WITH DRAFTNAUTS LLC

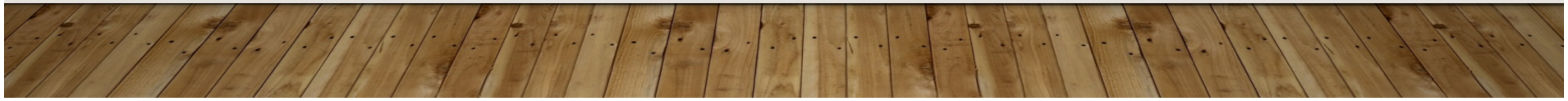
DRAFT SYSTEM PLANNING, DESIGN AND MAINTENANCE

DRAFTNAUTS LLC - ITHACA, NEW YORK

Like all great business plans, Corey Brown and Bill Jablonski drank a few pints and discovered there was a need for quality draft system design and installation. The year 2013 was a lifetime ago in this industry, and our prediction has been accurate.

We are fortunate to have met many great people in the beer world. Who understand –

Quality beer is a requirement. Quality presentation is a requirement. Profit margins are squeezed. Let's do it right.



DRAFTNAUTS

POUR MORE PROFIT

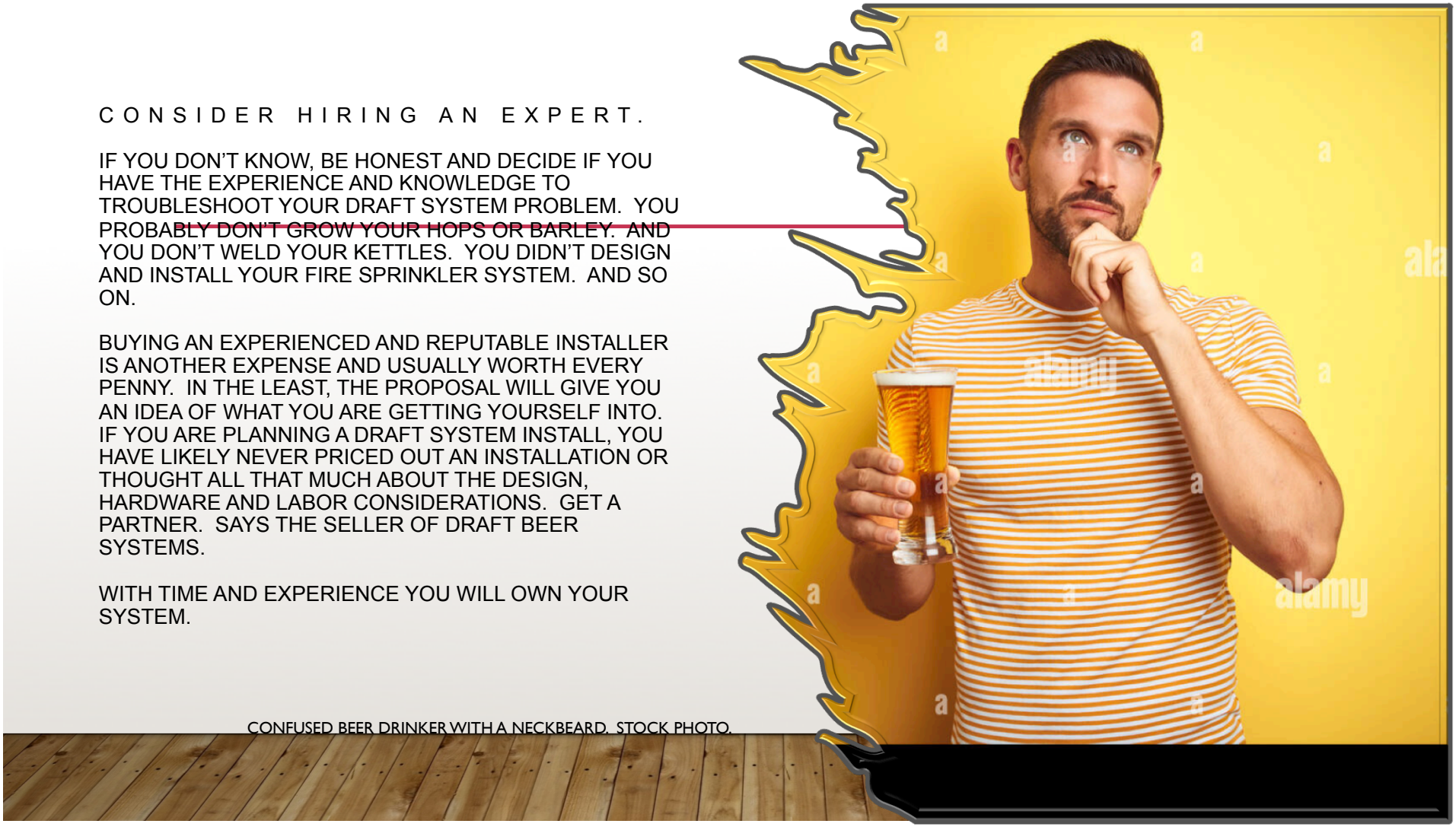
BREWERY ARDENNES
GENEVA, NEW YORK

C O N S I D E R H I R I N G A N E X P E R T .

IF YOU DON'T KNOW, BE HONEST AND DECIDE IF YOU HAVE THE EXPERIENCE AND KNOWLEDGE TO TROUBLESHOOT YOUR DRAFT SYSTEM PROBLEM. YOU PROBABLY DON'T GROW YOUR HOPS OR BARLEY. AND YOU DON'T WELD YOUR KETTLES. YOU DIDN'T DESIGN AND INSTALL YOUR FIRE SPRINKLER SYSTEM. AND SO ON.

BUYING AN EXPERIENCED AND REPUTABLE INSTALLER IS ANOTHER EXPENSE AND USUALLY WORTH EVERY PENNY. IN THE LEAST, THE PROPOSAL WILL GIVE YOU AN IDEA OF WHAT YOU ARE GETTING YOURSELF INTO. IF YOU ARE PLANNING A DRAFT SYSTEM INSTALL, YOU HAVE LIKELY NEVER PRICED OUT AN INSTALLATION OR THOUGHT ALL THAT MUCH ABOUT THE DESIGN, HARDWARE AND LABOR CONSIDERATIONS. GET A PARTNER. SAYS THE SELLER OF DRAFT BEER SYSTEMS.

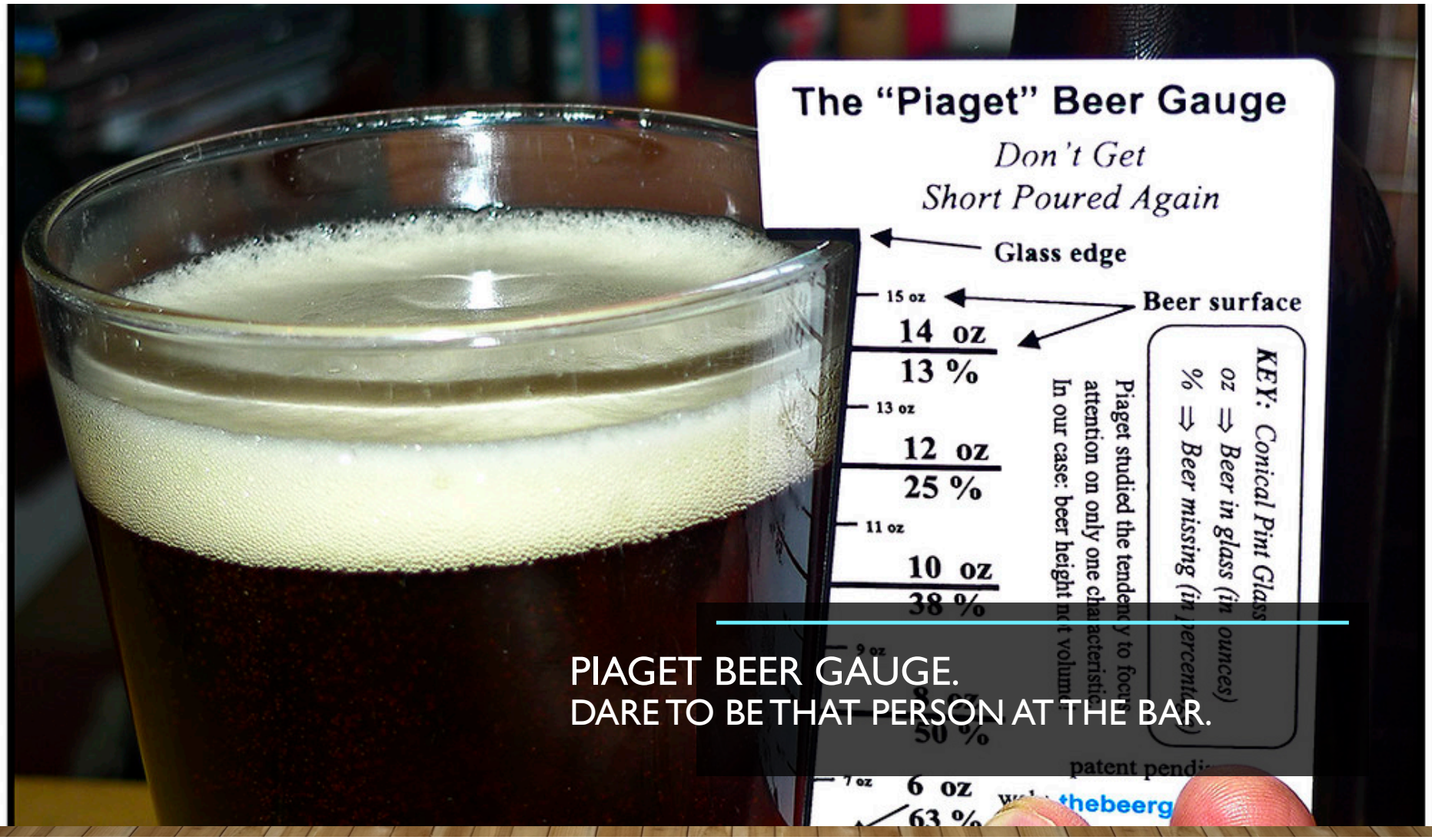
WITH TIME AND EXPERIENCE YOU WILL OWN YOUR SYSTEM.



CONFUSED BEER DRINKER WITH A NECKBEARD. STOCK PHOTO.

THE PERFECT POUR

- Wasting beer is expensive.
- The math is real. A 15.5g keg has 1,984 ounces. A $6 pint (16 ounces) is $0.375 per ounce. A 15.5g keg contains a potential $744 in revenue if every ounce is sold.
- A 10% hold back in retained foam is $75. Per keg. Day in, day out. All year. 10% is not ambitious. That is a perfect pint with a one finger foam collar and little to no drip.
- How many kegs turn over per year?

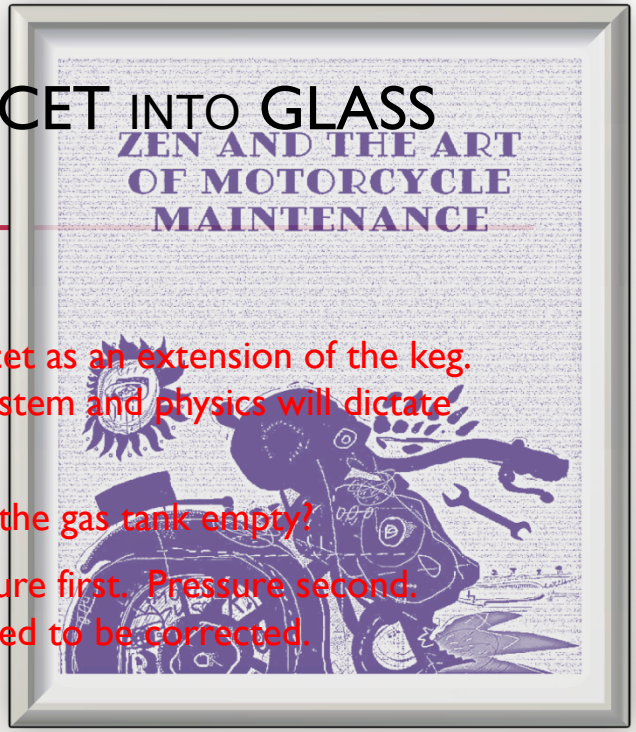


PIAGET BEER GAUGE.
DARE TO BE THAT PERSON AT THE BAR.

THREE LEGS OF A BALANCED DRAFT SYSTEM

- There are 3, and only 3, variables.
- Temperature.
  Pressure.
  Resistance.
  That's it and there aint no more.
- If any part of the system is unbalanced, you are wasting beer and losing money.

KEG ➡ TUBING ➡ SHANK ➡ FAUCET INTO GLASS



- Keep it cold along the entire route.
- All of the beer is in one big contraption. Think of the faucet as an extension of the keg. The beer does not know or care where it is within the system and physics will dictate how the beer reacts at all points along the route.
- Zen? Do you have the right key? Is the battery dead? Is the gas tank empty?
- Start with the obvious and move down the list. Temperature first. Pressure second. Resistance third. Remember, more than one thing may need to be corrected.

BRIGHT TANKS VS. KEGS

Service from bright tanks never works out so well. Bright tanks look great, and that's it. If your brewery can't use kegs you are at a disadvantage. Troubleshooting a system with bright tanks is difficult and correcting the problem is sometimes not possible.

Bright tanks are not kegs. It is challenging to achieve a balanced design because of the inconsistencies. Maintaining stable temperature (38F/ 3.3C) in a bright can be hard. Maintaining vols is another problem.

Plan to have trunk lines all over your brewery floor or hanging from the ceiling. Each one has variable resistance.

A bright tank draft system compromises all three legs of the draft system.- temperature, pressure and resistance.

Off site accounts will consider D Sanke kegs. Plastic kegs are a nightmare. Stay away.

Bright tanks are not kegs. Kegs are proven and reliable. Lease them. Buy them. Share them. Be creative.

DRAFT DISPENSE PROBLEMS ARE TEMPERATURE PROBLEMS

- 38 Fahrenheit / 3.3 Celsius. From keg to glass. Measure liquid temp in the cooler, not air temp.
- Temperature maintenance probably accounts for 90% of draft dispense problems. Although every beer has its best drinking temperature, this is not practical with a commercial draft system. All kegs are in one walk in or under bar cooler, and all draft lines live with the same conditions.
- Nobody every returned a beer because it was too cold. As far as we know.
- Pouring warm beer results in dumped foam and is wasteful. Keep it cold and fresh. Draft beer is likely your primary revenue. Make it count.
- Getting beer from the keg to the glass at the same temperature throughout is the primary challenge of a draft system. Glycol or air, your system must have 100% cold contact at every point.
- When it doubt, turn it down to 37F. 36F even. (2.8 to 2.2 Celsius)
- Wait a day for changes to take effect.

CO2 Volume Chart

Equilbrium PSI

Temperature

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
30F	1.82	1.92	2.03	2.14	2.23	2.36	2.48	2.60	2.70	2.82	2.93	3.02	3.13	3.24	3.35	3.46	3.57	3.67	3.78	3.89	4.00	4.11	4.22	4.33	4.44	4.66	4.77	4.87	4.98	4.98
31F	1.78	1.88	2.00	2.10	2.20	2.31	2.42	2.54	2.65	2.76	2.86	2.96	3.07	3.17	3.28	3.39	3.50	3.60	3.71	3.82	3.93	4.03	4.14	4.25	4.35	4.46	4.57	4.68	4.78	4.89
32F	1.75	1.85	1.95	2.05	2.15	2.27	2.38	2.48	2.59	2.70	2.80	2.90	3.00	3.11	3.21	3.31	3.42	3.52	3.63	3.73	3.84	3.94	3.97	4.15	4.25	4.36	4.46	4.57	4.67	4.77
33F	1.71	1.81	1.91	2.01	2.10	2.23	2.33	2.43	2.53	2.63	2.74	2.84	2.96	3.06	3.15	3.25	3.35	3.46	3.56	3.66	3.76	3.87	3.97	4.07	4.18	4.28	4.38	4.48	4.59	4.69
34F	1.68	1.78	1.86	1.97	2.06	2.18	2.28	2.38	2.48	2.58	2.69	2.79	2.90	3.00	3.09	3.19	3.29	3.39	3.49	3.59	3.69	3.79	3.90	4.00	4.1	4.2	4.3	4.4	4.5	4.60
35F	1.63	1.73	1.83	1.93	2.02	2.14	2.24	2.34	2.43	2.52	2.63	2.73	2.83	2.93	3.02	3.12	3.22	3.32	3.42	3.52	3.62	3.72	3.82	3.92	4.01	4.11	4.21	4.31	4.41	4.51
36F	1.60	1.69	1.79	1.88	1.98	2.09	2.19	2.29	2.38	2.47	2.57	2.67	2.77	2.86	2.96	3.05	3.15	3.24	3.34	3.43	3.53	3.63	3.72	3.82	3.92	4.01	4.11	4.21	4.3	4.40
37F	1.55	1.65	1.74	1.84	1.94	2.04	2.14	2.24	2.33	2.42	2.52	2.63	2.71	2.80	2.90	3.00	3.09	3.18	3.27	3.37	3.46	3.56	3.65	3.75	3.84	3.94	4.03	4.13	4.22	4.32
38F	1.52	1.61	1.71	1.80	1.90	2.00	2.10	2.20	2.29	2.38	2.48	2.57	2.66	2.75	2.85	2.94	3.03	3.12	3.21	3.30	3.40	3.49	3.59	3.68	3.77	3.87	3.96	4.06	4.15	4.24
39F	1.49	1.58	1.67	1.77	1.86	1.96	2.06	2.15	2.25	2.34	2.43	2.52	2.62	2.70	2.80	2.89	2.98	3.07	3.16	3.25	3.34	3.44	3.53	3.62	3.71	3.81	3.90	3.99	4.08	4.18
40F	1.47	1.56	1.65	1.74	1.83	1.92	2.01	1.10	2.20	2.30	2.39	2.47	2.56	2.65	2.75	2.84	2.93	3.01	3.10	3.19	3.28	3.37	3.46	3.55	3.64	3.73	3.82	3.91	4.01	4.10
41F	1.43	1.52	1.61	1.70	1.79	1.88	1.97	2.06	2.17	2.25	2.34	2.43	2.52	2.60	2.70	2.79	2.88	2.96	3.05	3.14	3.23	3.32	3.41	3.50	3.59	3.68	3.77	3.86	3.95	4.04
42F	1.39	1.48	1.57	1.66	1.75	1.85	1.94	2.02	2.12	2.21	2.30	2.39	2.48	2.56	2.65	2.74	2.83	2.91	3.00	3.09	3.18	3.26	3.35	3.44	3.53	3.62	3.70	3.79	3.88	3.97
43F	1.37	1.46	1.54	1.63	1.72	1.81	1.90	1.99	2.08	2.17	2.26	2.34	2.43	2.52	2.61	2.69	2.78	2.86	2.95	3.04	3.13	3.21	3.30	3.39	3.47	3.56	3.65	3.74	3.82	3.91
44F	1.35	1.43	1.52	1.60	1.69	1.78	1.87	1.95	2.04	2.13	2.22	2.30	2.39	2.47	2.56	2.64	2.73	2.81	2.90	2.99	3.07	3.1	3.24	3.33	3.41	3.50	3.58	3.67	3.76	3.84
45F	1.32	1.41	1.49	1.58	1.66	1.75	1.84	1.91	2.00	2.08	2.17	2.26	2.34	2.42	2.51	2.60	2.69	2.77	2.86	2.94	3.02	3.11	3.19	3.28	3.36	3.45	3.53	3.62	3.70	3.79
46F	1.28	1.37	1.45	1.54	1.62	1.71	1.80	1.88	1.96	2.04	2.13	2.22	2.30	2.38	2.47	2.55	2.64	2.72	2.81	2.89	2.98	3.06	3.15	3.23	3.31	3.40	3.48	3.57	3.65	3.74
47F	1.26	1.34	1.42	1.51	1.59	1.68	1.76	1.84	1.92	2.00	2.09	2.18	2.26	2.34	2.42	2.50	2.59	2.67	2.76	2.84	2.93	3.02	3.09	3.18	3.26	3.35	3.43	3.51	3.60	3.68
48F	1.23	1.31	1.39	1.48	1.56	1.65	1.73	1.81	1.89	1.96	2.05	2.14	2.22	2.30	2.38	2.46	2.54	2.62	2.71	2.79	2.88	2.96	3.04	3.13	3.21	3.30	3.38	3.46	3.54	3.63
49F	1.21	1.29	1.37	1.45	1.53	1.62	1.70	1.79	1.86	1.93	2.01	2.10	2.18	2.25	2.34	2.42	2.50	2.58	2.67	2.75	2.83	2.91	3.00	3.07	3.15	3.23	3.31	3.39	3.47	3.56
50F	1.18	1.26	1.34	1.42	1.50	1.59	1.66	1.74	1.82	1.90	1.98	2.06	2.14	2.21	2.30	2.38	2.46	2.54	2.62	2.70	2.78	2.86	2.94	3.02	3.10	3.17	3.25	3.33	3.41	3.49
51F	1.18	1.26	1.34	1.42	1.49	1.57	1.64	1.71	1.79	1.87	1.95	2.02	2.10	2.18	2.26	2.34	2.42	2.49	2.57	2.65	2.74	2.82	2.90	2.97	3.05	3.13	3.19	3.27	3.34	3.42
52F	1.16	1.23	1.31	1.39	1.46	1.54	1.61	1.68	1.76	1.84	1.92	1.99	2.06	2.14	2.22	2.30	2.38	2.45	2.53	2.61	2.68	2.76	2.84	2.92	3.00	3.06	3.19	3.22	3.30	3.37
53F	1.14	1.21	1.39	1.36	1.44	1.51	1.59	1.66	1.74	1.81	1.89	1.96	2.03	2.10	2.18	2.26	2.34	2.41	2.49	2.57	2.64	2.71	2.79	2.86	2.94	3.01	3.09	3.16	3.24	3.31
54F	1.12	1.19	1.27	1.34	1.41	1.49	1.56	1.63	1.71	1.78	1.86	1.93	2.00	2.07	2.15	2.22	2.30	2.37	2.45	2.52	2.59	2.66	2.74	2.81	2.89	2.96	3.04	3.10	3.17	3.24
55F	1.1	1.17	1.24	1.31	1.39	1.46	1.53	1.60	1.68	1.75	1.82	1.89	1.97	2.04	2.12	2.18	2.26	2.33	2.40	2.47	2.54	2.62	2.69	2.76	2.83	2.89	2.97	3.04	3.11	3.18
56F	1.07	1.15	1.22	1.29	1.36	1.43	1.50	1.57	1.65	1.72	1.90	1.86	1.93	2.00	2.08	2.15	2.22	2.29	2.36	2.43	2.5	2.57	2.64	2.71	2.78	2.85	2.92	2.99	3.06	3.13
57F	1.05	1.12	1.19	1.26	1.33	1.40	1.47	1.54	1.62	1.70	1.77	1.83	1.90	1.97	2.04	2.11	2.18	2.25	2.32	2.39	2.46	2.53	2.60	2.66	2.73	2.80	2.87	2.94	3.00	3.08
58F	1.03	1.1	1.17	1.24	1.3	1.37	1.44	1.51	1.59	1.67	1.74	1.80	1.87	1.94	2.01	2.08	2.15	2.21	2.28	2.35	2.42	2.48	2.55	2.62	2.69	2.75	2.82	2.88	2.95	3.02
59F	1.02	1.09	1.16	1.22	1.29	1.36	1.43	1.49	1.56	1.64	1.71	1.77	1.84	1.91	1.98	2.04	2.11	2.18	2.25	2.31	2.38	2.45	2.52	2.58	2.65	2.72	2.78	2.85	2.91	2.97
60F	1.01	1.08	1.15	1.21	1.28	1.34	1.41	1.47	1.54	1.62	1.62	1.75	1.82	1.88	1.95	2.01	2.08	2.15	2.21	2.28	2.35	2.41	2.48	2.54	2.61	2.67	2.74	2.80	2.86	2.92
61F	0.99	1.05	1.12	1.18	1.24	1.31	1.37	1.44	1.50	1.57	1.63	1.69	1.76	1.82	1.88	1.95	2.01	2.07	2.14	2.20	2.27	2.34	2.40	2.47	2.53	2.59	2.66	2.72	2.79	2.85
62F	0.96	1.02	1.09	1.15	1.21	1.27	1.34	1.40	1.46	1.52	1.59	1.65	1.71	1.78	1.84	1.90	1.97	2.03	2.09	2.16	2.22	2.28	2.34	2.41	2.47	2.53	2.59	2.66	2.72	2.78
63F	0.93	0.99	1.06	1.12	1.18	1.24	1.3	1.36	1.42	1.49	1.55	1.61	1.67	1.73	1.79	1.85	1.92	1.98	2.04	2.10	2.16	2.22	2.28	2.35	2.41	2.47	2.53	2.59	2.65	2.71
64F	0.91	0.97	1.03	1.09	1.15	1.21	1.27	1.33	1.39	1.45	1.51	1.57	1.63	1.69	1.75	1.81	1.87	1.93	1.99	2.05	2.11	2.17	2.23	2.29	2.35	2.41	2.47	2.52	2.58	2.64
65F	0.88	0.94	1	1.06	1.11	1.17	1.23	1.29	1.35	1.41	1.46	1.52	1.58	1.65	1.70	1.76	1.82	1.87	1.93	1.99	2.05	2.11	2.17	2.23	2.28	2.34	2.40	2.46	2.52	2.58

CARBON DIOXIDE VOLUME AT TEMPERATURE

Under-Carbonated: 0 - 1.40
Nitro Carbonation: 1.50 - 2.00
Darker Ales: 1.50 - 2.20
Most beers: 2.20 - 2.60
Highly Carbonated Ales: 2.60 - 4.00
Over-Carbonated: 4.10+

PRESSURE.

- Carbon dioxide (or blend gas) will determine the correct pressure. When the stable temperature you already determined is not the problem, get the applied pressure correct. Or – fix both.
- Maximum system pressure is typically 65 psi. Couplers have a safety PRV set to 65 psi. Applying excess pressure prior to the keg regulator is hard on the system and not necessary.
- Know your vols and use the vols chart. Be consistent. Check vols with a hacked pressure check coupler. Like this!

COUPLER PRESSURE GAUGE

- ¼” threaded fittings to hose barb (5/8” or 3/8”)
- Beer nut and tail piece (5/8” or 3/8”)
- Beer nut cap. On liquid out.
- Use beer washers.
- Check with temperature against vols chart.
- Your distributor may have an answer, or call the brewer to determine the proper vols. They brewer really does want their beer to be served correctly.

THIS GAUGE MAY LIE TO YOU

- This $5 part is notorious for out right lying. Below around 8 psi, do not trust the gauge. Handle the gauge carefully, if at all.
- Replacement is easy. ¼" threads, use a wrench. Many hardware stores have gauges.
- 0 to 30 psi is most useful but 0 to 60 psi or 0 to 100+ psi are sometimes needed.

ZAHM & NAGEL

- Ever use one of these contraptions?
- Results vary.

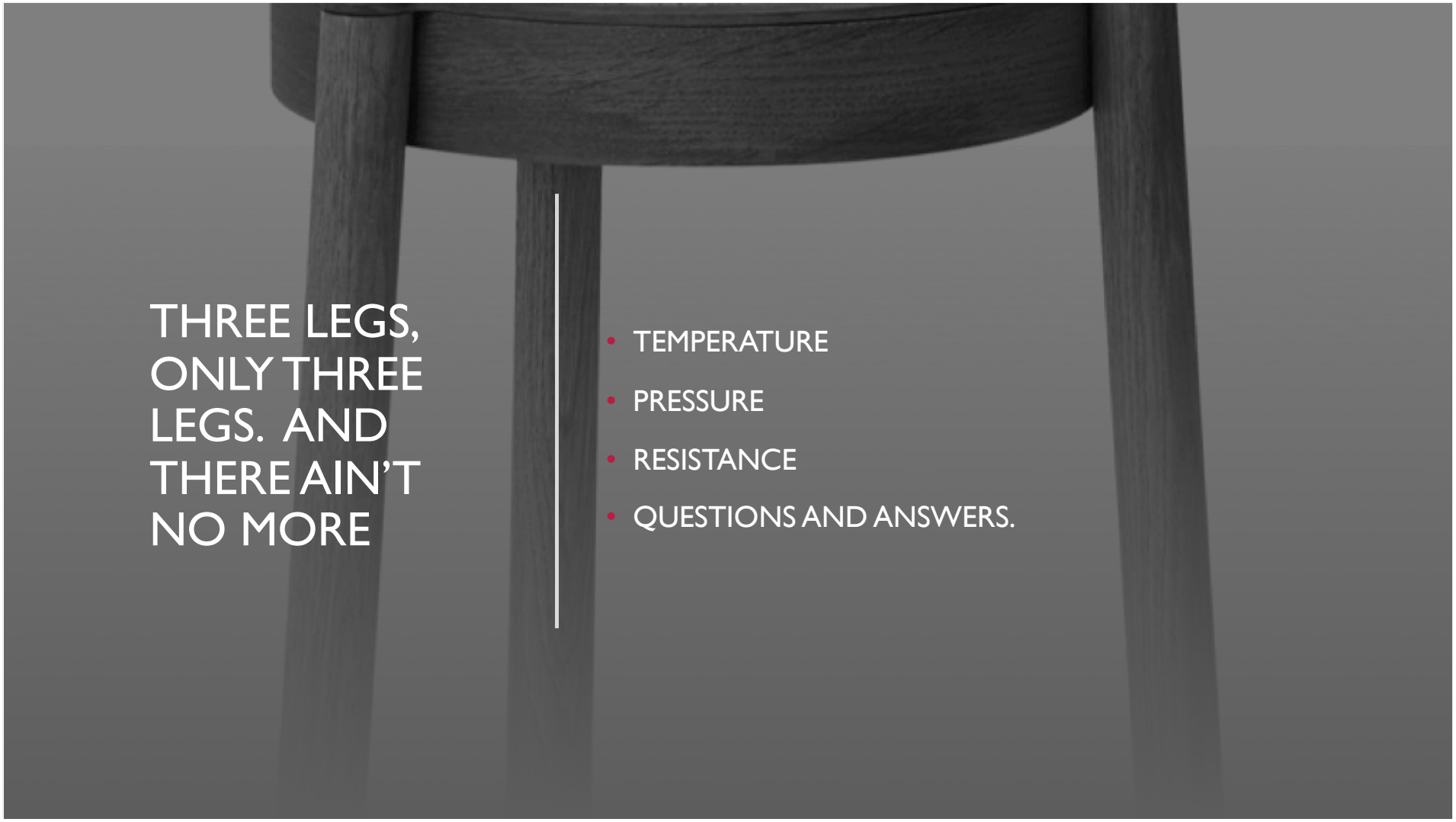
WHAT IS GOING ON WITH THIS DAMN KEG?!!!!

- Use a pressure coupler and know what's in your keg.
- Checking the pressure in the keg can help to determine if you need to adjust your applied pressure, correct your packaging procedure, or look elsewhere. Having a coupler with a pressure gauge is handy when visiting accounts.
- Every other bartender wants to mess with the regulator because the regulator is the only thing they can mess with. Lay down the law and put a stop to the insanity!
- Adjust carefully. Agitate and degas the keg if needed*. Wait 12 hours. Check again and correct if needed.
- Beer comes from the spear at the bottom of the keg; rocking, rolling, shaking, dropping the keg creates a very short-term effect. The system is closed until a faucet is opened.

RESISTANCE

Design resistance is built in. Hopefully, the draft system was built right, because it is not easy to reinstall choker or heaven forbid, the trunk line. Resistance determines the rate of flow only. If you have foam in the glass, it is usually because the temperature or pressure is not balanced. If you routinely need flow control faucets, or want to install flow controls to fix foam, the two other legs of the system are probably not balanced. So, fix that first.

System resistance determines velocity. That is to say the speed of the beer hitting the glass. Some finesse is needed at the faucet. Train your staff to pour a proper pint, into a clean glass, at the correct angle, with the proper amount of foam. This is easy profit. Hold the glass close and there will be relatively little foam. Let the last few ounces fall into a glass of beer and generate some nice foam collar. Voila.



THREE LEGS, ONLY THREE LEGS. AND THERE AIN'T NO MORE

- TEMPERATURE
- PRESSURE
- RESISTANCE
- QUESTIONS AND ANSWERS.

CLEANING YOUR DRAFT SYSTEM

- BEER IS FOOD, CLEANING YOUR DRAFT SYSTEM IS NOT OPTIONAL.
- THE DRAFT SYSTEM IS SIMILAR, BUT NOT THE SAME AS A BREWERY; SOME SPECIAL CONSIDERATIONS ARE REQUIRED.
- USE 100% STAINLESS STEEL, FDA AND NSF 51 MATERIAL EVERYWHERE.
- STATIC CLEANING AND PUMP CLEANING. SET A SCHEDULE AND BE VIGILANT.
- EITHER AFTER A SET PERIOD (ONCE A MONTH*) OR A SET VOLUME (EVERY KEG).

*The Brewers Association recommends cleaning every 2 weeks. This may or may not be needed, depending on the state of the system. A vigorous cleaning every 4 weeks is adequate, but don't go more than 4 weeks.
https://www.brewersassociation.org/association-news/importance-draught-beer-line-cleaning/

SANKE CLEANING CAN / STATIC CLEANING

- A Sanke can is cheap, easy and efficient. Fill it with a BLC, purge the lines, let it sit. Drink a beer. Purge again. Flush with many, many gallons of cold water. Check the pH. Remove faucets and detail if needed. Inspect couplers and detail if needed.
- Having two cans will speed up the process.
- Simple, cheap, easy.
- Flush with clear water.
- Flush with clear water.
- Flush with clear water.

- AT A MINIMUM, YOU SHOULD CLEAN YOUR DRAUGHT LINE EVERY TWO WEEKS WITH AN ALKALINE DETERGENT CLEANER TO REMOVE PROTEIN AND FILMS THAT BUILD UP QUICKLY.
- THE CLEANING CHEMICAL SHOULD BE RECIRCULATED THROUGH THE PRODUCT LINE FOR A MINIMUM OF 15 MINUTES AT A VELOCITY UP TO TWO GALLONS/MINUTE. SOAKING PRODUCT LINES IS NOT RECOMMENDED, BUT THE CLEANING SOLUTION SHOULD BE LEFT IN-LINE FOR AT LEAST 20 MINUTES IF RECIRCULATION IS NOT AN OPTION.
- ALL FAUCETS SHOULD BE COMPLETELY DISASSEMBLED AND CLEANED EVERY TWO WEEKS. MAKE SURE TO REPLACE ANY DAMAGED SEALS OR GASKETS.
- ACID CLEANING SHOULD BE PERFORMED QUARTERLY TO REMOVE INORGANIC COMPOUNDS SUCH AS "BEER STONE," WHICH ARE MINERAL DEPOSITS.
- ALL VINYL JUMPERS AND VINYL DIRECT DRAW LINES SHOULD BE REPLACED ANNUALLY.
- COUPLERS SHOULD BE REPLACED BASED ON CONDITION. INSPECT THE COUPLER BOTTOM SEAL AND O-RINGS, TO MAKE SURE THEY ARE PROPERLY LUBRICATED WITH A FOOD-GRADE LUBRICANT.
- GOOD QUALITY, WELL-MAINTAINED COUPLERS, FAUCETS AND SHANKS CAN LAST A LIFETIME. **PARTS THAT ARE 100 PERCENT STAINLESS STEEL ARE THE MOST RELIABLE AND WILL PROVIDE THE BEST QUALITY EXPERIENCE FOR YOUR STAFF AND CUSTOMERS.**
- ALWAYS MAKE SURE TO RINSE LINES WITH CLEAN WATER AFTER CLEANING!
- DRAUGHT LINES MAY NEED TO BE REPLACED AFTER POURING ROOT BEER, FRUIT OR PEPPER-FLAVORED BEERS, SOUR BEERS, MARGARITAS OR CIDERS IN ORDER TO AVOID PERMANENT FLAVOR INFLUENCE.
- **EVERY TIME YOU CLEAN, YOU DUMP BEER, DRAFTNAUTS.**

BREWERS ASSOCIATION GUIDELINES

JULY 1, 2016

DANK AND JUICY AKA CLOGGED AND CRAPPY.

- The more junk floating in the beer, the more junk potentially clogging the system.
- Consider cans.
- Mac Daddy spin down filtration, maybe 200 to 1,000 μ. ???
- Be prepared to flush the system with water, and with the glycol system off.
- Give the people what they want.

PUMP CLEANING (DYNAMIC)

- Not as simple as static cleaning but significantly more effective.
- Pulsating flow.
- Required for long draw systems.
- Equipment investment.
- DIY. Keep it below 60 psi.

DUAL FLUSHER AND FAUCET JUMPER

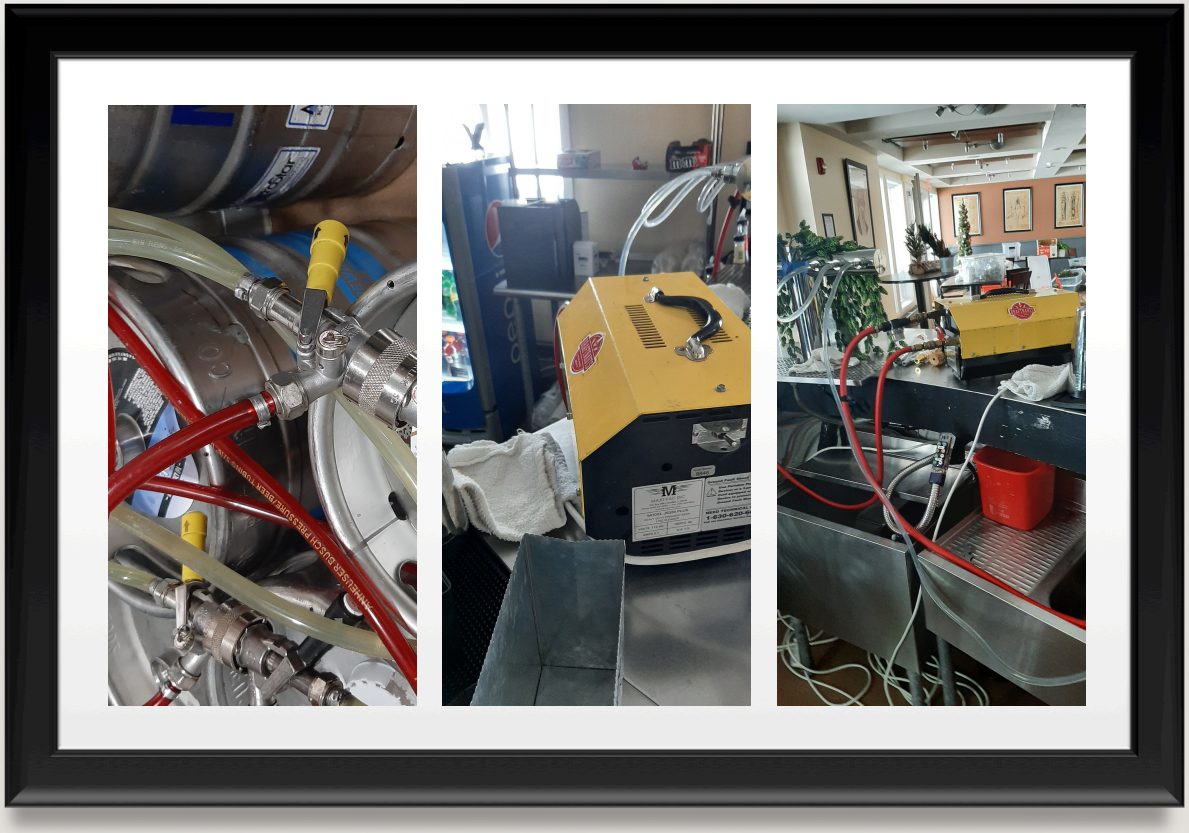
- Connect two couplers together with a ball-lifter.
- Connect two faucets together with a jumper. (Foxx).
- Daisy chain everything and pump cleaning fluid. (MicroMatic).
- Rinse with clear water. Check the pH of the water supply. Check the pH after cleaning.
- Do not use hot water.

PUMP CLEANING RIG

- $1,500 to $2,500 or more.
- Maxi-Vac from Foxx Equipment.
- DIY pumps can not exceed maximum pressure of system tolerance (65 psi or less) and require a throttle.
- Electric and water do not mix.

PUMP CLEANING

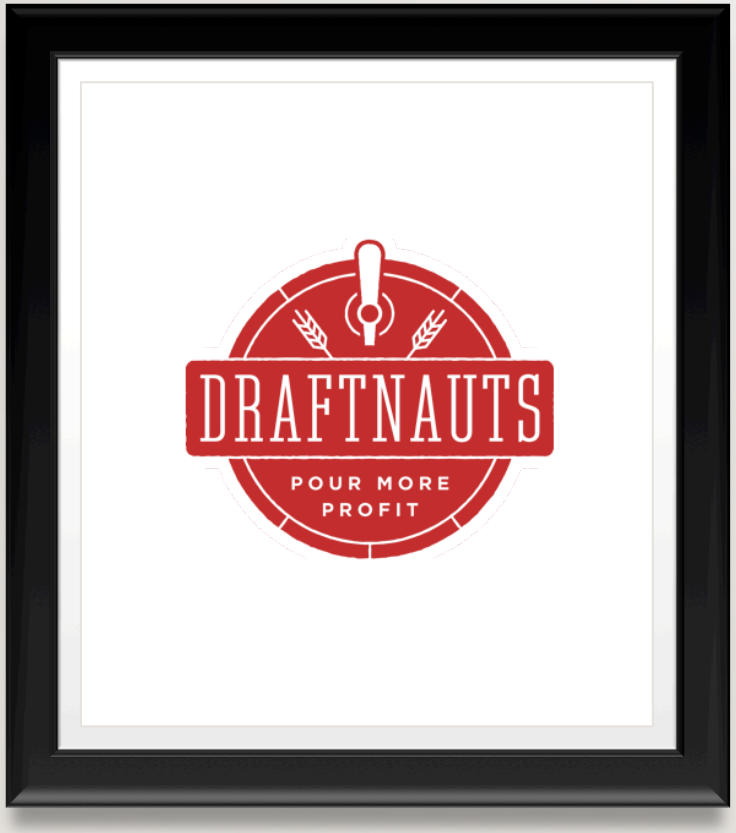
- Once per month, minimum.
- CIP system is possible
- Trained staff required.



Q AND A

BEER-THIRTY?

NUCLEATION POINTS.

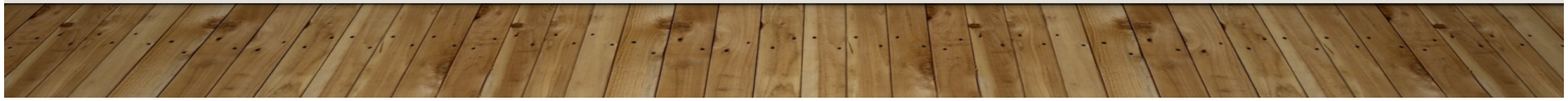


DRAFTNAUTS LLC
ITHACA, NEW YORK

- bill@Draftnauts.com (me)
- corey@Draftnauts.com
- 607 592 2932 text
- Good beer makes good friends. Contact us when you have questions and we will try to provide honest advice.

DESIGNING A GREAT DRAFT BEVERAGE SYSTEM

START BACKWARDS. WORK FORWARDS.



A REALISTIC BUDGET INCLUDES STAINLESS STEEL.

- Don’t waste too much money of Barchitecture.

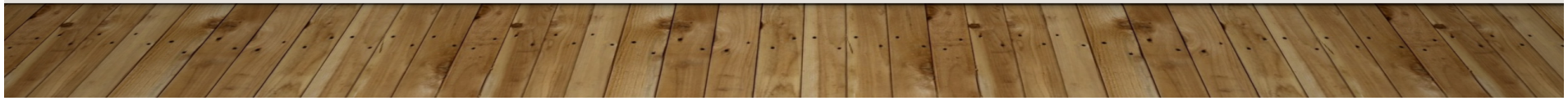
The draft system IS the product.

We used to say “Allow $1,000 per line” and a bit less for larger systems, but prices are rapidly increasing.

Capital Improvement tax relief helps.

Determine what buys the best product, a lot what you are buying can’t be seen.

Staring small and expanding later when funds are available is a solution.



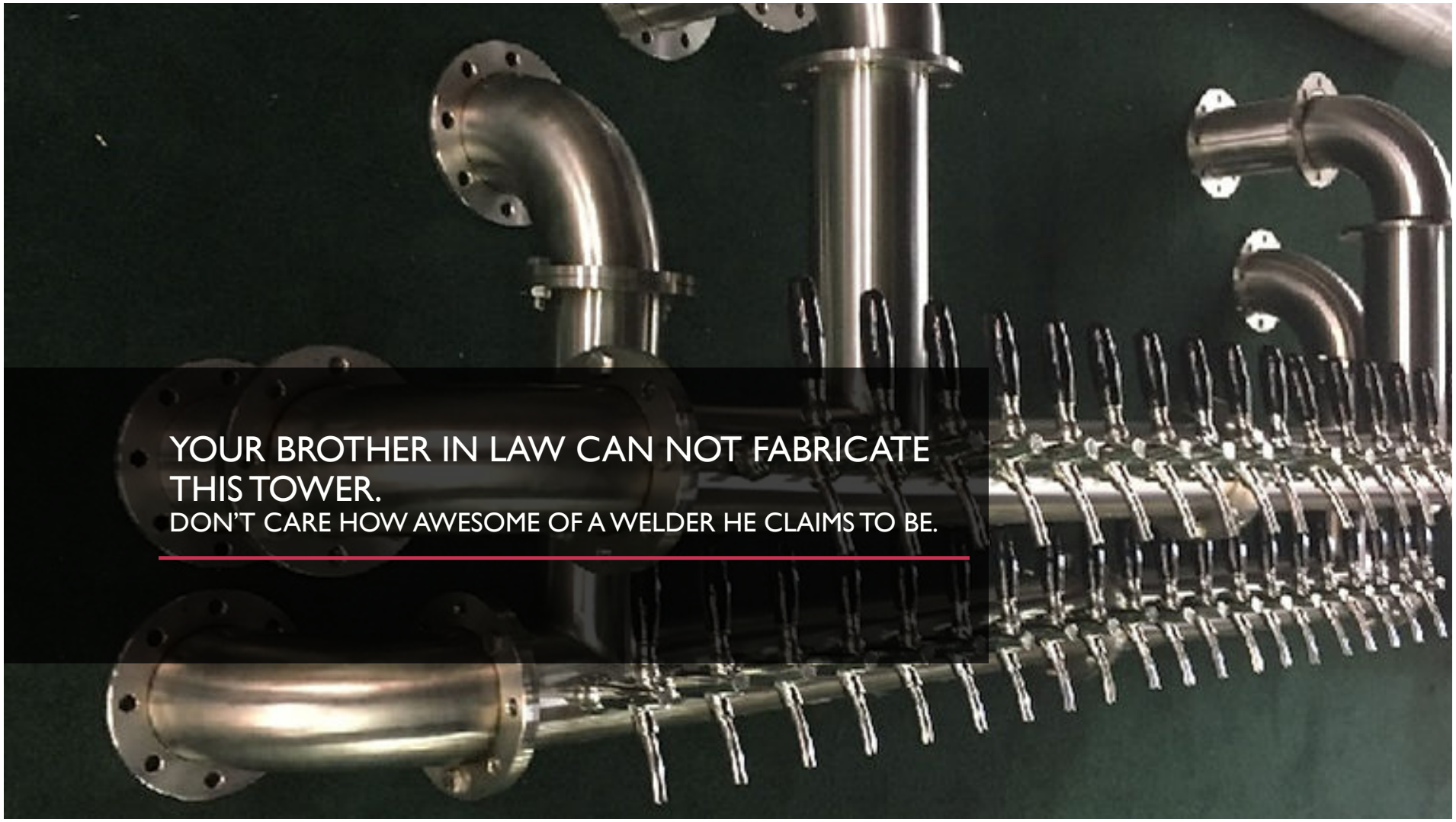

BARCHITECTURE
IT DOESN'T ALWAYS HELP.

BARCHITECTURE

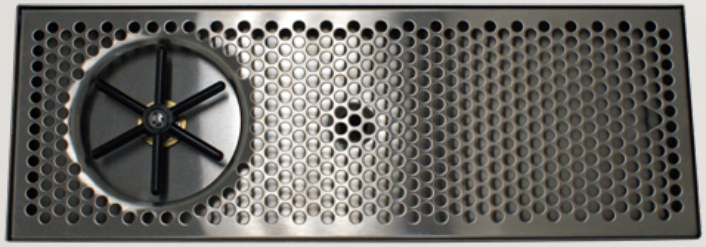
LIGHT BULBS?

BLACK IRON WILL RUST


DISPLAYED WITHOUT TAP HANDLES.
BECAUSE THEY SLAM UP AGAINST THE WALL.


YOUR BROTHER IN LAW CAN NOT FABRICATE THIS TOWER.
DON'T CARE HOW AWESOME OF A WELDER HE CLAIMS TO BE.

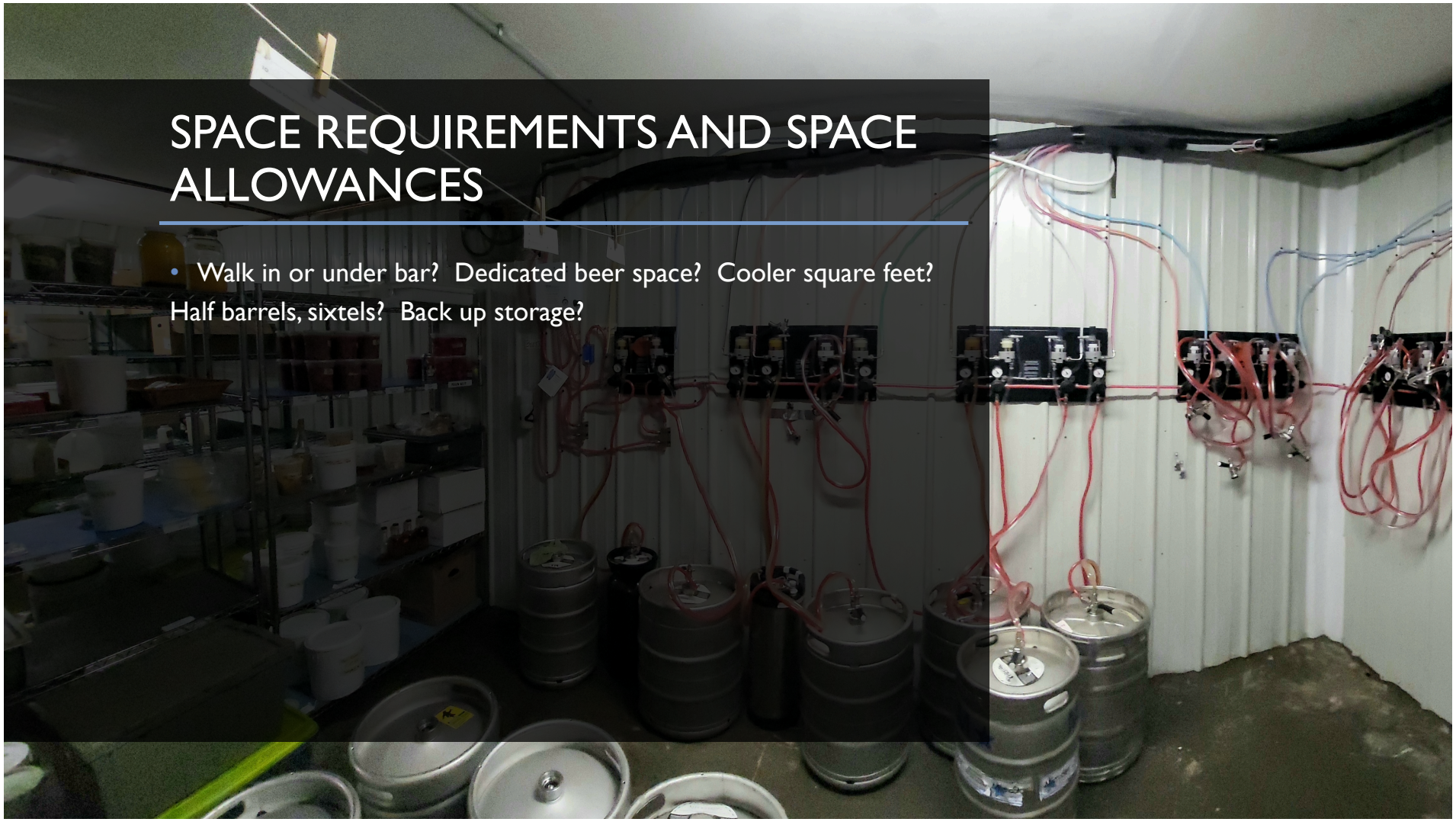
YOU'LL NEED A DRIP TRAY TOO



- Requires more planning than anticipated.
- Always a headache.
- Often the last thought.
- Include a rinser if needed.
- Plan on having a drain.

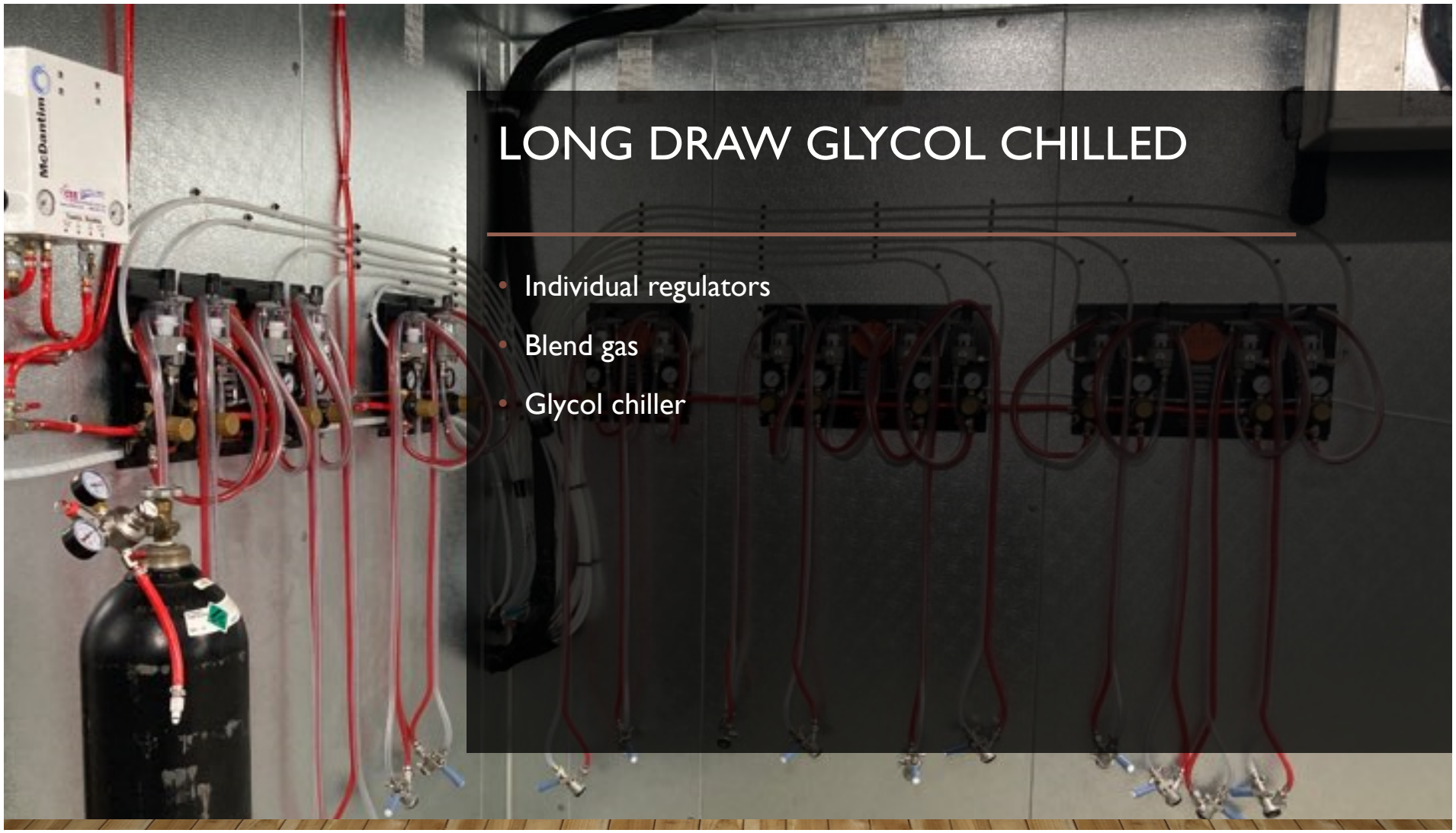
SPACE REQUIREMENTS AND SPACE ALLOWANCES

- Walk in or under bar? Dedicated beer space? Cooler square feet? Half barrels, sixtels? Back up storage?



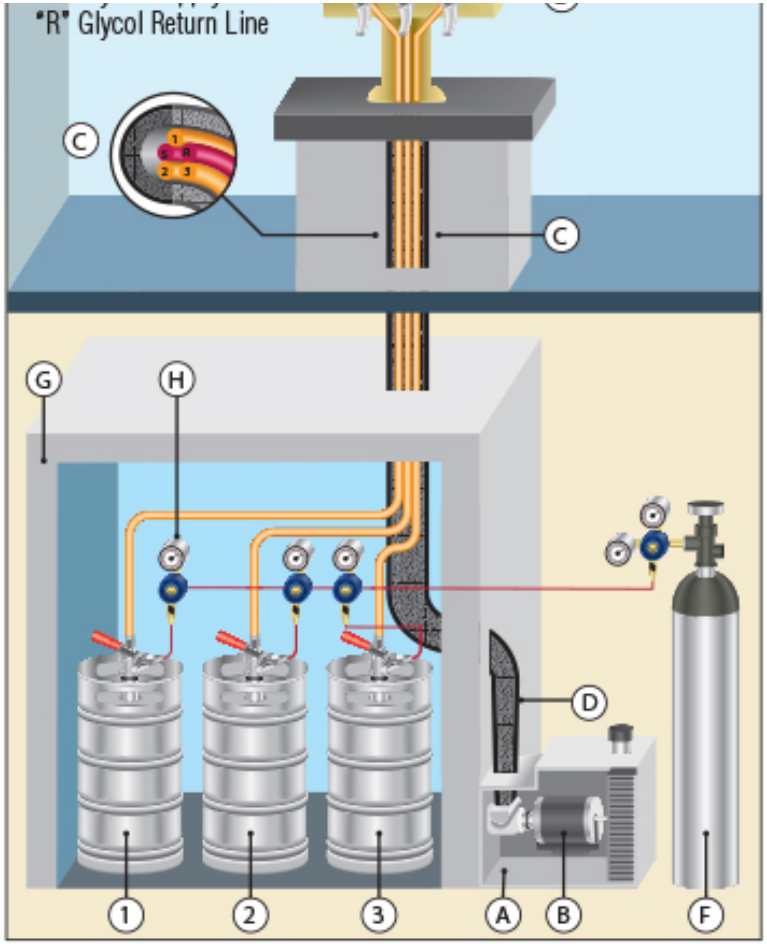
DIRECT DRAW / LONG DRAW

- Air cooled systems use forced air to maintain temperature. Air is a mediocre conductor of heat.
- Long draw systems recirculate cold glycol to maintain temperature within an insulated trunk line.
- Small glycol chillers replace fans in some systems and work significantly better.



LONG DRAW GLYCOL CHILLED

- Individual regulators
- Blend gas
- Glycol chiller

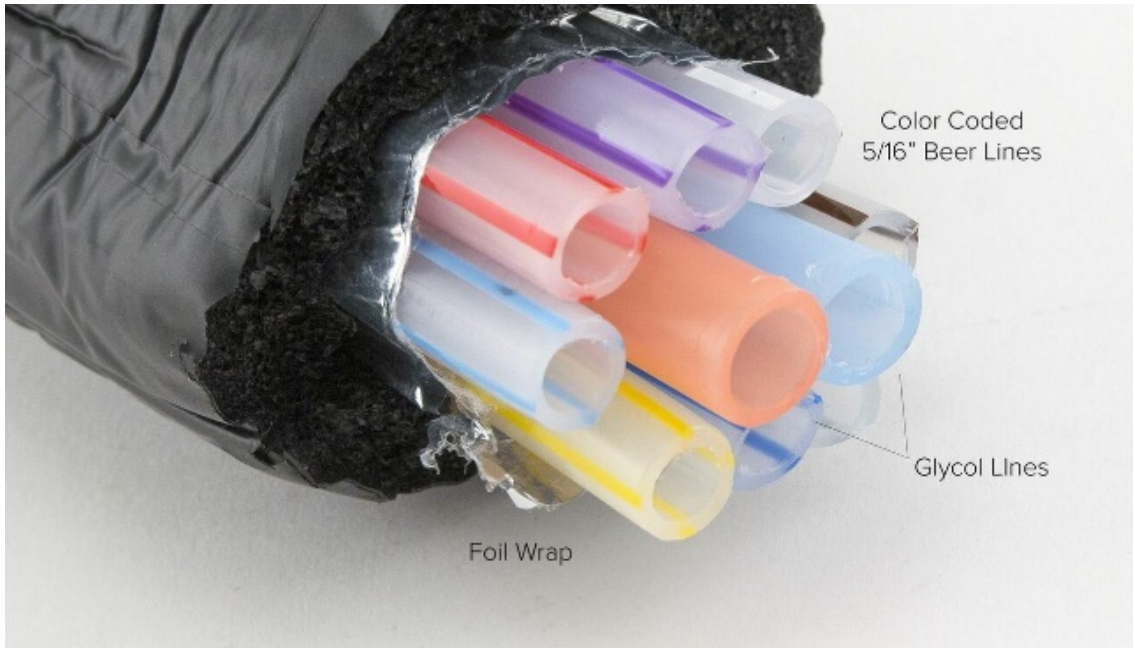


Complex Design

- Trunk line.
- Draft Tower.
- Glycol Chiller
- Gas Blender
- Multiple Regulators.
- Foam on Beer detectors (FOBs) save money, fast.
- Takes away cooler space for other things.

Trunk Line

- Insulated beer line with glycol loop.
- O2 impermeable material with low resistance.
- Difficult installation.
- Sometimes extraordinarily difficult to install.
- ¼” ID or 5/16” ID is a big improvement of 3/8” ID. 3/8” is obsolete.
- NSF 51 and 61 materials are very recent.
- Wine and high alcohol (50 proof) line is available too.



UNDER BAR WITH AIR COOLING

RAIL WITH UNDER BAR COOLER

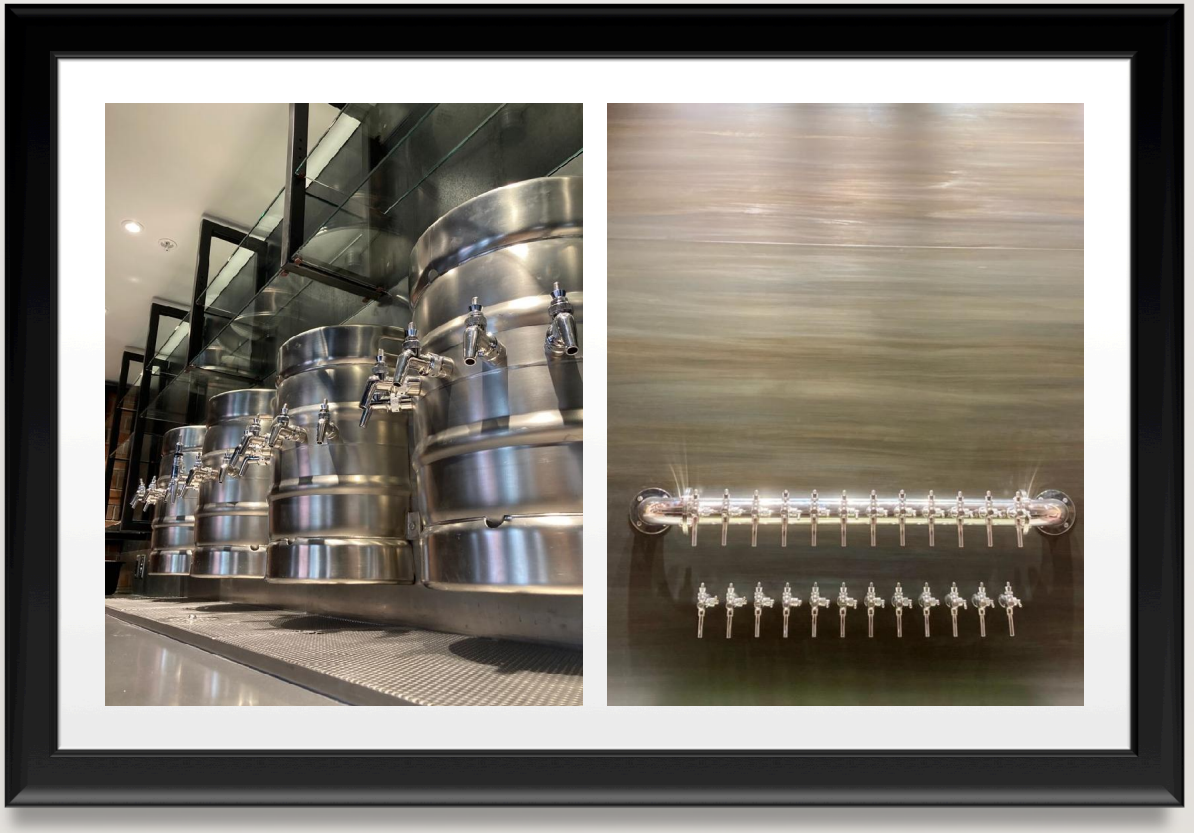
AIR COOLED TRUNK

IN LINE GROW FAN

- Low pressure
- Less than 100 cfm.
- 4” duct choked down with fittings.
- Runs 24/7/365.
- Check for leaks and seal everything, check again a few days later.

DIRECT DRAW WITH GLYCOL

BETTER THAN AIR, AND ONLY MARGINALLY MORE EXPENSIVE.



FACTS AND FIGURES NECESSARY FOR OVERCOMING DESIGN CONSTRAINTS

- McDantim Easy Blend software is a big help. Download this app.
- Barrier tube – ¼" = 0.4 lbs/ft, 5/16" = 0.15 lbs/ft
- Choker is 3/16" exclusively and should ideally be TPE, not PVC. TPE = 3.0 psi lbs/ft.
- PVC choker is likely 2.0 to 2.2 psi per foot.
- Rise = 0.45 lbs/ft and drop = -0.45 lbs/ft. Round to ½ pound per foot, measure from center of keg.
- Add 1 psi for coupler, faucet, FOB etc.

MODEL CALCULATIONS

- A system using 60 feet of 5/16" choker, kegs are in the basement cooler 16 feet beneath the faucets. The cooler is 38 degrees.
- 60*0.15 = 9 psi.
- 16*0.5 = 8 psi
- Add 1 psi for hardware.
- Total system restriction is 18 psi.

18 PSI MODEL SYSTEM

- 12 psi of applied 100% CO^2 gas equals 2.57 vols, so 12 psi is not enough pressure to overcome resistance. We need a blend gas. 70/30 blend will work.
- Knowing we want to target 2.57 vols, we can see that 24 psi of the 70% CO^2 blend results in the proper pressure.
- 3.0 psi per foot choker requires 2' of line, or 6 psi of restriction, to get us back to theoretical 12 psi of restriction.
- Over restricting the system a few pounds is usually tolerable. Under restricting the system will be a headache and wasteful.

GRAVITY AND RESISTANCE CAN BE OVERCOME WITH BLEND GAS.

- A significant drop from keg to faucet can not easily be overcome with choker or any other system restriction.
- Multiple faucet points for each keg can be installed, but the balance needs to be identical for each faucet. Use a Beer Manifold, installed horizontally.
- Pumps are expensive, noisy, hard to maintain, made for the soda people and generally not needed unless you are installing a stadium system.

DIRECT DRAW

EASY.

WITH A TARGET OF 12 PSI FOR 2.57 VOLS AT 38 DEGREES, OVER RESTRICTED TO 15 PSI, INSTALL ABOUT 5 FEET OF 3.0 CHOKER OR 7.5 FEET OF 2.0 PSI CHOKER. IT'S EASIER TO TRIM LINE THAN TO ADD LINE LATER. THAT'S IT.

WALK THROUGH A GLYCOL SYSTEM

- At Brewery Ardennes in Geneva, New York

- https://www.breweryardennes.com/


NITRO STOUT,
CIDERS, SELTZERS
BYO BOOTCAMP APRIL 2022 WITH
BILL JABLONSKI

Guinness is most familiar

CAMRA people will tell you everything you need to know…

Not a replacement for cask

Nitrogen is inert, odorless, tasteless, carbon dioxide is not.

75% Nitrogen / 25% CO_2

THE PARTS

A nitro faucet and blended gas

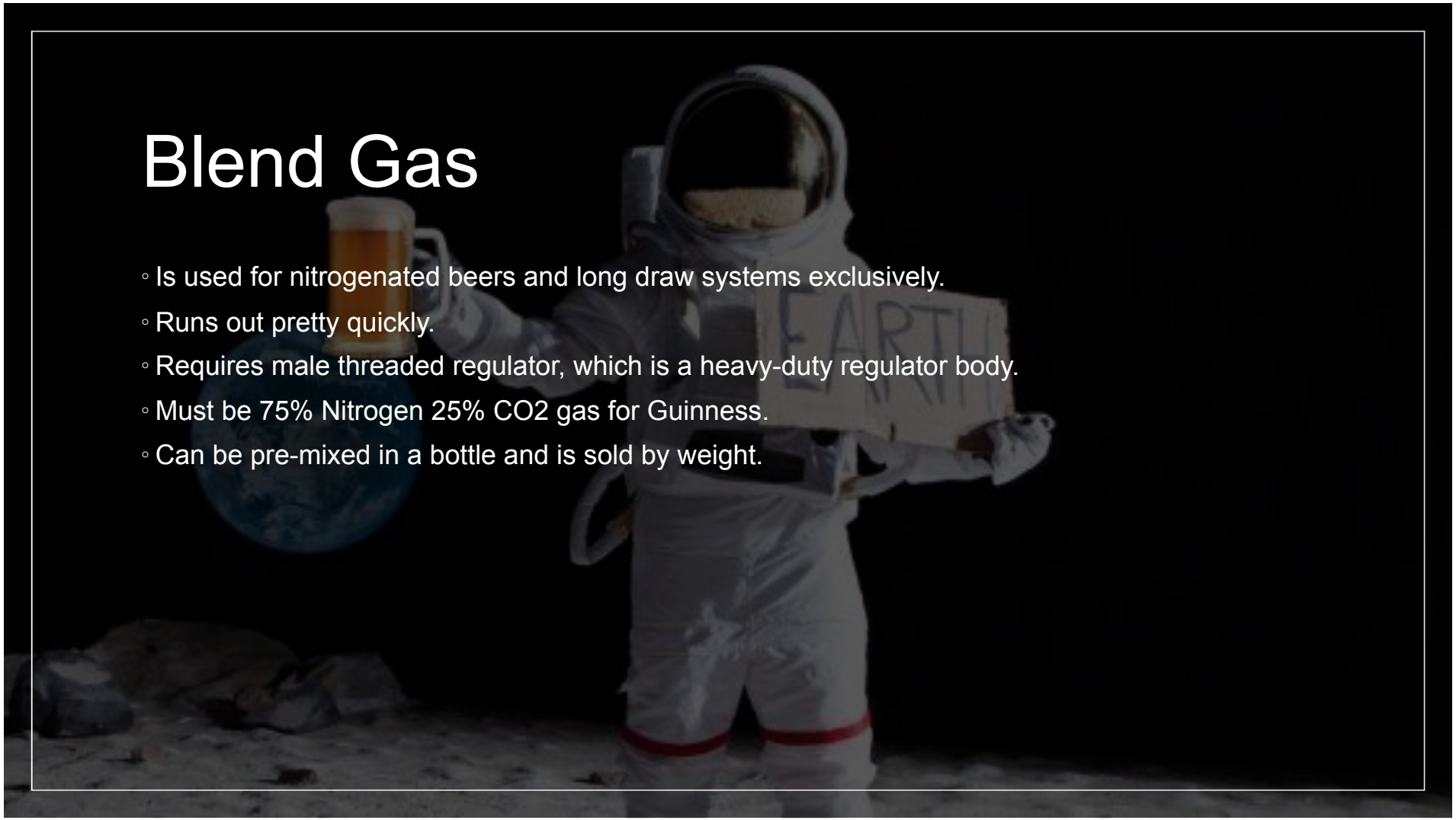
THE SET UP

30+ psi

THE POUR

Slowly make it look as magical as possible.

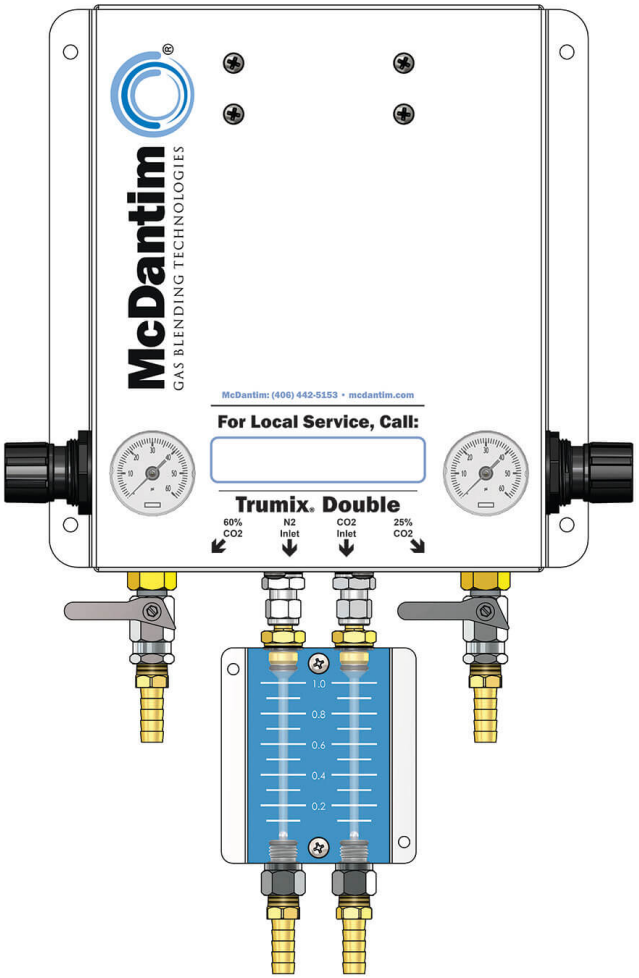
Blend Gas



- Is used for nitrogenated beers and long draw systems exclusively.
- Runs out pretty quickly.
- Requires male threaded regulator, which is a heavy-duty regulator body.
- Must be 75% Nitrogen 25% CO_2 gas for Guinness.
- Can be pre-mixed in a bottle and is sold by weight.

Gas Blender

- McDantim is the exclusive manufacturer.
- 60CO^2/40N blend is common but less effective.
- 70CO^2/30N hits the “sweet spot” more often.
- 25CO^2/75N nitrogen required blend for Guinness and similar.
- Having both CO^2 and nitrogen in bottle allows each gas to be used independently as well.
- **Add a flow detector, if not a CO^2 gas detector**.
- A rotometer is not a gas detector. A gas detector is not an oxygen detector. Oxygen detectors and LEL meters are expensive and require frequent maintenance.



Cider

- Much like beer but tolerates higher vols.
- Does not foam too bad because there is less protein.

THE PARTS

Noting special is required unless you have chrome plated hardware.

THE SET UP

Basically interchangeable with beer but tolerates higher vols better.

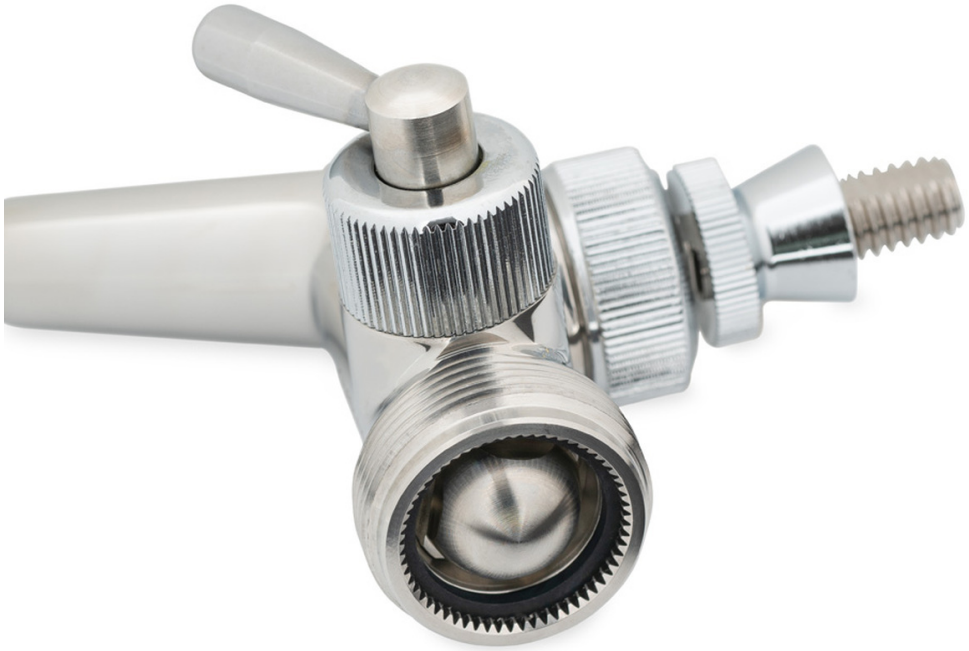
THE POUR

Special glassware? Can be poured with some vigor.


SELTZER
Soda Water, Club Soda, Bubbly Water, Carbonated Water, it’s all the same.

THE PARTS

FC faucet, high pressure tubing, good drinking water, a high pressure regulator if desired.



Flow Control

- Slows the flow.
- Does not correct temperature or restriction.
- It will pour warm foam slower however.
- Useful for highly carbonated beverages.
- Gives the bartenders something to mess with.

Gas Gun

- Nitrogen is useful to cap wine.
- Carbon dioxide can marginally help to keep carbonated beverages from going flat overnight.
- Both gases can purge oxygen, rather effectively for behind the bar purposes.