Using Mixed Gas for Beer Dispense

By Charles Nelson and Dan Fallon of McDantim, Inc.

Mixed Gas, sometimes called Beer Gas, Aligal or G-Mix, is the newest weapon in the arsenal of the Draft Beer Service person. Most brewers recommend a mix of nitrogen and CO2 for higher-pressure draft systems, condemning the use of air on beer completely. As with most new tools, there are a lot of misunderstandings about Mixed Gas. In this article, we hope to "clear the air" and to show how using mixed gas will reduce headaches, save money and improve beer quality.

"The Brew House" in Helena saves $600 per month with mixed gas!

The "Brew House" in Helena, Montana, has 18 beers on tap, ranging from pilsners to stouts, and they sell about 100 kegs of beer each month. Theirs is a 60-foot glycol system dispensing beer at about 20 psi. When they switched from pure CO2 to a mixed gas blend of 60 percent CO2, they began saving $600 per month. The saving is a result of eliminating wasted beer. In addition to the money saved, they have noted the convenience and ease of pouring. Bob White, Owner/Manager of the Brew House, stated, "Blended gas has made a huge difference in our operation. There is almost no wasted beer and we can no longer tell when a keg is getting empty; it pours perfectly right up to the end."

Revolution?

We see a new growing interest in beer in the US and especially in different styles of beers and beer quality. There is certainly a trend toward more beers on draft in each establishment. This places a strong emphasis on draft service.

The purpose of any draft system and the goal of all draft technicians should be to get the beer from the keg to the glass exactly as it came from the brewery. The new appreciation of quality beer provides new challenges for the people who distribute beer. Brewing is an art form with a rich culture and history and Americans are appreciating this art more each passing year. *Beer wholesalers are the curators of this art.* The proper care of the product and the design, building, and maintaining of draft systems will greatly enhance the quality of beer the customer receives and the appreciation of the brewer's art. It will ultimately improve sales and profits for the entire industry. Mixed gas is an important part of any high quality long draw draft system.

What is mixed gas?

Theoretically, mixed gas is simply a blend of CO2 and some other gas. In practice, nitrogen is the second gas of choice. In the past, air was very commonly used as the second gas. Today, we realize that air's advantage (low cost) is outweighed by its serious disadvantages. Air ruins beer. Since all major brewers condemn using air to dispense beer, it is a disservice and no longer acceptable for any beer wholesaler or service company to use or recommend it.

Nitrogen's advantages

Nitrogen is the perfect choice as a second gas for several reasons. Many beers use nitrogen as an ingredient. The best-known example and the originator of the Nitrogen concept is Guinness Stout on draft. The Guinness brewers go to great pains to dissolve nitrogen in the beer which improves the quality of the head. Nitrogen (N2) is the ingredient responsible for the "whipped-cream-like" foam in Guinness and other beers like Pyramid DPA, Boddingtons, Abbott's, Caffrey's, Murphy's Stout and Beamish Stout. N2, in the right proportion, is required in the gas used to push these beers. Without it, the dissolved N2 would come out of solution and these beers would not be the same.

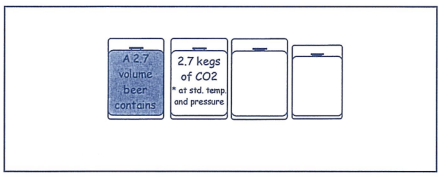
Nitrogen is one hundred times harder to dissolve in beer than CO2. While this is a challenge for the brewers mentioned above, it makes N2 a good choice for dispensing "normally carbonated" beers. N2 is not readily absorbed, does not react chemically under normal circumstances and will not affect beer flavors. N2 is 78 percent of the air we breathe, making it safe and readily available. A relatively new product called a "nitrogen generator" is available from several sources in the US today. Nitrogen generators filter relatively pure N2 from air and can be a very econom-

ical source of nitrogen. They can be built or used with a blending device and a CO2 source to provide all the gas for any bar or facility.

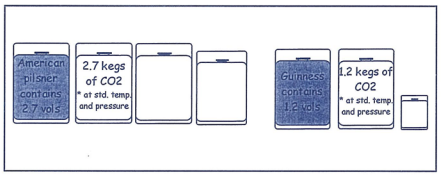
What will mixed gas do?

What mixed gas does best is to leave beer the same. Strange as that sounds, it means that used correctly, mixed gas will assure that the gas content of the beer stays constant, never over carbonating or going flat. In the case of nitrogenated beers, like Guinness, mixed gas keeps both N2 and CO2 dissolved, and in the case of "normal" beers it means keeping the CO2 content perfect.

"CO2 content" refers to how much CO2 is dissolved in the beer. In the US, we usually refer to it in "volumes." One volume of CO2 means there is exactly as much gas dissolved in the liquid as there is liquid. For example, a typical US pilsner has about 2.7 volumes of CO2. This means that if you could get all the CO2 out of a half-barrel of beer and collect it the gas would fill 2.7 half-barrel kegs.



CO2 is an ingredient in beer and affects flavor considerably. It would be reasonable to compare CO2 to hops as a beer ingredient. Each beer is "designed" with a CO2 content in mind, and to change the gas content would change the flavor as surely as adding hops would. A quick test of this would be to visit your nearest convenience store and try the same brand of water in both still and carbonated versions. The only difference you taste is the effect of the carbonation. Nitrogenated beers generally have a very different flavor and one of the main differences is caused by their much lower CO2 contents. Where a typical American pilsner has 2.7 volumes of CO2, Guinness has 1.2 volumes, less than half the CO2 of the American pilsner.



In comparing tastes, note the lack of sharpness or bite in the lower CO2 content beer. Any product that was carbonated and loses carbonation will have a new flavor and not a good one. To sample this flavor, let the carbonated water mentioned earlier go flat and compare the taste to that of the still water of the same brand. The difference in flavors is the off-flavor left from carbonation gone flat. Beers that go flat do not simply taste like lower CO2 beers; they have an undesirable flavor.

CO2 Content also affects pourability.

In a good draft system all beers can be poured properly as they come from the brewery. Good brewers design beers to look good in the glass. If the CO2 content of a beer goes up as it sits on draft, the beer will become foamy, taste too sharp, be hard to pour and be wasted. Waste of this type can often be 6 percent to 8 percent of total beer sales. If the CO2 content of a beer goes down while on draft, the beer will taste off, look unappealing and be wasted. Flat beer is wasteful because you are putting extra (poor quality) beer in every glass. When this problem exists, waste can be 2 percent to 6 percent of sales.

With overcarbonated and flat beers the problem increases the longer a keg is on tap. With the trend toward having more beers on tap, each keg is on tap for a longer time. Mixed gas is the perfect solution to these situations. *The correct blend(s) will keep all the beers at the right CO2 content no matter how long they are on tap.*

Bullet-Proof Systems

Draft beer systems that operate at higher pressures with the correct blend of gas actually experience fewer problems with foaming and gas breakout. The higher hydraulic pressures in the beer lines reduce the chance that gas will break out, turning beer to foam. With pure CO2, these higher pressures would eventually overcarbonate the beer. With a system designed for these higher (20 – 30 psi) pressures and the correct blend of gas, you get the best of both worlds.

Premixed Bottles vs. Gas Blenders

You have two ways of getting mixed gas for dispensing beer. The most common source of mixed gas today is high-pressure cylinders of premixed gas. The second method is to mix N2 and CO2 using a blender on site. In most cases, mixing gas on site is the lower cost and more practical option.

Premixed Cylinders are usually available in only one or two blends. While it is possible to put any blend of gases in a cylinder, it is impractical and more expensive to

mix higher CO2 blends in a cylinder. When a cylinder is used for pure CO2 or any blend containing more than 30 percent CO2, it is required to be inspected every 5 years. Cylinders containing blends with 30 percent or less CO2 can be inspected every 10 years. Also, cylinders with blends of more than 30 percent CO2 cannot be filled to full capacity without affecting the blend quality. The practical result is that blended gas is usually available in blends of 25 percent CO2 (which is perfect for beers like Guinness) or 30 percent which is the maximum practical CO2 percentage for premixed cylinders. *30 percent CO2 is not enough CO2 in the mix for normally carbonated American beers.* A 2.7 volume American pilsner would stay properly carbonated only if dispensed at 38^0 F. and above 70 psi. In nearly all cases, a 50 percent to 80 percent CO2 blend is appropriate for normally carbonated American beers.

Mixing gas on site using a gas blender allows the customer to buy N2 and CO2 individually, which in most cases is far cheaper than buying mixed gas in cylinders. Mixing on site also gives customers the chance to choose the correct blend for their beers and their bar.

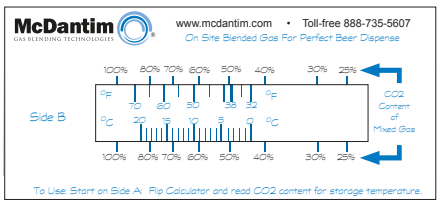
Why does the blend matter?

We all know that keeping the right pressure of CO2 on beer is required to keep the beer right. Too much CO2 pressure and the beer will get foamy; too little and the beer will go flat. The combination of blend and total pressure determines the "partial pressure" of CO2 that the beer sees. At 100 percent CO2 and 12 psi, the "partial pressure" of CO2 is 12 psi. At 18 psi and an 80 percent CO2 blend, the "partial pressure" of CO2 is still 12 psi and at 89 psi and a 30 percent CO2 blend, the "partial pressure" of CO2 is still 12 psi. It is the "partial pressure" of CO2 that affects the beer's carbonation.

Using 100 percent CO2 at 18 psi will eventually turn the beer into a 3.6 volume beer which would pour as pure foam. A blend of 30 percent CO2 at the same 18 psi would eventually cause this beer to have less than 1 volume of CO2, one third of what the brewer intended. Since the pressure of an existing system is already determined, we adjust the blend to keep the beer perfect.

Choosing the correct blend

CO2 is the critical element of the blend. We always recommend choosing a blend that will keep the CO2 content of the beer constant. The second gas (nitrogen) is only there to provide extra push as necessary. The math of choosing a blend is a bit more than most beer service technicians will want to contend with. All calculations must be done in absolute pressure rather than the standard pressure we are used to. McDantim has made up a slide rule that makes selecting blends straightforward.



These are available for FREE by contacting McDantim, Inc. Either toll-free at (888) 735-5607 or by email at info@mcdantim.com.

What Mixed Gas won't do!

Mixed gas is the perfect solution for maintaining CO2 content in draft beer. This does not mean it will fix all evils or that the draft system can be ignored or neglected. Mixed gas will never substitute for good refrigeration, a good design or proper maintenance. As part of a good overall package, mixed gas will reduce headaches, improve your reputation and profits, but it will not fix a bad draft system.

From the horse's mouth

Garrett Oliver, Brewmaster for Brooklyn Brewery, recipient of the Institute for Brewing Studies "Russell Schehrer Award for Innovation in Craft Brewing" sums up the whole situation pretty well. He wrote recently, *"Over the last decade, many draught systems have begun to employ pre-blended gas, 'G-Mix' to dispense beer. For many, G-Mix was a great improvement over what they had been using – an air compressor (air is one of beer's worst enemies, and begins to destroy the product immediately on contact, damaging flavor and causing it to go flat. Serving your beer with air is the equivalent of pouring a pint, setting it down, and then drinking it the next day). G-Mix is composed of 75% nitrogen and 25% carbon dioxide. The selling point for G-Mix is that it will not over-carbonate your beer. This is true. Unfortunately, it's only half the truth.*

Instead, G-mix often makes your beer go flat, ruining the quality of your beer, and costing you business and plenty of money. The 'G' in G-mix stands for 'Guinness'. Guinness is a beer which is almost flat and needs to be served under very high pressure. The purpose of G- mix is to

keep Guinness from becoming over-carbonated or going completely flat under high pressure. The problem is that G-mix has this effect on all beers – they will become as flat as Guinness or flatter."

Any draft beer system that uses too high a pressure to properly use pure CO2 will benefit greatly from the correct blend of mixed gas. The right blend will protect the quality of the beer, prevent or reduce foaming or flat beer and save you and your customers money. Properly used, it is and will continue to be one of the best tools in the draft technician's bag of tricks. *Mixing on site with a gas blender is the most economical, most convenient and best way to get the correct blend.*

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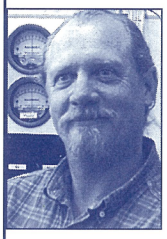
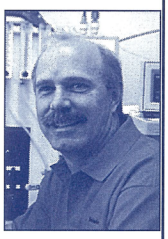


Dan Fallon is President of McDantim, Inc. which specializes in making gas blenders for dispensing beer. "We've been perfecting blender design for over 20 years. There are over 50,000 of our blenders pouring beer around the world today. The McDantim Trumix blender is the only one currently approved by Guinness. We have a range of technical information available for free and can be reached the following ways":



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