



## **The ins and outs of beer dispensing in general and from KeyKeg in particular.**

Due to its carbonized nature, the correct dispensing of beer needs some special attention.

For all kinds of kegs the first preposition is that dispensing should never take place below the equilibrium pressure of the dissolved CO<sub>2</sub>. The equilibrium pressure is the minimum pressure necessary to maintain the CO<sub>2</sub> gas dissolved in the beer. Dispensing any keg below this pressure will unavoidably lead to a loss of CO<sub>2</sub> gas, i.e. a loss of sparkling behaviour of the beer resulting in unfavourable "flat beer". Furthermore, arising of bubbles in the beer hose (which is soon at ambient temperature) will lead to dispense difficulties (sputtering/splashing). While dispensing from KeyKeg in straight up position, also all out gassing taking place in the KeyKeg will accumulate to bubbles in the beer line and lead to dispense complications.

When dispensing from ordinary stainless steel kegs the use of too little pressure is widespread in an attempt to save CO<sub>2</sub> propellant from costly CO<sub>2</sub> bottles. The equilibrium pressure depends on two aspects: CO<sub>2</sub> content and temperature. CO<sub>2</sub> contents for beer typically vary from approx. 4 grams per litre up to 7 grams per litre. At 20°C these carbonisation grades result in equilibrium pressures of 1.4 to 3.2 bars respectively.

In regular stainless steel kegs dispensing should not take place above the equilibrium pressure either. Dispensing above the equilibrium pressure will inevitably lead to over- carbonisation, a pick-up of CO<sub>2</sub> gas by the beer. This phenomenon is harmful for the taste of the beer as well. For the KeyKeg this preposition is not applicable. In the KeyKeg this second effect cannot occur because the beer is at all times separated from the propelling gas. Therefore KeyKeg has great benefits when a higher dispense pressure is needed. When for instance dispensing on the ground floor or even first floor from kegs stored in a cool cellar, the necessary extra 0.3 bar pressure per floor level can be added to the "normal" dispensing pressure without any negative effects of over-carbonisation. In fact dispensing from KeyKeg is advised at a slightly higher pressure than the equilibrium pressure (or higher) to avoid any possibility of CO<sub>2</sub> loss of the beer.

The harmful effects when neglecting the equilibrium pressure, discussed in the last paragraph are especially important in low-volume outlets where the amount of beer sold is only moderate and the pick-up or loss of CO<sub>2</sub> gas in the keg can take place during a long time span.

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Besides the most important aspects concerning the equilibrium pressure there is more to be taken into account in order to dispense a perfect glass of beer:

1. The dispensing system from the coupler via beer hose, cooler and dispensing column to the tap valve causes a certain pressure drop during dispensing. Together with the (begin) pressure on the keg this pressure drop affects the flow rate of the beer from the tap.
2. Depending on the carbonisation and temperature of the beer this flow rate should not exceed a certain value to avoid excessive foaming of the beer in the glass. From the mentioned dependence on carbonisation grade and temperature follows that a certain dispensing facility is dedicated only for type of beers with, at least approximately, the same carbonisation grade and serving temperature.
3. A way to achieve some extra regulating possibilities is the application of a compensator valve at the tap. With a compensator an adjustable pressure drop and thus flow rate drop can be achieved at the very end of the beer line to avoid excessive foaming in the glass. In this way a higher beer pressure and/or a too short beer line can be compensated. A lot of even professional compensators in the market however are not properly designed from a beer flow point of view and therefore cause out-gassing/foaming of the beer in the compensator.
4. With this remark we come to the final important item in the dispense system: an undisturbed beer flow should be guaranteed from the coupler to the dispense unit. Instantaneous pressure drops at all connections should be avoided. The main rule is that the cross-section of the line should never increase, at least not in an abrupt way. A carefully designed smooth increase in cross-section, like for example at the outflow of the tap is possible. A decrease of the cross-section is less of a problem. However all sudden corners and flow changes should be avoided, therefore the use of any other valve except ball valves which allow an undisturbed flow when fully opened is highly unfavourable. Furthermore the valves should be opened and closed instantaneously when dispensing.

A last topic in beer dispensing is avoiding so called "wild beer". When moving a beer keg, the beer gets agitated, physically the CO<sub>2</sub> molecules get less tied to the water molecules and are more easily/faster to be set free at pressures below the equilibrium pressure. Leaving a moved keg at peace for some hours will cause the gas to be better tied up to the water and facilitate the dispensing tremendously.