

I just found this on an internet forum. It sounds correct as I remember it. If the pressure is less, i.e. 500 or 600 psi, you don't have a full tank. read below:

Frank

CO2 - Liquid or Vapor

by erdoz1 <erdoz1/wt.net> Date: Mon, 20 Sep 1999

In response to several posts regarding whether the CO2 in the high pressure cylinder is liquid or vapor - It is...BOTH!

At a room temperature of **80 F**, the vapor pressure is ~ **880 psia**, and the **liquid and vapor phases coexist in the two-phase zone**. The proportions of liquid and vapor will vary according to the total mass contained within the closed system.

As CO₂ is withdrawn from the cylinder, the liquid fraction decreases and vapor fraction increases. The pressure remains constant matching the vapor pressure of CO₂ at the room temperature. (I have assumed that cylinder temperature equilibrates with last drop of liquid disappears, the system operates in the single phase zone and the pressure will drop according to the standard gas relationship ($PV=zNRT$). At pressures below 75 psia, the solid- vapor phase must be considered, but this is outside our discussion. BTW, the Gibbs Phase Rule is $v= c-p-2$.

Normally, the CO2 cylinder should be charged by weight, to ensure that a vapor pocket is left so that the vapor can disengage from the liquid before flowing to the regulator. This is important, because the liquid will produce a much greater refrigeration effect than the vapor when reduced in pressure (crank up the regulator flow and notice how cold it gets) - this may result in the regulator valve seat "icing" with resultant poor performance. This particularly important for CO₂ since the equilibrium at below ~ 70 psia downstream of the regulator is between the gas and the solid and will make "snow" (which is why this gas is particularly hard to regulate at low flows & high pressure drops). The CO₂ cylinder should be oriented vertically, but at the low flows the aquarist uses, a slight tilt is not critical.

One more thing - if you store the cylinder at ~ 100 degrees F (NOT RECOMMENDED!!!), the cylinder will now be operating at about 1100 psia in the critical zone where the liquid and vapor properties are indistinguishable.