49													1.85	1.93	2.01	2.10	2.18	2.25	2.34	2.42	2.50	2.58	2.66	2.75	2.83	2.91			
50														1.82	1.90	1.98	2.06	2.14	2.21	2.30	2.38	2.45	2.54	2.62	2.70	2.78	2.86	2.94	
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Move across from the temperature of the beer to the desired volumes of CO₂, then up to find the correct psi of your regulator