

Dispensing Beer With Blended Gas

Overview

Introduction During the past decade, utilizing a mixture of Carbon Dioxide (CO₂) and Nitrogen (N) gasses for dispensing draft beer has become enormously popular at retail outlets such as bars, restaurants, pubs and large venues.

Driving this popularity is the dispensing of stout or nitrogenated draft beers. Guinness, Murphy Stout, Boddingtons and other craft brews require a CO₂ and Nitrogen blend to achieve the correct presentation, and flavor in the glass.

Gas blending is also applied for dispensing ales and lagers where high gas pressures are required to propel beer through a draft beer system.

Today, blended gas technology, such as the Micro Matic MM200 blender, is capable of supplying the appropriate ratios of mixed gas to both stout beer and ales / lagers, while protecting the integrity of the product from keg to glass.

Purpose The purpose of this document is to describe the features and benefits of dispensing draft beer with a blend of CO₂ and Nitrogen gasses. To present different methods of acquiring a blend of gases and the advantages and disadvantages of each.

CO₂ and Draft Beer

CO₂ a Natural Ingredient Carbon dioxide is natural to the brewing process and is considered an ingredient of the brewer's recipe. CO₂ has flavor characteristics and must be maintained with the gas pressure source, or the draft beer will either become flat or gassy.

CO₂ and Draft Beer (continued)

CO₂ Pressure and Beer Carbonation

The CO₂ content in beer is measured in volumes.

Temperature, applied gauge pressure (Pounds Square Inch Gauge – “PSIG”), and the gas blend ratio influence the CO₂ content.

If the CO₂ partial pressure in the mix is too low, this allows CO₂ to leave the beer and enter the keg’s headspace resulting in flat beer.

If the CO₂ partial pressure is too high in the mix, CO₂ is imparted in the top surface layer where the beer and gas headspace meet, saturating the beer. This layer of gas-saturated beer will eventually be at the bottom of the keg and it will be like trying to dispense a beer mousse...all foam.

These conditions are undesirable for pour cost or resale at a retail establishment.

The key is to apply the correct CO₂ partial pressure to maintain equilibrium in the keg, so the CO₂ in the beer does not leave solution nor is there gas being imparted into the beer.

Nitrogen and Draft Beer

Nitrogen Features

Nitrogen has the symbol N, and is a colorless, odorless, tasteless and mostly inert non-metal gas. It is readily obtainable, as it constitutes 78% of the Earth’s atmosphere.

Nitrogen has a wide variety of applications, including serving as a more inert replacement for air where oxidation is undesirable as in dispensing beer. Nitrogen is perfect for blending with CO₂ and supplying the extra hydraulic push required during dispensing.

Nitrogen is used to nitrogenate some beers, particularly stouts, which make the draft beer smoother with a thicker, tighter knit head (foam).

Blending Gasses

Why blend Gasses

Different Beers require different gas blends to maintain the brewers favor characteristics. A nitrogenated beer will typically have a lower CO₂ content (volume) and thus demands a lower CO₂ partial pressure. However, the beer must still be propelled through a draft beer system. This requires an applied gas pressure (PSIG) much higher than the CO₂ partial pressure. The difference in pressures is made up with a ratio of Nitrogen.

Nitrogen is the Brewers choice, because it is also a key ingredient used to achieve the thick and tight knit foam characteristics associated with Nitrogenous beers on tap. A higher applied pressure is also required for dispensing stout beers through stout faucets to acquire the cascading effect and creamy froth in the glass. Applying the right blend of Nitrogen and CO₂ for the applied pressure required by the beer system, will assure a high quality, great tasting beer.

Nitrogen is also blended with CO₂ to propel traditional Lagers and Ales through a draft beer system. Lagers and Ales do not contain Nitrogen, so the Nitrogen is only used to compensate for the difference between the beer systems required applied pressure (propelling pressure) and the CO₂ partial pressure needed to maintain the flavor and quality of the beer on tap.

Typically beer systems greater than 25' in length and or those with chronic temperature fluctuations will require the higher applied pressures.

The Gas Blend Ratio

The gas blend ratio is based on the CO₂ volumes of the product, temperature of the beer, and required applied pressure to the keg.

CO₂ Volumes for stout beers such as a Guinness range from 1.2 volumes to craft stouts with up to 1.7 volumes. Ales and lagers can range from 2.2 up to 2.8 volumes and in some craft beers, higher.

An ideal liquid temperature is 38° F. A survey of American consumers finds this to be very desirable temperature for consumption and the CO₂ in the beer is very stable.

The "PSIG" at the keg using mix gas normally range from 20 to 25 PSIG for ales and lagers, and up to 30-40 PSIG for stouts. To acquire equilibrium with stouts a 25% CO₂ / 75% nitrogen mix is ideal and for ales and lagers a 60% CO₂ / 40% nitrogen ratio is required.

Mixed Gas in Cylinders

Mixed Gas Overview

Mixed gas from cylinders and on-site gas blending are the two sources of this medium for dispensing draft beer. Mixed gas in a gas cylinder is normally a mix of CO₂ (25%) and N (75%) and available through existing gas suppliers. It is commonly called “beer gas” or “Guinness gas”.

Risk of using Mixed Gas Cylinders

Mixed gas in a cylinder with a ratio of 25% CO₂ / 75% N is appropriate for stout beers but when applied to ales and lagers, allows the beer to go flat because the partial pressure of CO₂ is too low.

Gas suppliers have difficulties raising the ratio of CO₂ in the mix as this gas eventually liquefies under high pressure in the cylinder.

This mix in a cylinder is expensive, and the ratios of CO₂ and Nitrogen can be very inconsistent and the amount of gas contained in the cylinder is low.

The internal pressure of mixed gas cylinders is also considerably higher than a cylinder containing only CO₂, thus increasing the potential risk of an accident.

Misusing Mixed Gas Cylinders

Unfortunately, many retail outlets are improperly applying mixed gas in a cylinder to their beers on tap. These retail establishments are attempting to offset system inefficiencies, temperature fluctuations, with higher applied gas pressures and the wrong gas blend ratios, thus affecting the beer’s flavor, quality and sales. This is a costly mistake, because draft beer is so profitable, the last thing a bar owner should do is serve off-taste draft beer, and cause their customers to switch to a bottle, can or worse yet, go somewhere else to drink a pint.

Blended Gas

Blended Gas Overview

On-site blending entails a source of CO₂ such as bulk or cylinder gas and a nitrogen cylinder or nitrogen generator. These two gas sources are supplied to a very accurate blending device. The blend can be customized to deliver the right CO₂ Nitrogen blend for the beer(s) on tap.

Blending gasses on-site is the preferred method of supplying a gas blend ratio to draft beers.

Gas Blending Technology

Micro Matic gas blenders are accurate with in +/- 2%, are tamperproof and shut down if a gas source is depleted – protecting the retailers' keg beer inventory.

The MM100 offers a single blend of 60% CO₂ / 40% N for ales and lagers while the MM200 produces an additional blend for the stout beers.

These blenders are easy to install and custom blends are available if required.

Over time these blenders will pay for themselves through lowering gas cost and most importantly, assuring low pour cost at retail and a quality presentation encouraging resale, thus increased profit.

Dispensing Draft Beer

Serving a Great Tasting Beer

Today, Micro Matic's dispensing technology allows retailers; breweries and wholesalers to successfully serve draft beer. With barrier tubing, stainless contact, innovative installation techniques, efficient glycol chillers, high tech beer line / glassware cleaners, and now a pressure source which not only assures clear beer, but draft beer that keeps the customer coming back for more.

It is time to invest in draft beer by utilizing Micro Matic Gas Blenders to complete the perfect secondary packaging system. The return on investment will be rapid and consumers will know where to go to enjoy perfect draft beer, again and again.