



New Guidelines For the Use of Blended Gas for Draught Beer Dispense:

**Prepared by the Brewers Association
Technical Committee Draught Beer
Quality Working Group**

www.draughtquality.org



Introductions

DBQ – The Draught Beer Quality (DBQ) Working Group is an active subcommittee of the Brewers Association Technical Committee. In April 2009, the DBQ published the Draught Beer Quality Manual (DQM, or “Manual”).

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Purpose

- **Communicate new guidelines on the use of mixed gas for dispensing beer at retail**
- **Explain how the guidelines were developed**
- **Define next steps**



Outline

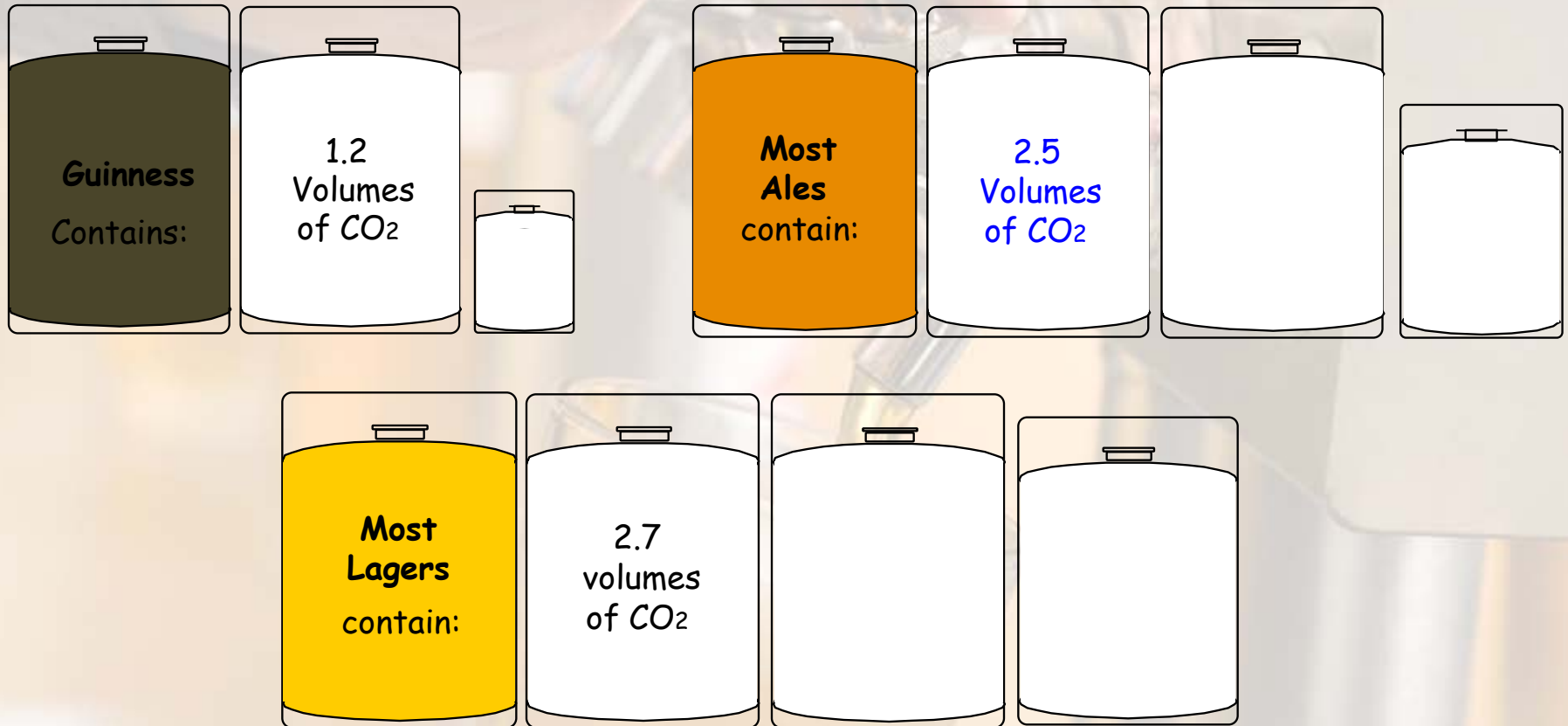
- Brief tutorial on the fundamentals of mixed gas;
- Share results of extensive Q4 2009 ABI retail field survey;
- Explain the process used to arrive at new standards;
- Reveal easy-to-use tools to balance keg carbonation
- Expectations and conclusion;



Gas Basics

Gas levels are measured in Volumes / Volume.

These levels are set by the brewer to create the desired flavor and presentation.



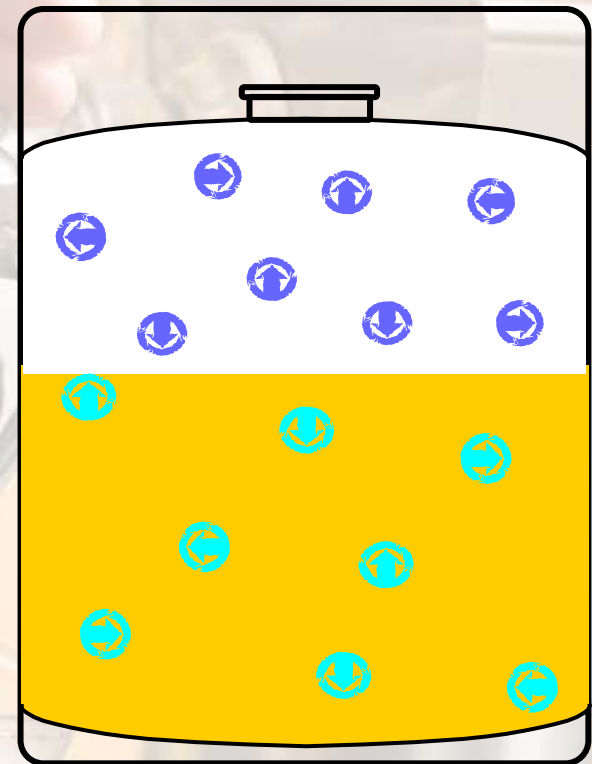
The Physics of Gas & Beer

Gas is a group of molecules flying around at high speed. When contained within walls, as they are in a keg, they create pressure.

When one wall is a liquid the molecules constantly enter and leave the liquid.

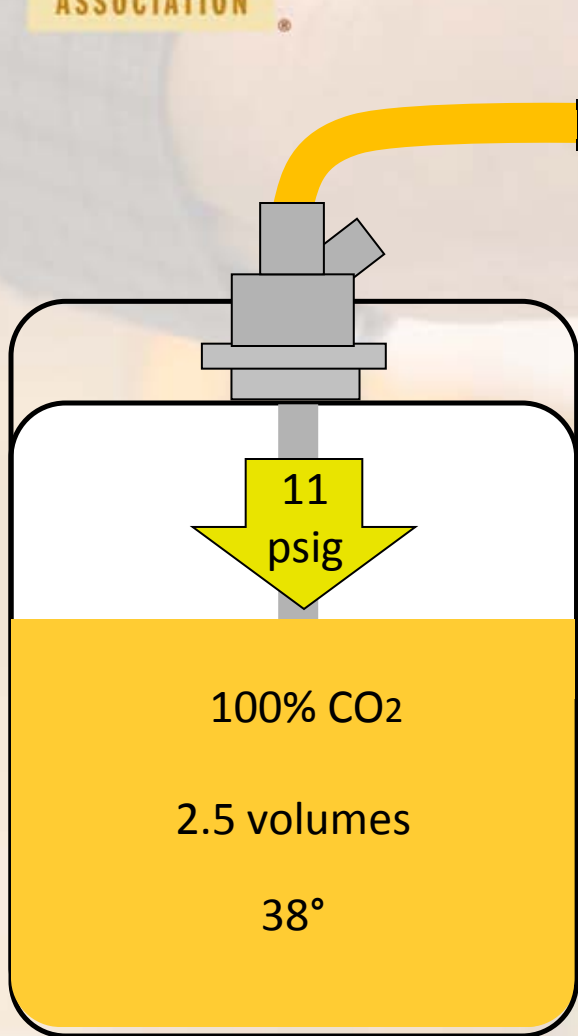
The rate at which the molecules enter and leave the beer depends on:

- Pressure applied to the Beer;
- % of CO₂ in the dispense Gas;
- Temperature of the beer in the keg.
- Higher pressures, higher % of CO₂ and lower temperatures all increase the absorption of CO₂ in the beer.





The Physics of Gas & Beer

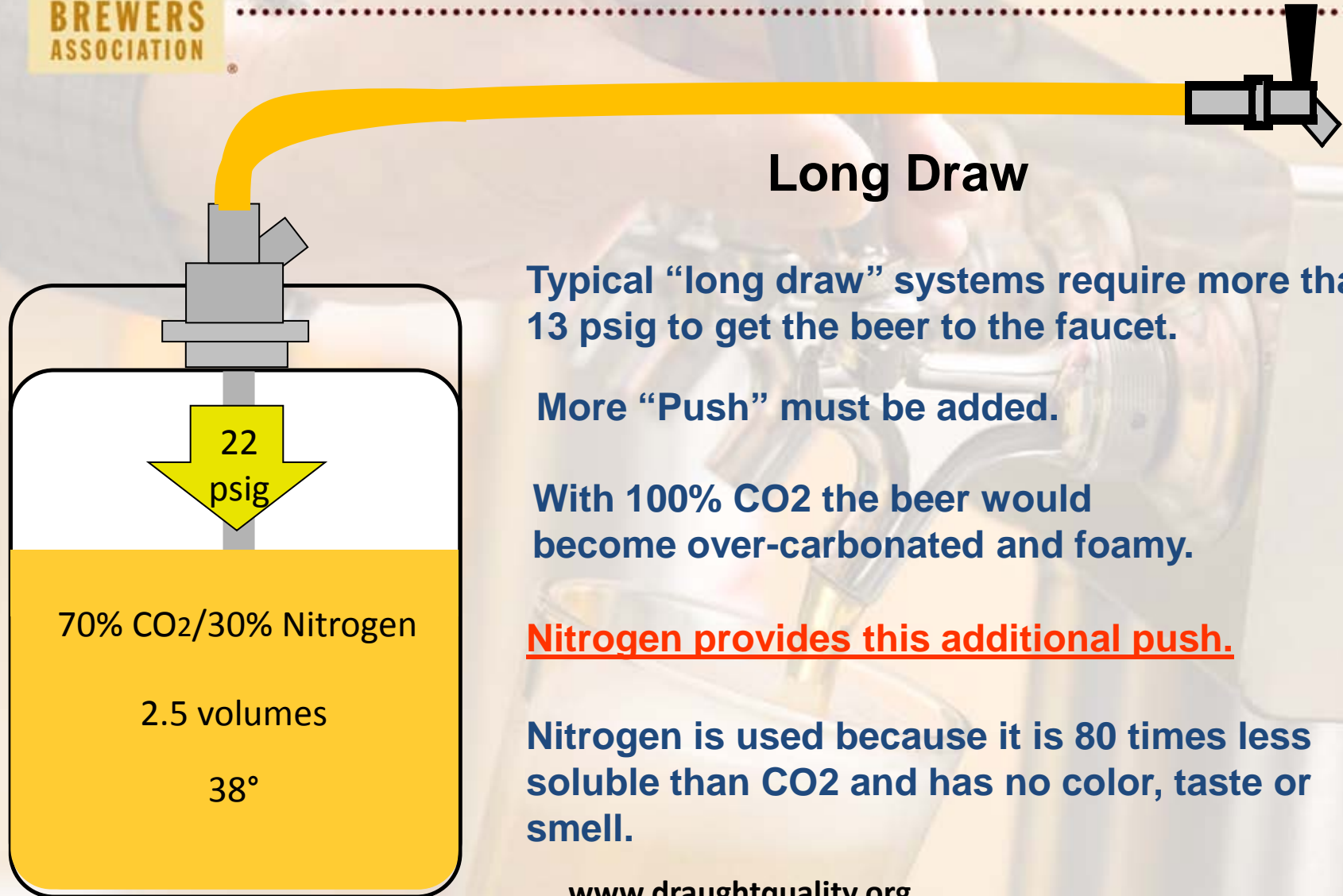


Short Draw

Maintains Perfect Carbonation



The Physics of Gas & Beer



Long Draw

Typical “long draw” systems require more than 13 psig to get the beer to the faucet.

More “Push” must be added.

With 100% CO2 the beer would become over-carbonated and foamy.

Nitrogen provides this additional push.

Nitrogen is used because it is 80 times less soluble than CO2 and has no color, taste or smell.



Results of Field Survey

Market	CO2 Range			Out of Spec
	Low	In Spec	High	
	<2.3	2.3-2.9	>2.9	
1	67.6%	29.4%	2.9%	70.6%
2	93.3%	6.7%	0.0%	93.3%
3	100.0%	0.0%	0.0%	100.0%
4	35.0%	52.5%	12.5%	47.5%
5	40.0%	42.5%	17.5%	57.5%
6	52.5%	40.0%	7.5%	60.0%
7	30.0%	55.0%	15.0%	45.0%
8	65.0%	10.0%	25.0%	90.0%
9	92.5%	5.0%	2.5%	95.0%
10	70.0%	22.5%	7.5%	77.5%
11	82.1%	17.9%	0.0%	82.1%
12	10.0%	77.5%	12.5%	22.5%
13	47.5%	30.0%	22.5%	70.0%
14	40.0%	42.5%	17.5%	57.5%
15	72.5%	25.0%	2.5%	75.0%
16	20.5%	79.5%	0.0%	20.5%
	56.5%	34.1%	9.4%	65.9%

- 18 markets, 40 accounts per market, 720 ttl, chosen at random;
- Questionable temperature data from 2 markets removed

Field Survey Assumptions

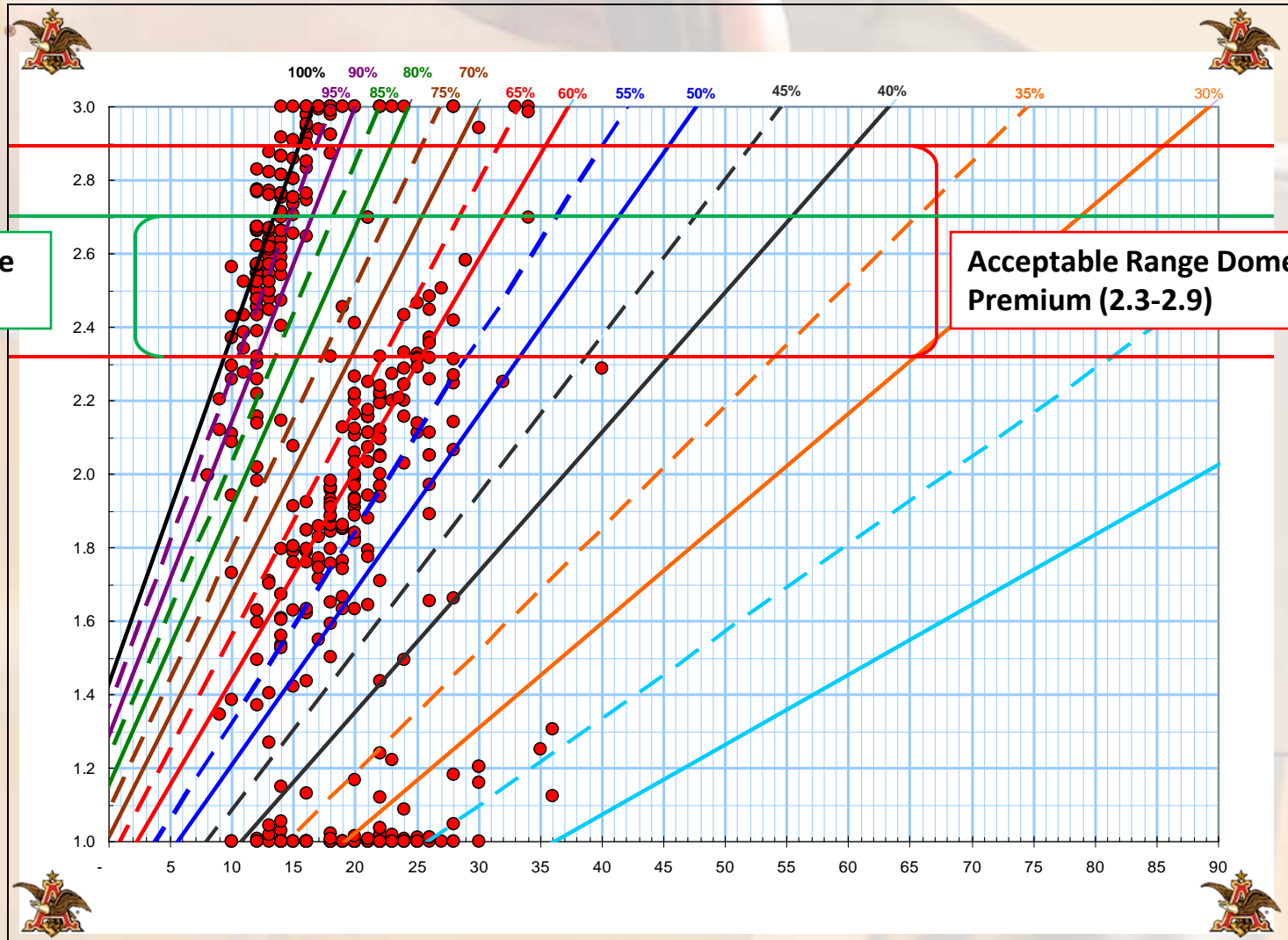
- Acceptable range for “Domestic Premium type” beers is 2.3 – 2.9v/v;
- Acceptable range for “Micro type” beers is 2.3 – 2.7v/v;
- When talking about a gas mix or blend, as a convention, CO₂ will always be listed 1st:
 - Example: 70/30 means 25% CO₂;
 - Example: 25/75 means 25% CO₂;
- Nitrogenated beers are assumed to have 1.2 volumes of CO₂.



The Process

Account Name	City, State	Refig System	Gas Supplier	Brand	In Keg Temp	In Keg Press	Actual Gas Blend
Hooters	Tampa	Glycol	NuCO2	LandShark	36	24	62.7
Fridays Airport	Tampa	Glycol	NuCO2	Bud Light	36	20	63
Champps	Tampa	Glycol	NuCO2	Bud Light	38	20	56.8
Bar Louie	Tampa	Glycol	NuCO2	Bud Light	42	34	62
Long Bar	Tampa	Direct Draw	NuCO2	Select	40	18	100

The Process

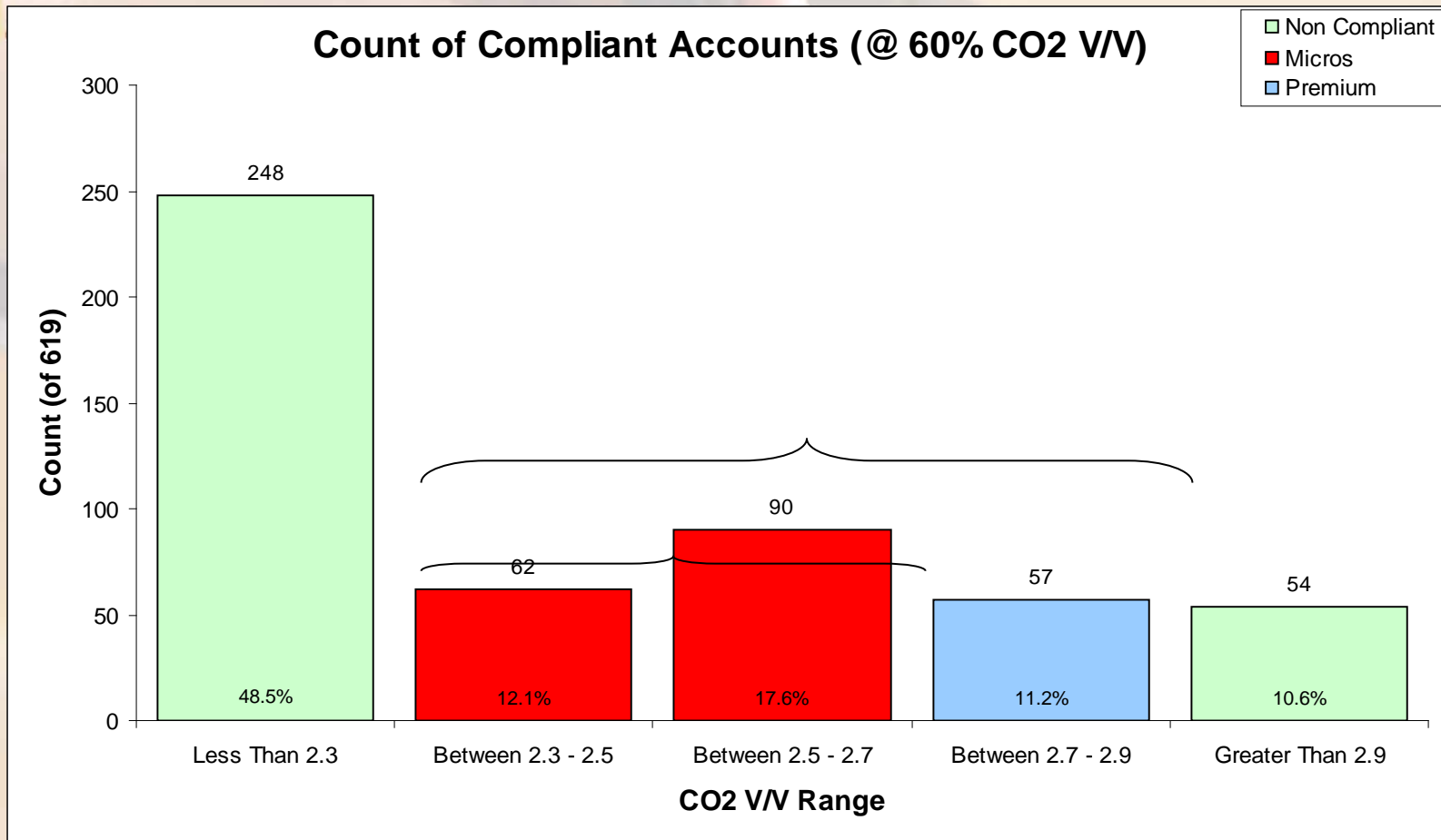


Acceptable Range
Micros (2.3-2.7)

Acceptable Range Domestic
Premium (2.3-2.9)

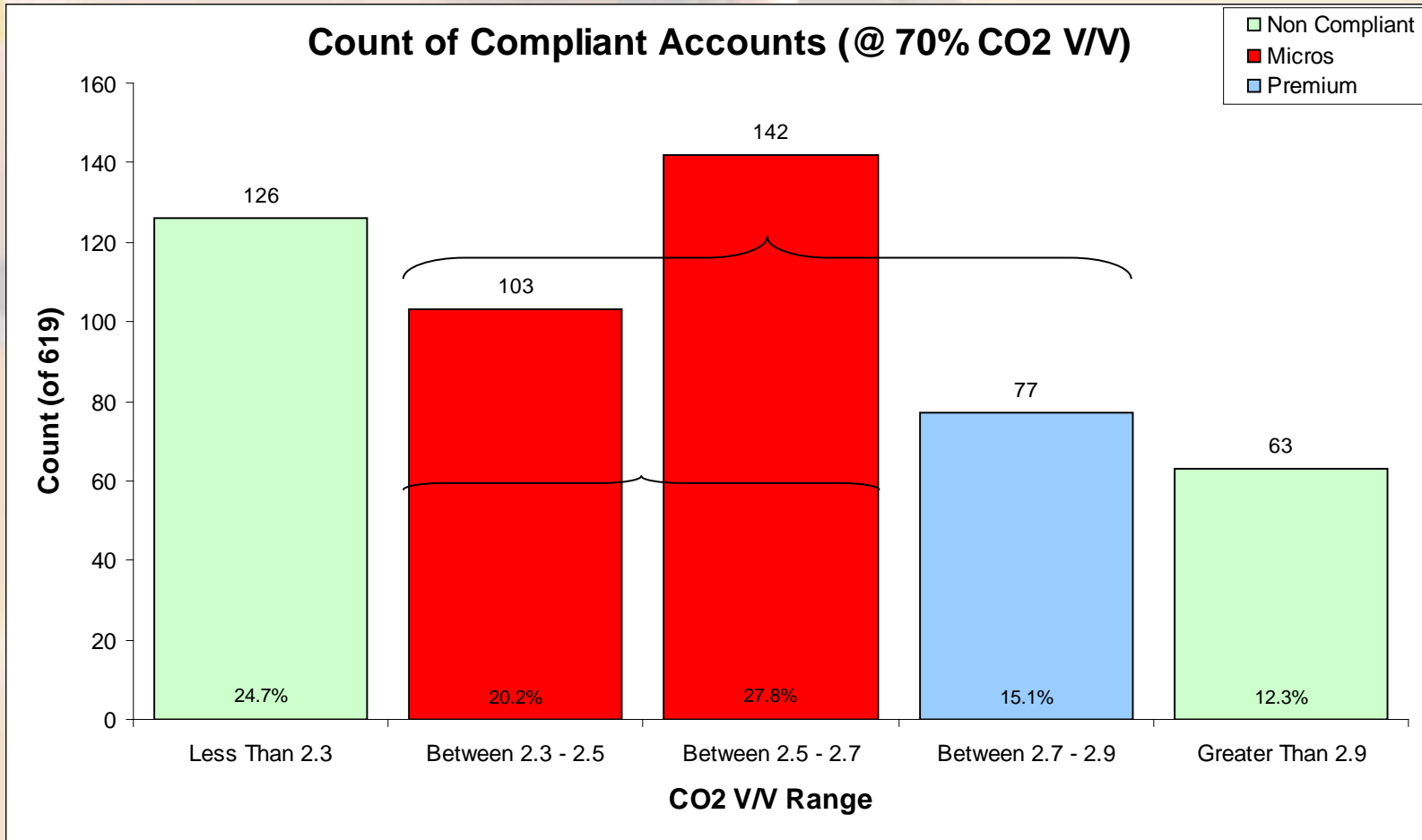


How Things Would Look on 60/40



- 20% of “Micro’s are in spec. 31% of Premium Domestic in spec.”
- 22% Micro’s OOS on high side, 11% of Premium Domestic OOS on high side.
- All data sanitized to remove accounts with storage temp’s above 40°

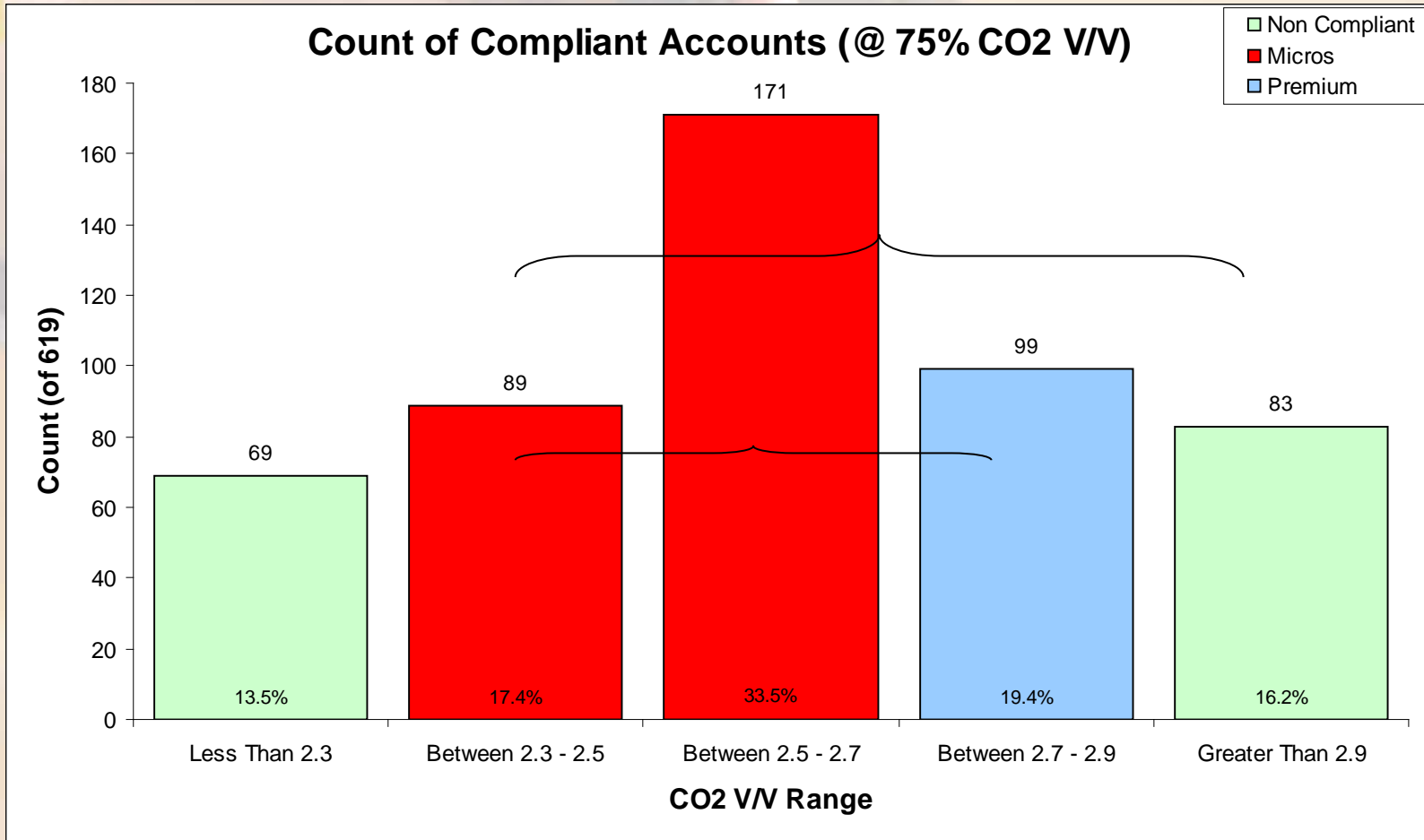
How Things Would Look on 70/30



- 50% of “Micro’s are in spec 65% of Premium Domestic in spec.”
- 27% Micro’s OOS on high side, 12% of Premium Domestic OOS on high side.
- All data sanitized to remove accounts with storage temp’s above 40°



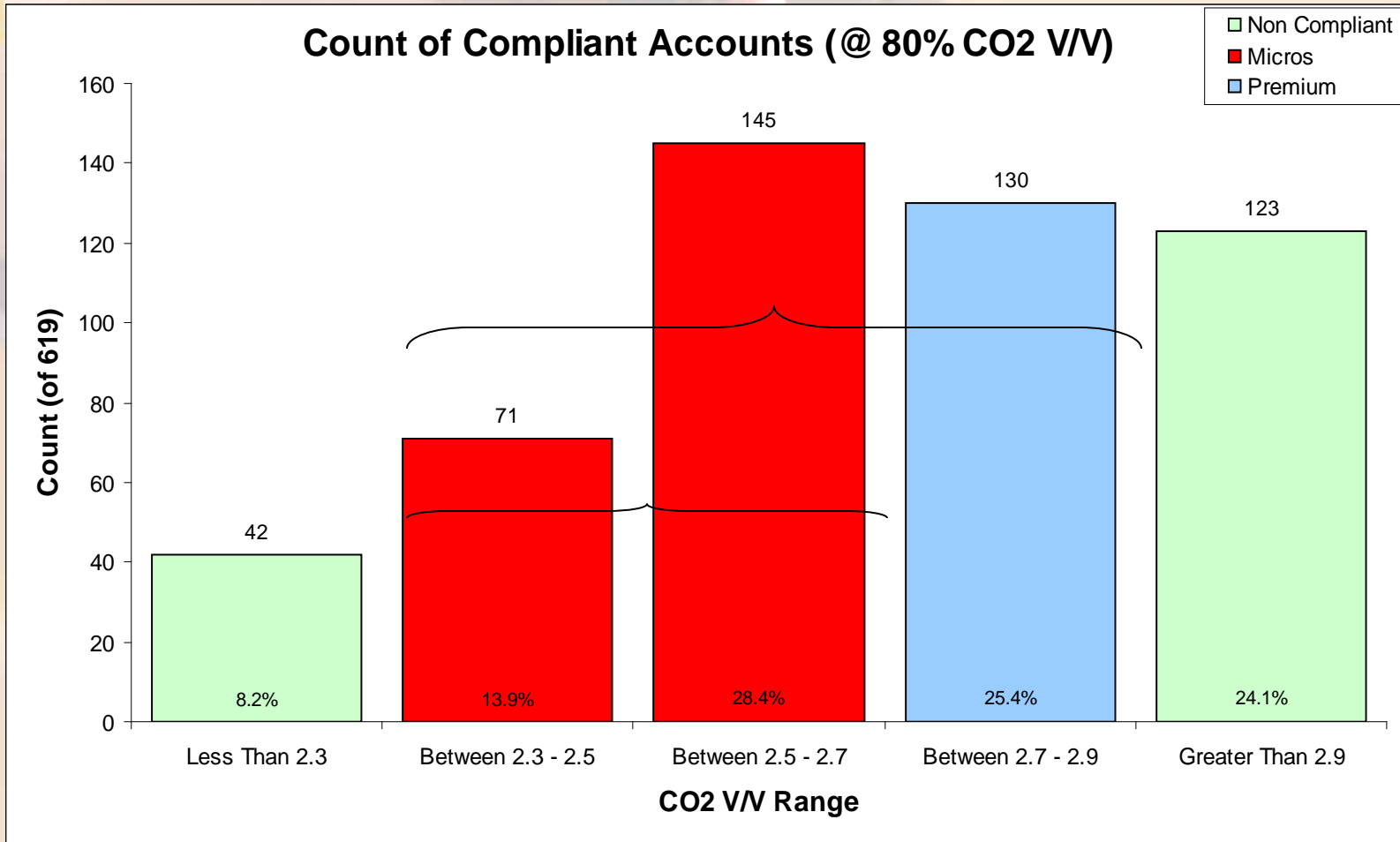
How Things Would Look on 75/25



- 51% of “Micro’s are in spec 70% of Premium Domestic in spec.”
- 36% Micro’s OOS on high side, 16% of Premium Domestic OOS on high side.
- All data sanitized to remove accounts with storage temp’s above 40°



How Things Would Look on 80/20



- 42% of “Micro’s are in spec 67% of Premium Domestic in spec.”
- 50% Micro’s OOS on high side, 24% of Premium Domestic OOS on high side.
- All data sanitized to remove accounts with storage temp’s above 40°



Conclusions

- **25/75 Gas is killing the vast majority of beers;**
- **70/30 works in more accounts than 60/40;**
- **One size does not fit all. No one gas will work for every account in the country;**
- **Ideally custom blends should be calculated on an individual account basis.**



Gas Blend Solution

•McDantim has begun production of:

- Single and 2 Blend blenders to 70/30 spec.
- 3 Blend blenders for Micromatic and NuCO₂, with similar versions available for other vendors.

2.5 Beer							
16-20 psi				20-25psi			
Temperature	Blend	High	Low	Temperature	Blend	High	Low
35°	75%	2.69	2.38	35°	65%	2.66	2.33
37°	80%	2.67	2.43	37°	65%	2.55	2.23
38°	80%	2.61	2.38	38°	70%	2.69	2.35
40°	85%	2.66	2.42	40°	70%	2.58	2.26

2.7 Beer							
16-20 psi				20-25psi			
Temperature	Blend	High	Low	Temperature	Blend	High	Low
35°	80%	2.78	2.53	35°	70%	2.87	2.51
37°	85%	2.83	2.58	37°	70%	2.75	2.4
38°	85%	2.77	2.53	38°	75%	2.88	2.52
40°	90%	2.82	2.57	40°	75%	2.77	2.42

2.5 v/v Median		
Presssure	Storage Temp. 35-37°	Storage Temp. 38-40°
16-20 psi	75% - 80%	80% - 85%
20-25 psi	65%	70%

2.7 v/v Median		
Presssure	Storage Temp. 35-37°	Storage Temp. 38-40°
16-20 psi	80% - 85%	85% - 90%
20-25 psi	70%	75%



Gas Blend Solution

- Use of 2 blends for regularly carbonated beers allows for balancing of kegs of varying carbonation levels
- Beers are grouped into one of two carbonation ranges with different blend used for each
- Carbonation levels can be maintained within $\pm .2$ v/v CO₂



Excel Perfect Blend Program

Enter these values:	
Temperature (°F)	38
Pressure (psig)	18
CO ₂ Content (vols/vol)	2.5
Perfect CO ₂ %	79%

Enter these values:	
Temperature (°F)	40
Pressure (psig)	22
CO ₂ Content (vols/vol)	2.7
Perfect CO ₂ %	79%

Enter these values:	
Temperature (°F)	36
Pressure (psig)	26
CO ₂ Content (vols/vol)	2.7
Perfect CO ₂ %	66%



Pressure Adjustment Solution

- Individual pressure adjustment for each beer to maintain carbonation
- Easily adaptable in single gas blend systems



Pressure Adjustment Solution

psi at 60% CO2			psi at 65% CO2			psi at 70% CO2				
	2.5 v/v	2.7 v/v		2.5 v/v	2.7 v/v		2.5 v/v	2.7 v/v		
40	27-33 (30)	31-37 (34)	Temp.	40	24-30 (27)	27-33 (30)	Temp.	40	21-26 (24)	24-29 (27)
38	25-31 (28)	29-35 (32)		38	22-28 (25)	26-31 (28)		38	20-25 (22)	23-28 (25)
37	25-30 (27)	28-34 (31)		37	22-27 (24)	25-30 (27)		37	19-24 (21)	22-27 (24)
35	23-28 (26)	26-32 (29)		35	20-25 (23)	23-28 (26)		35	18-22 (20)	20-25 (23)
psi at 75% CO2			psi at 80% CO2			psi at 85% CO2				
	2.5 v/v	2.7 v/v		2.5 v/v	2.7 v/v		2.5 v/v	2.7 v/v		
40	19-24 (21)	22-26 (24)	Temp.	40	17-21 (19)	19-24 (22)	Temp.	40	15-19 (17)	17-22 (20)
38	17-22 (20)	20-25 (22)		38	15-20 (18)	18-22 (20)		38	14-18 (16)	16-20 (18)
37	17-21 (19)	20-24 (22)		37	15-19 (17)	17-21 (19)		37	13-17 (15)	16-19 (17)
35	16-20 (18)	18-22 (20)		35	14-18 (16)	16-20 (18)		35	12-16 (14)	14-18 (16)

- Pressure ranges will keep beer carbonated within +/- .2 v/v
- Ideal gauge pressure in parentheses
- 5 psi variance is ideal – keeps flow rates within 20oz./min.
(1psi. = 4 oz./min. flow rate)



Important Notes about Gas Blends

- The balance of the gas blend should always be Nitrogen, and should never be compressed air.
- They are meant to be used in long draw systems where :
 - The length of run is long enough that the desired flow rate is unattainable at ideal pressure of straight CO₂ (usually 30-35 feet)
 - The cooling system of the draught lines cannot guarantee consistent temperature from the keg cooler to the draught lines
- They are not meant to be used in conjunction with pneumatic beer pumps, which use straight CO₂ for applied keg pressure.



DBQ Group Recommends

- Ideally, each account is evaluated to determine the ideal blend.
- 70% CO₂ / 30% Nitrogen is a better choice as the default blend up to 24 psi than is 60/40;
- G-Mix, or so-called “Guinness Gas”, which is 25% CO₂ / 75% Nitrogen, should NEVER be used for the dispense of normally carbonated beers.



Suggested Next Steps

- BA Tech Committee DBQ Group members including Sierra Nevada, Boulevard, ABI & MillerCoors, along with the dealer installer community, are leading the way;
- Continue to improve draught beer quality by recommending and installing 70/30;
- Continuing education for independent installers at events like GABF
- Drive awareness through trade press and publications, and at seminars like this



What We Need From You

- This is a huge opportunity to strike a blow against flat beer and to improve the quality of draught beer at retail;
- Embrace, communicate and recommend 70/30 as the best fit for default blended gas;
- Provide the Draught Beer Quality Working Group with any and all feedback



Gas Blend Initiative Supported By:

