Kegging Instructions for the Beginner

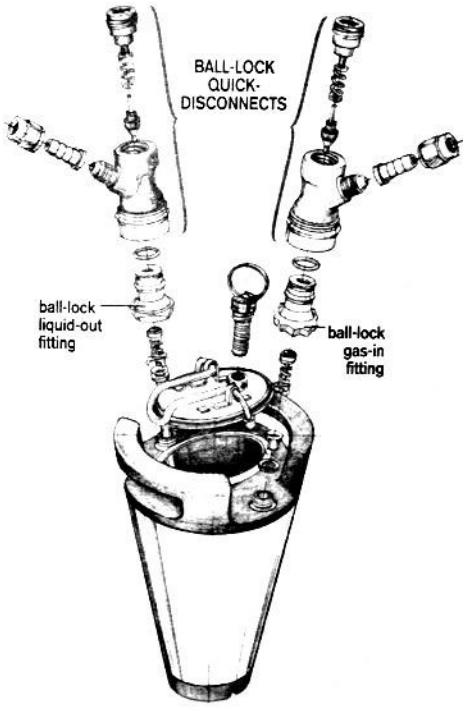
Warnings—Please read and follow all warnings whenever you use your kegging equipment.

- Always keep your CO_2 cylinder in an upright position to prevent the liquid CO_2 from entering and damaging the regulator.
- Always close the CO_2 cylinder's valve when not using the CO_2. Sometimes a leak will develop somewhere in the system. Closing the valve will prevent the loss of CO_2.
- Before attempting to open the tank lid on your keg, always first vent off the keg's pressure by opening the keg's pressure relief valve.
- Never store the CO_2 cylinder above 100°F, and never place the CO_2 cylinder in a place where the temperature may climb over 100°F.
- Never drop the CO_2 cylinder. Damage to the regulator, gauges, cylinder or valve may result.

Keg System Parts

Kegs

Five-gallon Cornelius ball-lock kegs are the standard size kegs. Three and ten gallon kegs exist, but are hard to find. Kegs are available in two basic styles—ball-lock or pin-lock, depending on the type of connectors required to tap the keg. Ball-lock kegs, which use locking ball bearings disconnects to attach to the keg, are the most common type of keg.

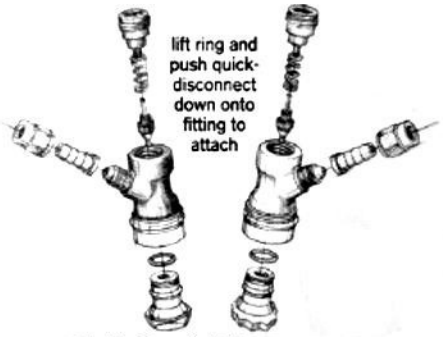


Ball Lock Keg

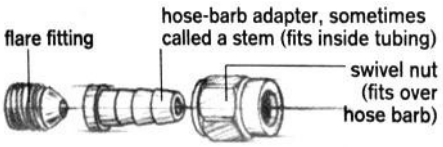
Keg Quick Disconnects

There are two kinds of disconnects for each style of keg: a gray gas-in disconnect and a black beer-out disconnect.

Quick-disconnects are available in two forms. The first type has a built in hose barb. The second type has a threaded male flare fitting on which you attach a removable swivel



Ball-Lock Disconnect

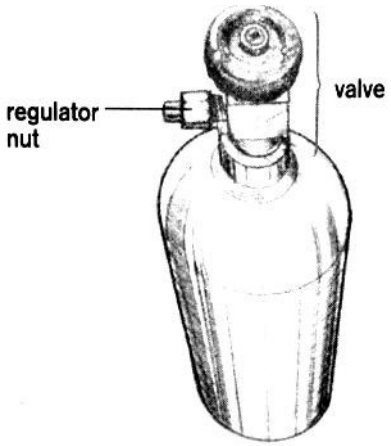


Flare / Hose Barb / Swivel Nut

nut and hose-barb. For ease of cleaning and sanitizing, the male flare/swivel nut assembly is the preferred type, since the hose can easily be removed by unscrewing the swivel nut.

CO_2 Cylinder

The five-pound CO2 cylinder is the most common size for home brewers. The cylinder



CO2 Cylinder

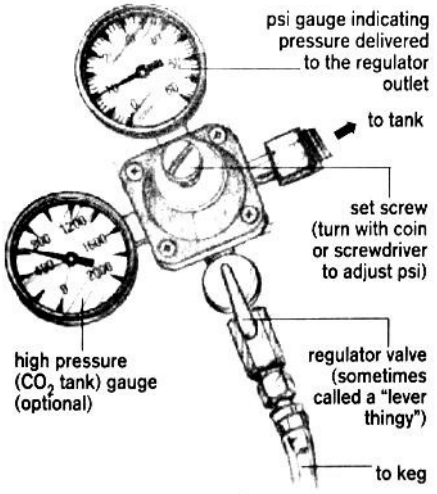
is so named because it hold five pounds of liquefied carbon dioxide. A full five-pound cylinder should supply enough CO_2 to carbonate and dispense up to a year's worth of homebrew.

By federal law, all CO2 cylinders have a certification date stamped onto the cylinder's neck, and the law requires the cylinder to have a hydrostatic pressure test every five years. Hydrostatic pressure tests generally cost $15.

Always keep CO2 cylinders in an upright position to prevent the liquid CO_2 from entering and damaging the regulator.

Regulator

A full CO2 cylinder holds 800 pound per square inch (psi) at room temperature, so a regulator is required to scale back the CO2



Regulator

cylinder pressure to normal working pressures, which range from 5 to 30 psi to carbonate and dispense the beer. The regulator screws onto the tank valve and reduces the pressure to safe levels. A set screw on the regulator, which turns with a screwdriver, adjusts the output pressure, which is measured by the top gauge. You rarely need more than 40 psi.

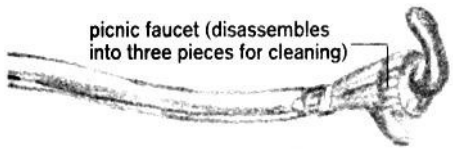
The CO_2 in the tank starts out as liquid, and the pressure of the gas in the head space of

the tank will be between 650 and 900 psi, depending on the room temperature of the cylinder. The high-pressure gauge on the regulator will only begin to drop when all the liquid CO_2 is gone.

Your regulator is equipped with a one-way check valve that makes it impossible for beer to accidentally flow back into the regulator and ruin it. For example, if your keg is at a higher pressure than the regulator pressure, the check valve will prevent beer foam from shooting up the gas line and ruining the regulator.

Picnic Faucet

Your kegging setup includes a plastic beer faucet for dispensing the beer. The picnic faucet has a barbed end which press-fits onto the beer line. The use of 3/16" inner diameter thick-walled beer tubing is included (and recommended) for dispensing the beer. As a general rule, smaller inner-diameter beer tubing is better than larger inner-diameter tubing (for example, ¼" or greater), because smaller tubing allows the liquid to travel the tube's length in a capillary action, thus minimizing splashing.

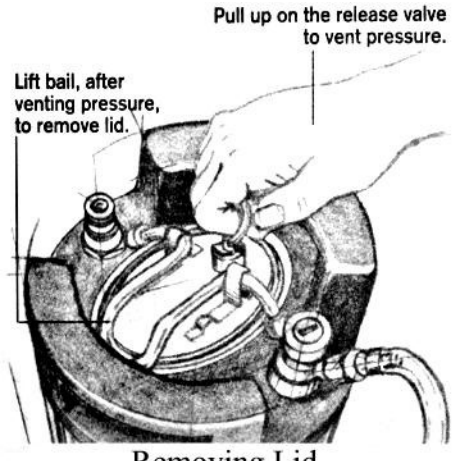


Picnic Faucet

Keg Disassembly & Cleaning

Before using your keg for the first time, a thorough cleaning is necessary. We recommend cleaning all kegs, even if you have a new or factory-reconditioned keg. First, vent any pressure in the keg by lifting the tab or ring attached to the pressure-relief valve.

With the pressure vented, you'll be able to open the tank lid. Lift up on the bail handle and push the tank lid down. Caution: kegs are rated to hold up to 130 psi of pressure, so you could injure yourself if you try to force the lid open with pressure inside. After pushing the cover down a little, rotate it a quarter turn and you'll be able to lift it out.

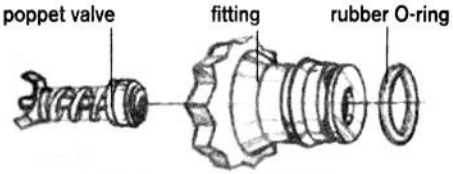


Removing Lid

Replacing the Seals on Used Kegs

If you are using a used keg (a non-factory reconditioned keg), you should replace all five keg seals with new ones.

After removing the tank lid, you will notice the large rubber O-ring. You should replace this O-ring with a new one.



Disassembled Fitting

Next, using a deep-socket wrench, loosen both the gas and liquid fittings, called tank plugs, on the top of the keg. There are several sizes of fittings, but 11/16" and 7/8" diameter are the most common for ball-lock kegs.

Note: most kegs label at least one of the tank plug positions. For example, the top of the keg will be stamped "IN," meaning gas in, or "OUT" for beer out. Furthermore, your keg is constructed with two different tank plugs. One is dedicated for gas, and the other for liquid. Make sure that you reassemble the keg with the respective tank plugs in their proper position. Typically, the liquid tank plug requires a 6-point socket, and the gas tank plug requires a 12-point socket. Sometimes both the liquid and gas tank plugs are 6-point. If so, examine the actual points on the gas tank plug. On each of the points will be a small notch mark. You will not see this notch on the liquid side. If you reassemble the tank plugs switched around, they will in fact thread down onto the keg, but you will have difficulty attaching the disconnects to the keg. Also, you may damage the disconnects.

Remove both tank plugs and the dip tubes beneath them. The gas tank plug has a short tube, and the liquid tank plug has a long tube that goes all the way to the bottom of the keg. Each tank plug has a small O-ring around it on the outside, and each dip tube has an even smaller O-ring around it. Replace all four of these O-rings.

Inside each tank plug is a spring loaded valve called a poppet valve. Normally the poppet valves do not need to be replaced, but if the valve seal becomes damaged, then it will leak and should be replaced.

Keep in mind, however, that your keg is a retired soda keg. Soda syrups are very thick and were thus dispensed under relatively high pressure. Assuming that the kegs would be kept under high pressure, the kegs were designed such that some internal pressure was required to close the seals tightly. When you are dispensing your beer, you will be using lower pressures than the kegs were actually designed for. Consequently, when you remove your gas disconnect, you may hear gas hissing through the poppet valve. If this happens, tap on the poppet valve until it seats correctly. If you use more than one keg, you may find that some of the poppet valves are temperamental. Others never leak. In any case, it is not uncommon for a correctly operating keg to leak below 10 psi. Therefore, if you have a leaky keg, then when you are not actually dispensing your beer, you should keep at least 10 psi on your keg.

Cleaning Kegs

With the keg disassembled, you should thoroughly clean your keg. Fist, rinse the keg, fittings and tubes with hot water to remove obvious syrup or dried beer. You may need to scrub the inside of the keg with a nylon bristle carboy brush or nylon scrubbing pad to remove the stubborn residue. Don't worry about scratching the inside surface. Just get it clean. Then fill the keg with very hot water and B-Brite brewery cleanser. Fill a separate tub with B-Brite solution and soak the small parts, such as the tank lid and tank plugs. We recommend using a plastic wallpaper bin for cleaning and sanitizing keg parts. Wallpaper bins can be purchased at any hardware store. They are long, narrow and shallow and hold less than two gallons of solution. Therefore, you won't waste sanitizer. Also, the long keg dip tube will lay down completely submerged in solution.

After the keg is thoroughly cleaned (see "Keg Cleaning Tips" below), it is ready to be sanitized. To sanitize your keg, only use iodophor sanitizer. Warning: never use chlorine bleach to clean or sanitize your keg. Even though your keg is constructed of stainless steel, chlorine is reactive with stainless steel, and it will destroy your keg. To sanitize your keg, mix 1 tablespoon (1/2 fl. Oz) per 5 gallons water. Soak for 2 minutes minimum. Remember: iodophor is a powerful sanitizer only. Equipment must thoroughly be cleaned first using a powerful cleanser, such as B-Brite. In a wallpaper bin full of iodophor, soak the dip tubes, tank plugs and lid. Next, reassemble the keg. It is not necessary to tighten down the tank plugs with all your strength. Doing so could damage the seals. Simply snug the tank plugs down firmly. It is not necessary to rinse iodophor if you let it air dry. Since we never take the time to let the equipment dry, we simply pour about a quart of water into the keg, slosh it around, and then drain it.

Keg Cleaning Tips

A great advantage of kegging beer is that it saves you the time and hassle of bottling. Cleaning kegs is easy, and to make the process even easier, we recommend letting time do the work for you. How do you do this? Plan on cleaning the keg one day before you plan on filling it. For example, in the evening sometime after dinner, disassemble the keg hardware and place it in your wallpaper bin full of B-Brite. Next, fill your keg with 4 gallons of B -Brite. You've just spent five minutes cleaning, and you're done. Let everything soak overnight. Let time do the work for you. The

next morning, take the keg holding the 4 gallons of B-Brite and toss it upside down in a five- or six-gallon bucket. Some B-Brite will drain out into the bucket, but more importantly, the B-Brite solution will now be in contact with the top of the keg, both inside and outside, giving it a thorough cleaning. Leave the carboy upside down in the bucket until that evening. Now the keg, dip tubes and tank plugs will be spotlessly clean, and you've invested a mere five minutes of work. Your kegging equipment is now ready to be rinsed and sanitized with iodophor.

Kegging the Beer

As soon as your fermentation has completed, you may keg the beer. Make sure the keg has been properly cleaned and sanitized as discussed above. Before siphoning the beer into the keg, it is helpful to first purge the empty keg with CO_2. This protects the beer from oxidation. To do this, remove the keg lid, and attach the CO_2 disconnect. Set the regulator pressure to about 5 psi and purge the keg for about 10 seconds. CO_2 is heavier than air, so it will sink to the bottom and flush the air out the open top. Purge the CO_2 just prior to filling the keg, since the CO_2 will eventually mix with air.

Turn off the regulator and siphon the beer from the fermenter to the bottom of the keg. As the beer fills the keg, the CO_2 is gradually pushed out, leaving a blanket of CO_2 to protect the surface of the beer from air.

Replace the tank lid. The gas-in line is still connected to the keg, so set the regulator to about 5 psi and fill the head space of the keg with CO_2 (listen for the gas to stop flowing through the regulator). Turn off the CO_2. Open the safety valve to let almost all the pressure out, then fill the keg with CO_2 again. Do this three times to purge any remaining air from the head space in the keg. Now you are ready to carbonate the beer.

Carbonating the Beer

When carbonating your keg, you have two options. You may either prime the keg with corn sugar or malt extract, or you may force carbonate the keg from your CO_2 cylinder. Regardless of which method you use, you'll notice that the quality of the carbonation improves with time. After a few days, the bubbles will seem finer and the head on your beer will be longer lasting. After several weeks, the carbonation will be excellent.

Priming the Beer

To prime your keg, simply use ½ cup of corn sugar or ¾ cup of dried malt. Like bottling, be sure to first boil your priming sugar in about 1 cup of water for about 5 minutes before adding it to the keg. Keep in mind, however, that your keg requires some degree of internal pressure to tighten the seals, especially the large O-ring on the tank lid. If you simply add the priming sugar and close the lid, it is likely the tank lid will not be properly sealed, and the CO_2 gas produced will simply bleed out the sides of the lid. For this reason, when priming the keg with sugar, be sure to pressurize the keg's headspace with about 15 to 20 psi. This should securely tighten the seals and allow for proper carbonation. Like bottling beer, remember to keep the keg at the yeast's proper fermentation temperature. Once the beer is sufficiently carbonated (expect 2 weeks), then you may move the keg to a cooler location.

Force Carbonating the Beer

To force carbonate the keg, the first step is to determine how much carbonation you want. The dial gauge on your regulator is calibrated in pounds per square inch, but carbonation is generally measured in volumes of CO_2, which represents the quantity of gas that is actually dissolved in the beer. For English styles like bitter, about 1.5 to 1.8 volumes of CO_2 are about right. For effervescent styles like German weizen, 2.8 to 3.0 volumes are typical. For most other beers, something in the 2.4 to 2.6 range works best.

Table 1 shows the pressure requirements for proper carbonation. As you can see, it is important to know the temperature of the beer in your keg before you begin. A stick-on thermometer works well. Let's assume the beer you just kegged is 42 degrees F. With most beers, you want carbonation to be in the range of 2.2 to 2.6 volumes of CO_2. By using table 1, you learn you'll need about 10 psi at 42 degrees F for 2.2 volumes of CO_2.

So you are ready to carbonate. Your CO_2 is hooked up to the keg, the tank lid is on and the air is purged from the keg's head space. Now turn on the CO_2. Turn the screw on the regulator to set it for (in this example) 10 psi. Now listen to the CO_2 flow. As the pressure reaches equilibrium, the flow will slow down

Table 1: Pressure Required for Desired Carbonation

DIRECTIONS: Look down the left column to find your keg temperature and read across to the number in the column corresponding to the desired carbonation level. That number is the CO2 pressure to apply to the beer, in psi.

Temp	Volumes of CO2 Desired													
(°F)	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
32	0.6	1.6	2.5	3.5	4.4	5.4	6.3	7.3	8.2	9.2	10.1	11.0	12.0	12.9
34	1.3	2.3	3.3	4.3	5.3	6.3	7.3	8.2	9.2	10.2	11.2	12.1	13.1	14.1
36	2.1	3.1	4.1	5.1	6.2	7.2	8.2	9.2	10.2	11.2	12.3	13.3	14.3	15.3
38	2.8	3.9	4.9	6.0	7.0	8.1	9.1	10.2	11.2	12.3	13.3	14.4	15.4	16.5
40	3.6	4.7	5.7	6.8	7.9	9.0	10.1	11.2	12.3	13.4	14.4	15.5	16.6	17.7
42	4.3	5.5	6.6	7.7	8.8	10.0	11.1	12.2	13.3	14.4	15.5	16.7	17.8	18.9
44	5.1	6.3	7.4	8.6	9.7	10.9	12.1	13.2	14.4	15.5	16.7	17.8	19.0	20.1
46	5.9	7.1	8.3	9.5	10.7	11.8	13.0	14.2	15.4	16.6	17.8	19.0	20.2	21.3
48	6.7	7.9	9.1	10.4	11.6	12.8	14.0	15.3	16.5	17.7	18.9	20.1	21.4	22.6
50	7.5	8.7	10.0	11.3	12.5	13.8	15.0	16.3	17.6	18.8	20.1	21.3	22.6	23.8
52	8.3	9.6	10.9	12.2	13.5	14.8	16.1	17.3	18.6	19.9	21.2	22.5	23.8	25.1
54	8.9	10.4	11.8	13.1	14.4	15.7	17.1	18.4	19.7	21.1	22.4	23.7	25.0	26.3
56	9.9	11.3	12.6	14.0	15.4	16.7	18.1	19.5	20.8	22.2	23.6	24.9	26.3	27.6
58	10.7	12.1	13.6	15.0	16.4	17.8	19.2	20.6	21.9	23.3	24.7	26.1	27.5	28.9
60	11.6	13.0	14.5	15.9	17.3	18.8	20.2	21.6	23.1	24.5	25.9	27.4	28.8	30.2
62	12.4	13.9	15.4	16.9	18.3	19.8	21.3	22.7	24.2	25.7	27.1	28.6	30.0	31.5
64	13.3	14.8	16.3	17.8	19.3	20.8	22.3	23.8	25.3	26.8	28.3	29.8	31.3	32.8
66	14.2	15.7	17.3	18.8	20.3	21.9	23.4	25.0	26.5	28.0	29.6	31.1	32.6	34.1
68	15.1	16.6	18.2	19.8	21.4	22.9	24.5	26.1	27.6	29.2	30.8	32.4	33.9	35.5
70	15.9	17.6	19.2	20.8	22.4	24.0	25.6	27.2	28.8	30.4	32.0	33.6	35.2	36.8
72	16.8	18.5	20.1	21.8	23.4	25.1	26.7	28.4	3.0	31.6	33.3	34.9	36.5	38.2
74	17.8	19.4	21.1	22.8	24.5	26.2	27.8	29.5	31.2	32.9	34.5	36.2	37.9	39.5
76	18.7	20.4	22.1	23.8	25.5	27.2	29.0	30.7	32.4	34.1	35.8	37.5	39.2	40.9
78	19.6	21.4	23.1	24.9	26.6	28.4	30.1	31.8	33.6	35.3	37.1	38.8	40.5	42.3
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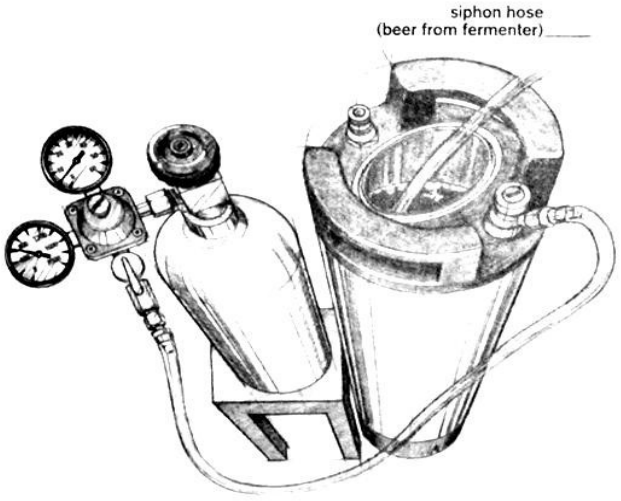
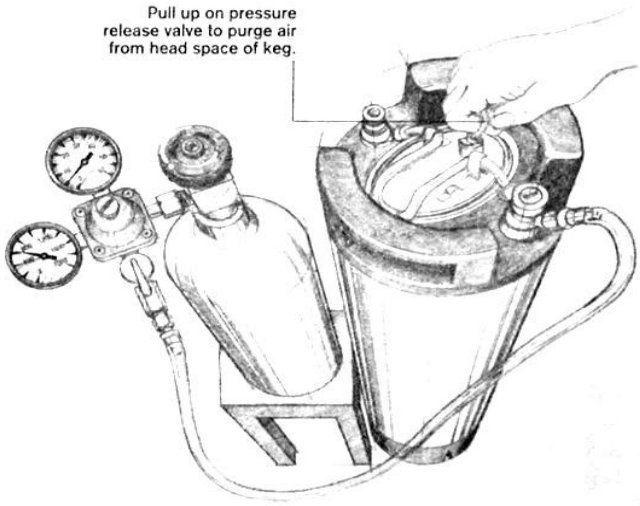


Filling the Keg from the Fermenter



"Burping" the Keg

and eventually stop (this won't take more than a few minutes). The reason it stopped so soon is that when the keg is standing upright, there is only a small surface area where the gas can dissolve into the beer.

Shaking the keg will agitate the surface and start the flow again. To make this process more efficient, you can lay the keg on the floor and roll it back and forth with your foot. When laying the keg on its side, be sure the keep the gas disconnect at the top, 12 o'clock position. Even though your regulator has a built in check valve and will prevent beer from shooting out of the keg at high pressure, it still could pour into your gas line. Keeping the gas disconnect at the 12 o'clock position should prevent any beer from getting into your gas line. As you rock the keg back and forth with your foot, you will hear the CO_2 flowing through the regulator as it is dissolving into the beer. When the flow stops, the beer is saturated with CO_2 and is now carbonated. This method of forced carbonation may take up to 15 minutes.

To reduce the carbonation time, we will usually begin the process at a higher pressure. For example, your beer is 42 degrees F, and from Table 1, you've determined 10 psi is the proper carbonation pressure. Instead, you may turn up the pressure higher, say to 20 psi. Then shake the keg for a minute or so, and then turn the pressure back down to 10 psi. By starting at the higher pressure, you've forced in much more CO_2 in a shorter time. With a little practice, you can generally have the beer carbonated in only a few minutes.

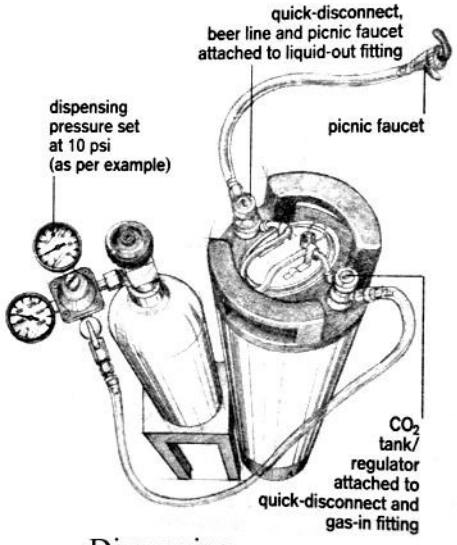
Even though the beer is now carbonated, it will be foamy because of all the agitation. After a few hours, the beer will settle down and be ready to serve.

Dispensing the Beer

So you are ready to pour a glass of freshly kegged and carbonated brew. The simplest way involves a little trial and error, but don't worry.

Find Your Dispensing Pressure

Attach the beer-out disconnect to the beer-out tank plug. Next, bleed off most of the keg's pressure by pulling the ring (or lifting the tab, depending on your keg's design) on the tank lid's pressure relief valve. Pull the ring slowly so that you release the gas slowly. If you pull the pressure relief valve wide open, you may cause the beer to foam up and out the lid. Third, turn the pressure on your regulator down to 0 psi, attach the gas-in disconnect, and then turn the pressure up to 2 or 3 psi. Dispense some beer into your glass with the faucet lever depressed fully open. Chances are the beer flow rate will be too slow, but with little to no foaming. That means you can increase your dispensing pressure to speed up the flow. Increase the regulator pressure a few psi and pour more beer. Keep doing this until you achieve the desired flow rate but with minimal foaming. You have just determined your keg's *dispensing pressure*. As long as your keg remains at the same temperature, this dispensing pressure will remain the same. If, however, you chill the keg further in a refrigerator or on ice, you will be able to increase your dispensing pressure, since your beer will contain the CO_2 better at colder temperatures.



Dispensing

Storing the Beer

Once you are done dispensing your beer for the night (or weekend), you may want to increase the keg's pressure to retain proper carbonation. For example, your beer is at 42 degrees F, and you learned from Table 1 that you needed 10 psi to properly carbonate the beer. Yet you discovered that your dispensing pressure was 6 psi. Thus, if you want your beer to remain at the original level of carbonation, you will need to store the keg at 10 psi. We don't always re-pressurize the keg to the carbonation pressure after each evening. Instead, we may only restore the keg's pressure at the end of the weekend.

There is no problem storing and dispensing your keg at cellar or even room temperatures, but you will discover that your dispensing pressure will be very low. This forces you to waste a lot of CO_2, since you are constantly alternating between high storage pressures and low dispensing pressures. If you have this problem, you should consider buying a used refrigerator. If you look in the classified ads, you usually can find a decent used refrigerator for less that $100. A further advantage of having a refrigerator is that it will usually hold up to four kegs, which means you can have up to four beers on draught at one time. With a refrigerator, you can also install tap-through-the-door faucets for easy dispensing. Enjoy!