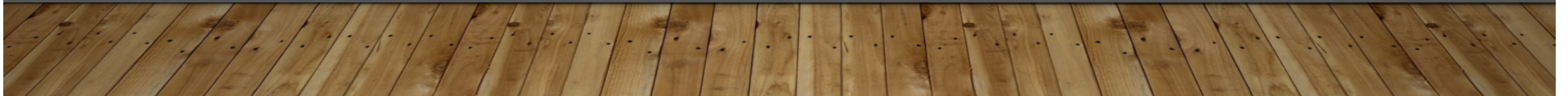


DRAFT SYSTEM'S FOR HOMEBREWERS

WITH BILL JABLONSKI BYO BOOT CAMP JANUARY 2021



DRAFTNAUTS LLC - ITHACA, NEW YORK

My homebrewing started in 1996, the year of my marriage and the year my S.O. bought one of the fancy home brew kits. I still have the buckets and even the original glass carboy. And a basements worth of homebrewing equipment. May God bless my wife.

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. All successful brewers love beer first and foremost. The rest comes as a natural result.

Let's do it right and hopefully make some more friends along the way.

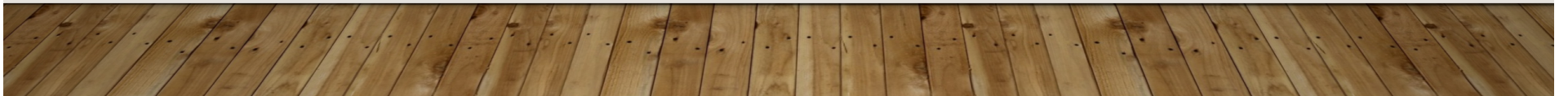


THIS GUY.

NOT THIS GUY.



Maybe this guy. I don't know. Maybe.



THE TAKE AWAY IS WE ARE HOMEBREWERS!

THE VERY NAME HAS BECOME SYNONYMOUS WITH PEOPLE WHO DIY, FIGURE IT OUT, GET IT DONE AND GENERALLY MAKE MAGIC HAPPEN. SEE STEVE JOBS. ([HTTPS://EN.WIKIPEDIA.ORG/WIKI/HOMEBREW_COMPUTER_CLUB](https://en.wikipedia.org/wiki/Homebrew_Computer_Club))

WE ARE DOERS. WE ARE TECHNICAL. WE ARE PRACTICAL. WE FIGURE IT OUT.

HOMEBREWERS ARE TYPICALLY PEOPLE WITH AN IDEA LOOKING FOR A PROBLEM TO SOLVE. AND THERE IS A GOOD CHANCE YOU HAVE ALREADY HAVE SOME IDEAS OF YOUR OWN. WE ARE GOING TO DISCUSS THAT.

TODAY WE ARE BLESSED WITH MANY SOLUTIONS THAT CAN BE DELIVERED TO YOUR DOOR WITH A FEW CLICKS. WE HAVE SEMINARS. WE HAVE ONLINE COMMUNITIES.

WE ARE STILL A COMMUNITY OF DIY PEOPLE.

CONFUSED BEER DRINKER WITH A NECKBEARD. STOCK PHOTO.

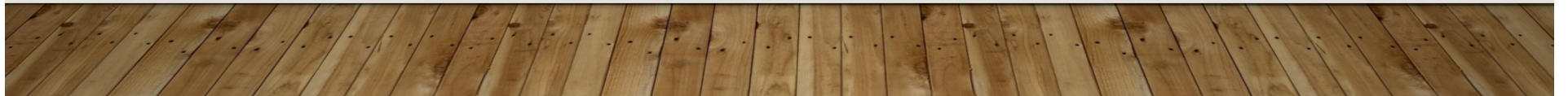
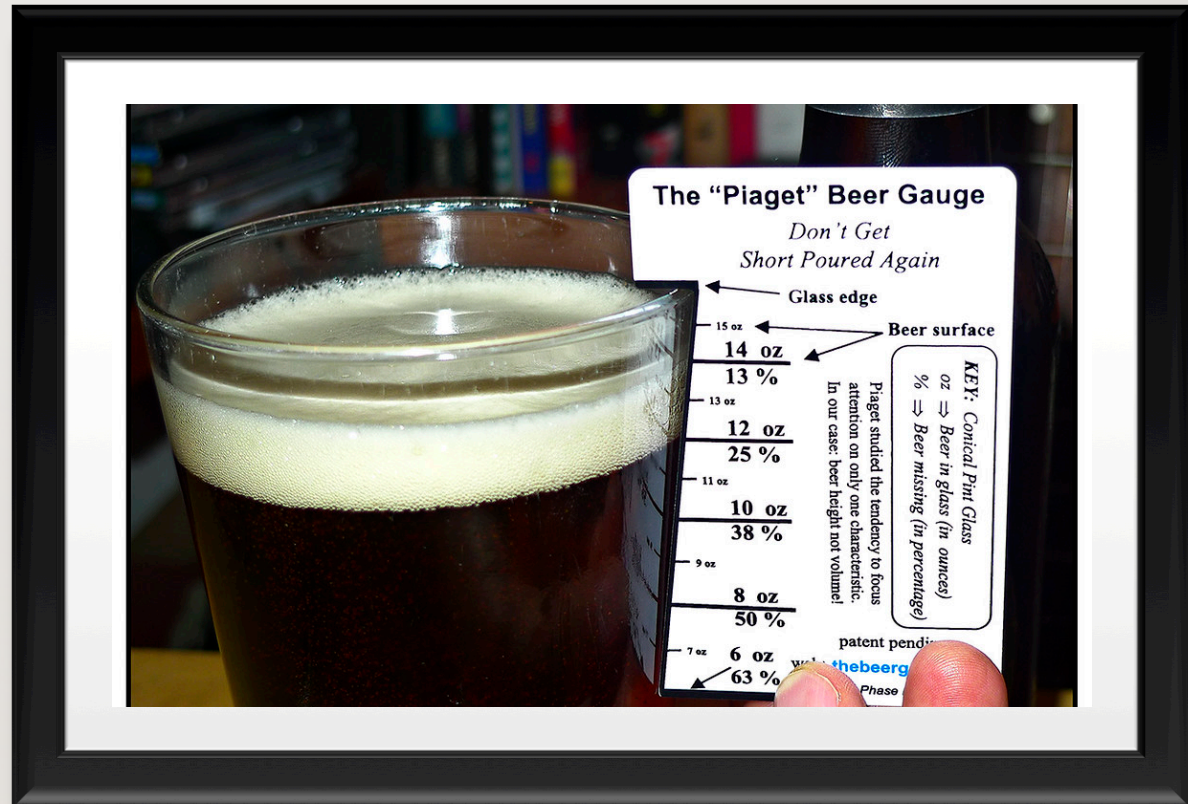


THE PERFECT POUR

- Wasting beer is expensive. And annoying
- The math is real. A 5 gallon keg has 769 ounces or 48 proper 16 ounce pints.
- Let's not waste it.
- Discuss

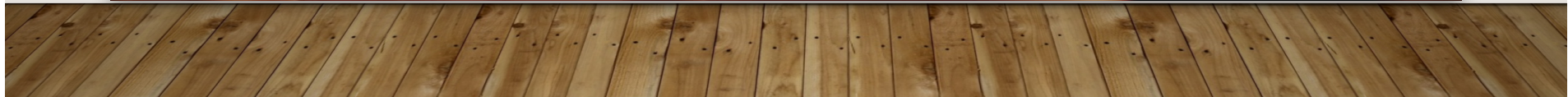
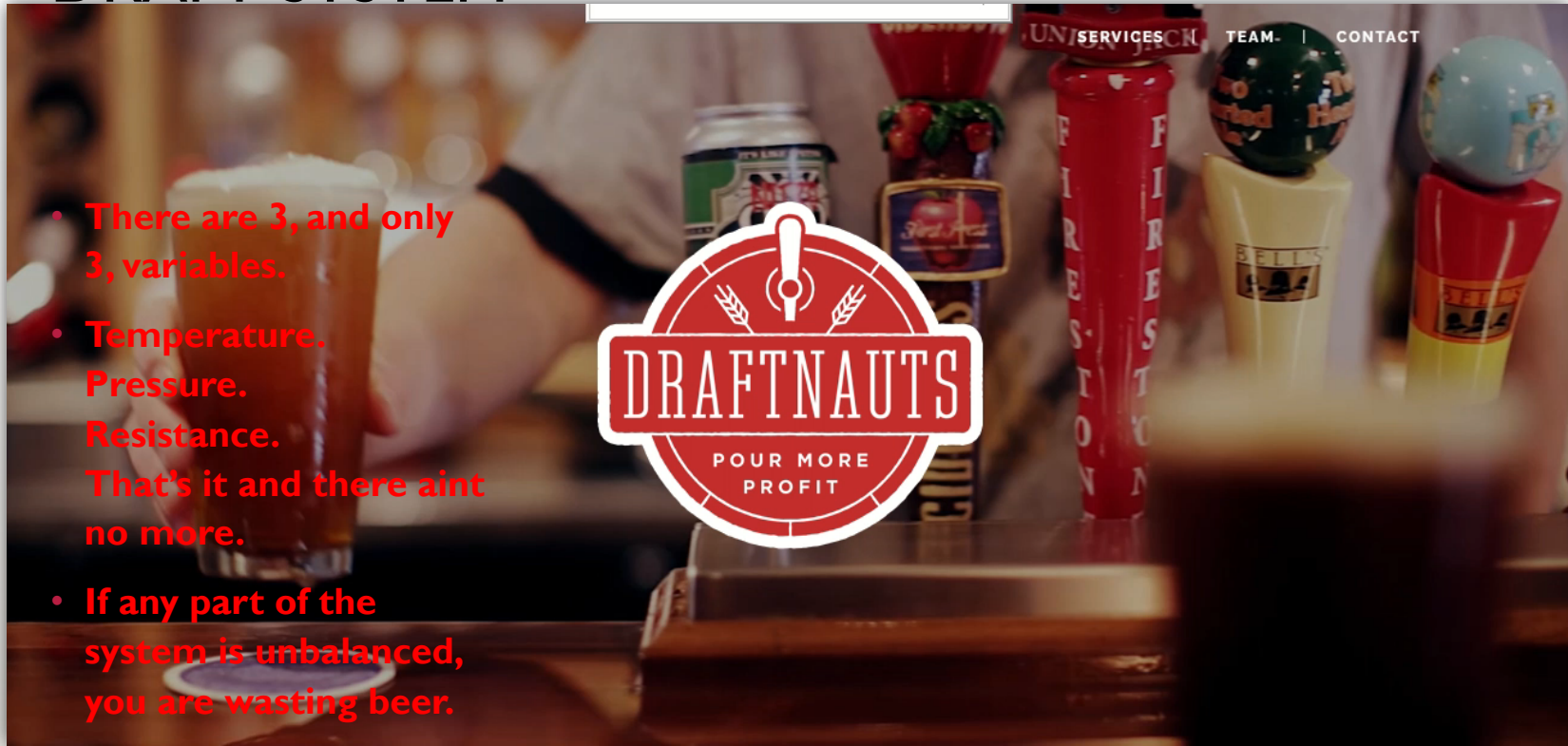


PIAGET BEER GAUGE



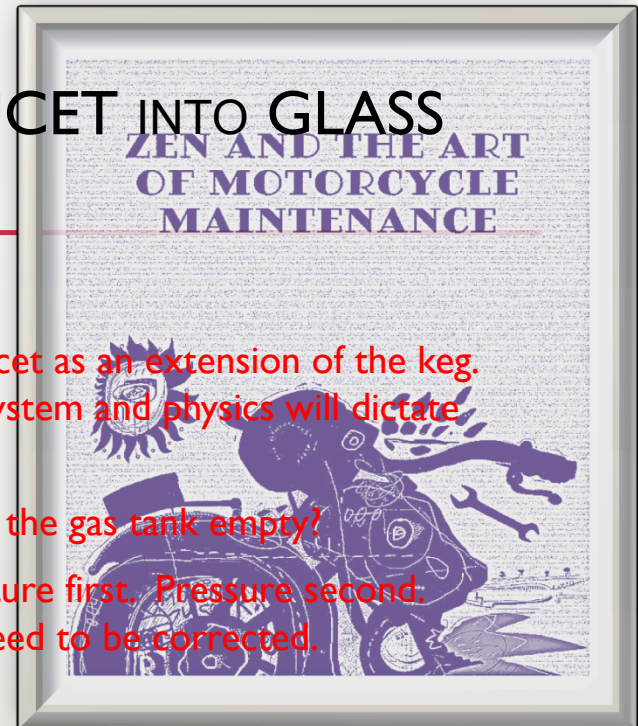
THREE LEGS OF A BALANCED DRAFT SYSTEM

- 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.



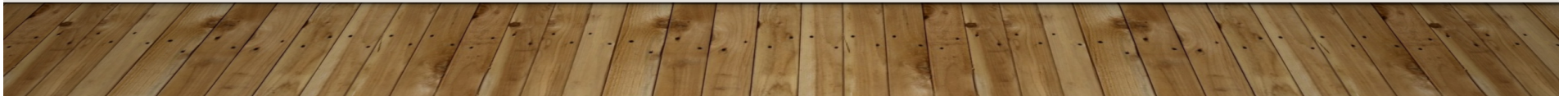
KEG → TUBING → SHANK → FAUCET INTO GLASS

- 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.



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 most draft systems. All kegs are in 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. 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.

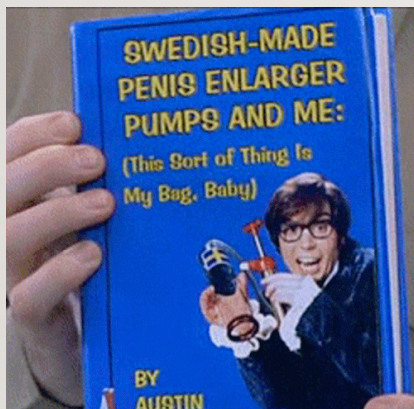


COUPLER PRESSURE GAUGE

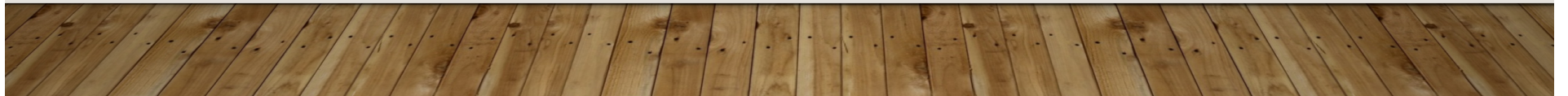
- DIY this set up with Corney QD's.
- 1/4" threaded fittings to hose barb (5/8" or 3/8")
- Beer nut and tail piece (5/8" or 3/8")
- Beer nut cap. On liquid out.
- Washers.
- Check with temperature against vols chart.



ZAHM & NAGEL



And maintains equilibrium.





NOT AVAILABLE IN STORES. HOMEBREWED WIN.

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.
- You want to mess with the regulator because the regulator is the only thing you 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.

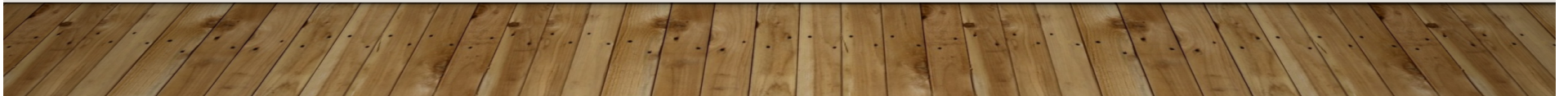


CLEANING A DRAFT SYSTEM

- BEER IS FOOD, CLEANING YOUR DRAFT SYSTEM IS NOT OPTIONAL.
- THE DRAFT SYSTEM IS SIMILAR, BUT NOT THE SAME AS A YOUR BREWERY; SOME SPECIAL CONSIDERATIONS ARE REQUIRED.
- USE 100% STAINLESS STEEL, FDA AND NSF 51 MATERIAL EVERYWHERE.
- STATIC CLEANING (OR LESS LIKELY 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

- USE YOUR CORNEY.
- A keg is cheap, easy and efficient. Fill it with a BLC, purge the lines, let it sit. Drink a homebrew. 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, one with water, will speed up the process.
- Simple, cheap, easy.

BREWERS ASSOCIATION GUIDELINES

JULY 1, 2016 EDITION

- 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.

DANK AND JUICY AKA CLOGGED AND CRAPPY.



- The more junk floating in the beer the more junk clogging the system.
- Consider cans.
- Mac Daddy spin down filtration, maybe 200 to 1,000 μ . ??? Or DIY a solution.
- Be prepared to flush the system with water.
- Give the people what they want. Make what you 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 \$2,000
- Maxi-vac or 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
- CIP system is possible
- Trained staff.

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.

The background of the slide is a complex, abstract pattern of wavy, overlapping lines in various shades of blue and black. The lines create a sense of movement and depth, resembling a stylized, textured surface or perhaps a representation of liquid or fabric. The overall effect is dynamic and visually engaging.

DRAFT BEER SYSTEM BALANCE

Bill Jablonski - Draughtnauts
BYO Boot Camp
January 2022



The three leg stool analysis.

- There are three (and only three) variables.
- Temperature.
- Pressure.
- Resistance.
- A balanced system delivers the beer into the glass with the proper carbonation at the proper temperature.
- Add 1 psi per 2,000 feet of elevation. 610 meters.
Applied pressure is in relation to atmosphere pressure.

ONE proper balance

- When temperature is stable and correct, and the correct resistance is known, the proper pressure will produce a good pour without any waste.
- If any variable is out of whack, the other variables must change as well.
- Sometimes, two variables are screwy. Be patient.

PROPER STYLE VOLS

Consider our ability to detect carbonation levels from one beer to the next. A change of 0.2 vols is probably about as close as we could notice unless the beers are side by side.

We have some room for variances here.



Temperature

Get a good thermometer if you don't have one.

Thermoworks are great. Digital thermometers with a thermocouple are best.

Dial thermometers are fine if calibrated and maintained. Use an ice bath.

Liquid temp, not air temp.

A datalogger is useful and cheap.

38 F is the target. And not too much variable here.

- **Too warm.**
- Frustrated neck beard man. He is tired of beer waste.



Too cold.

Holds too much gas and makes you feel bloated, but it can fix some unbalanced issues.





Homer drinks
cold beer

This guy.

Pressure

- Reference the beer carbonation chart against your verified temperature.
- Apply proper pressure by increasing slowly to the desired psi.
- Let the needle creep up and make small corrections with the knob. It is a one way valve – you can not lower the psi with the regulator.
- Use the PRV to release pressure if needed and try again.
- Check psi in 15 minutes.
- PSI gauges do fail.

Resistance

- 0.45 psi per foot of rise, measured from the middle of the keg. But this is not detectable in a short system.
- 2.0 psi to 3.0 psi per foot of choker. TPE is 3.0. PVC is 2.2, 2.0 or lower.
- Garden hose and spigot example.
- Add about 1 psi for all the other crapola installed. Shank, QD's, faucet.

2.5 vols for an IPA.

Assume we are at or near sea level and we have 38F beer. To get 2.5 vols in our beer and into our glass, we would need to have 11 psi of applied pressure. This provides 2.48 vols.

Slightly over restricting the system helps us control *velocity*.

Velocity is the speed of the pour and the degree with which the beer hits the glass.

Flow Controls help. A little.



A FLOW CONTROL FAUCET WILL SLOW DOWN THE POUR AND WILL DECREASE VELOCITY.



YOU WILL PROBABLY POUR FOAM SLOWER IF YOU HAVE NOT CORRECTED THE UNBALANCED SYSTEM.



How to pour a beer, according to an expert.

Beer clean glass.

Hold the glass at an around a 45 angle and bring to spout without touching the spout.

Open faucet completely.

Beer runs against the side of the glass, then tilt glass vertically as it nears full.

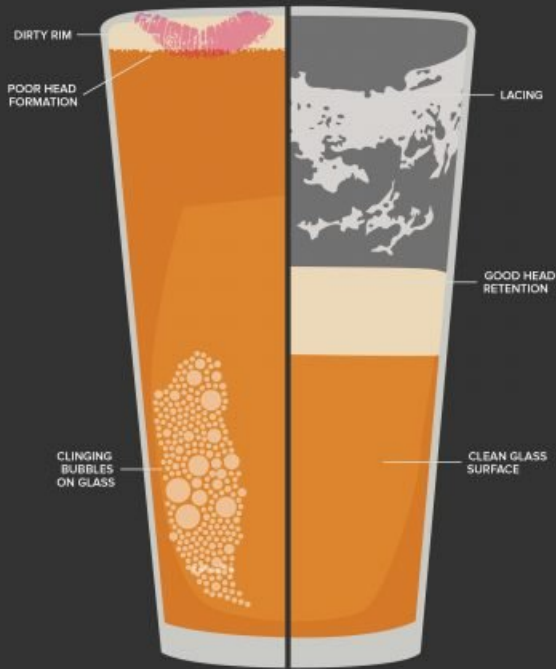
Drop glass in the last few ounces to achieve the desired foam collar.

Teach your friends!

KEGWORKS

BEER CLEAN GLASS

DIRTY vs. CLEAN

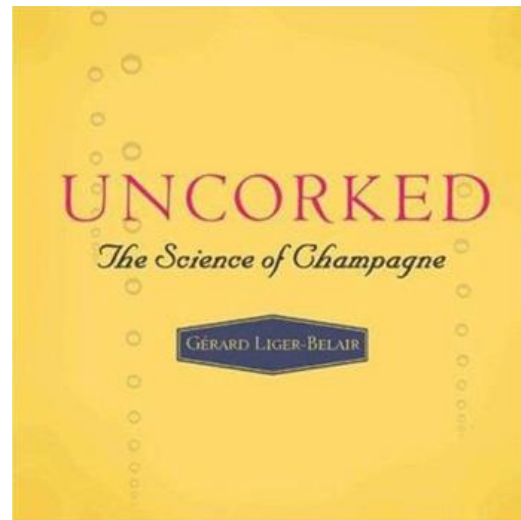


Beer Clean and Nucleation Points

Beer clean is not a mystery.

Use hot water if needed.

Use only enough soap. If you have odors or residue, try again. Use a dry, lint free towel. Let glass completely dry. A lot depends on your water. Yes dishwashers are ok, but they can damage delicate art work.



Nucleation Points and the Magical Torx Towel.

- Torx Paper Towels or similar will give your glass of beer some magic abilities.
- So will a dash of salt, if that sounds like a good idea.
- Uncorked, by Gerard Liger-Belair.

CORNELIUS KEGS FOREVER

Unfortunately, they have all been
bought up.



Q and A. Proper glassware anyone?



shutterstock.com · 635171513



**BUILDING A
KEGENERATOR OR
KEEZER +
DESIGN IDEAS**

BYO Boot Camp January 2022

Kegeerator or Keezer?

Kegeerator

- Front door
- Tall and Narrow
- Limited Space
- Useless Hump
- Front Door Drilled
- Less Energy Efficient. No fan is required
- Can have somewhat remote air cooled lines
- Looks Like... an old fridge
- Creative design options
- Door can be drilled without fear, usually

Keezer

- Top load
- Short and Wide
- More Space
- Useful Hump
- No possibility of drilling
- More Energy efficient, a fan can help
- Air cooled lines are not very practical
- Looks Like... Giant White Appliance
- Creative design options
- Sides can not be drilled



Commercial Kegerator for Residential Use?

- Prices vary but it's just a cold box with hardware.
- Does the guy selling a TV screen know *anything* about a kegerator? Best Buy?
- Some will hold a half bbl.
- Commercial units for bars can be loud, expensive when new, and often abused when used.
- Used units may need some TLC.
- Any residential unit will require substantial investment in parts.

OR BUILD A HOME BREWED KEGENERATOR

Remote faucets in this unused doorway with a kegerator beneath.





DIY your old fridge

Any ratty fridge will do.

Paint it.

Lives in your garage or basement.

Comes with a handy bottle and can storage space.

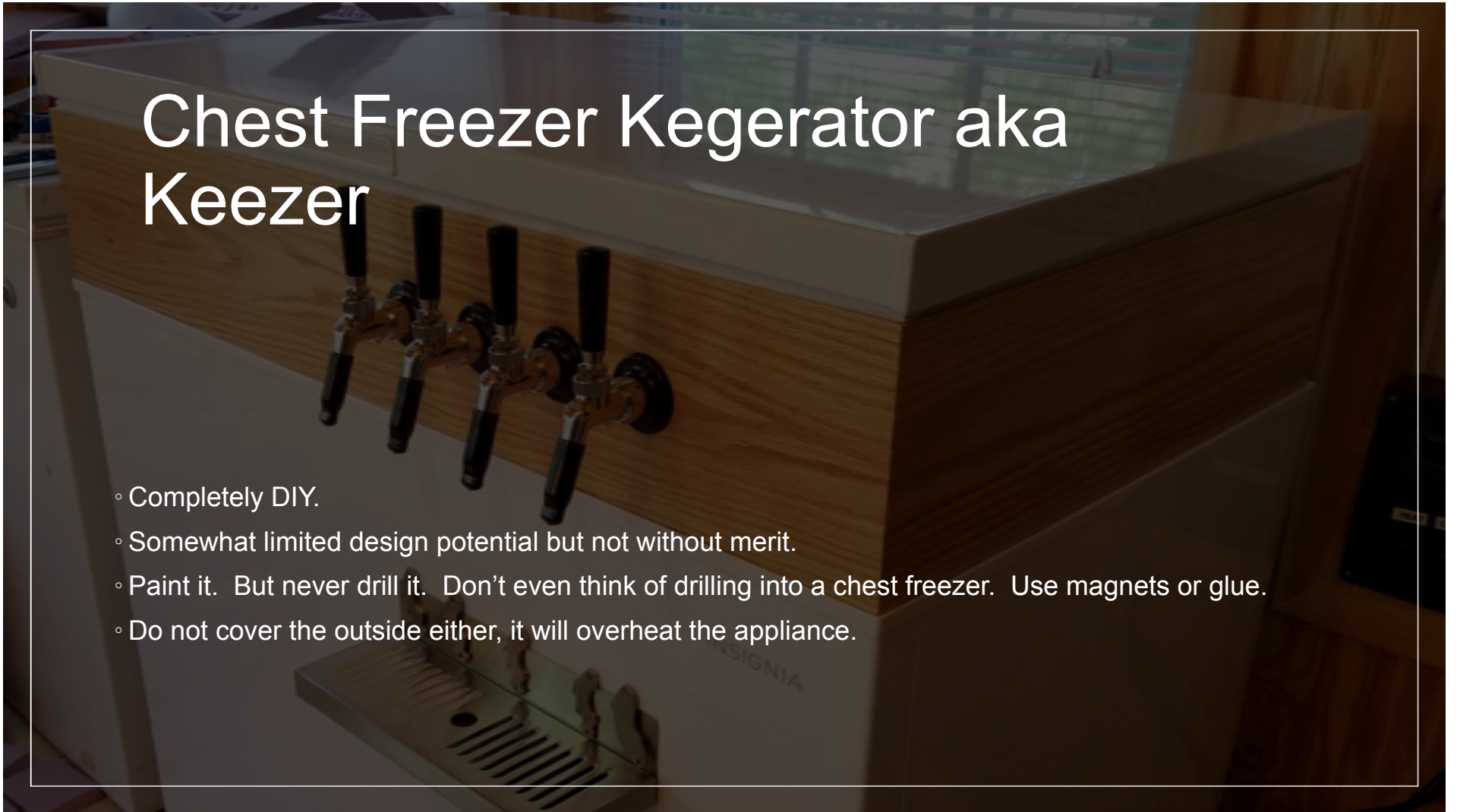
Paint it. Dry erase it.

Hardware is re-useable in the next one.

Paint it. Chalkboard paint.

Chest Freezer Kegerator aka Keezer

- Completely DIY.
- Somewhat limited design potential but not without merit.
- Paint it. But never drill it. Don't even think of drilling into a chest freezer. Use magnets or glue.
- Do not cover the outside either, it will overheat the appliance.





KEG A SAURUS WILL HOLD DOZENS OF CORNELIUS KEGS

Paint it.



Home Bar

- How many home brews on tap?
- Wood or Stainless Steel or both.
- Tile. Live Edge bar top. Concrete. Anything that can be cleaned.
- Some ventilation is needed.
- Remote faucets require forced air.



NITRO STOUT, CIDERS, SELTZERS

BYO Bootcamp January 2021 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% CO₂



THE PARTS

A nitro faucet and blended gas



THE SET UP

30+ psi

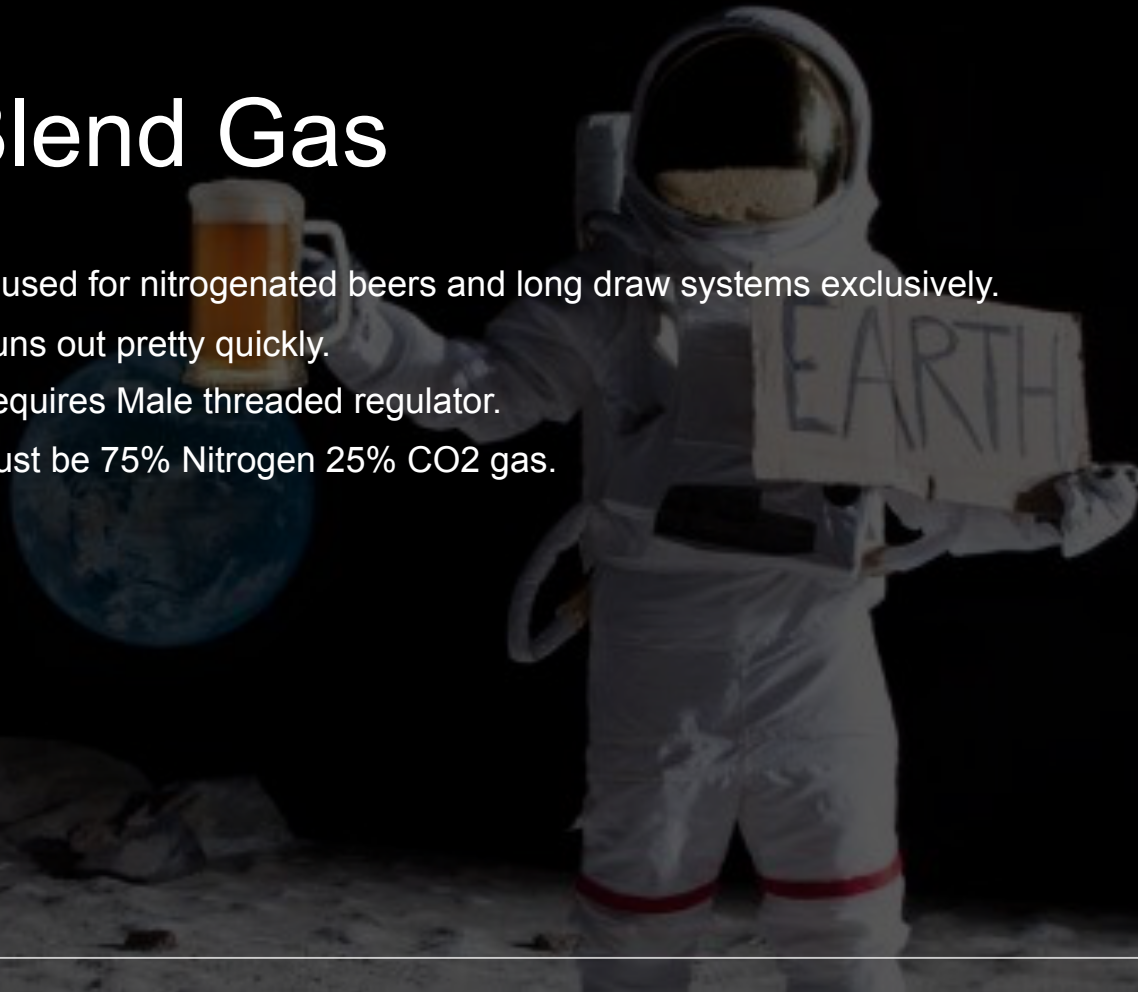


THE POUR

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.
- Must be 75% Nitrogen 25% CO2 gas.





Cider

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



THE PARTS

Nothing 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 to me.



THE PARTS

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

WHATEVE
R YOU
THINK OF,
IT'S
PROBABLY
POSSIBLE.





Remote faucets on this one.

- Add a fan, run the lines, keep it cold.
- Commercial Beverage Air unit.
- Semi Permanent.



◦ Have a friend paint it.



Online example of what not to do. BYO Boot Camp it!

- How do you load this thing?
- Where does the heat go?
- How tall must you be to reach the faucets?
- Drip tray?
- Requires a fan (but probably skipped that part).
- *Cool lighting*



THE SET UP

Push the CO2 to near 60 psi but not beyond system design constraints. 80 psi with specialty equipment.
Add flavors and additives.



THE POUR

Slow it down with the FC.

The background of the slide is a complex, repeating pattern of blue and black wavy lines. The lines are thin and densely packed, creating a sense of movement and depth. The pattern consists of large, overlapping, teardrop-like shapes that resemble stylized leaves or petals. The blue lines are set against a black background, and the overall effect is a vibrant, textured design.

LONG DRAW DRAFT SYSTEMS

Bill Jablonski Draftnauts
BYO Boot Camp January 2022

**A significantly
more complex,
more expensive
and more fun
system.**

Remote draw beer dispense refers to when the faucets are far from the keg.

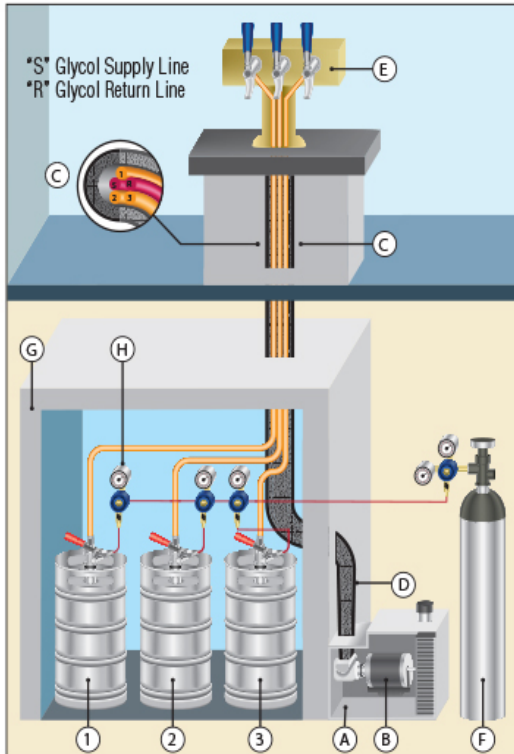
Beer can be poured anywhere with a solid design and the right parts.

A simple remote draw system will add \$1,000 and up to a direct draw system.

Yes, beer can be sent almost anywhere in the house.

With careful planning and attention to critical components, long draw can be a DIY project.

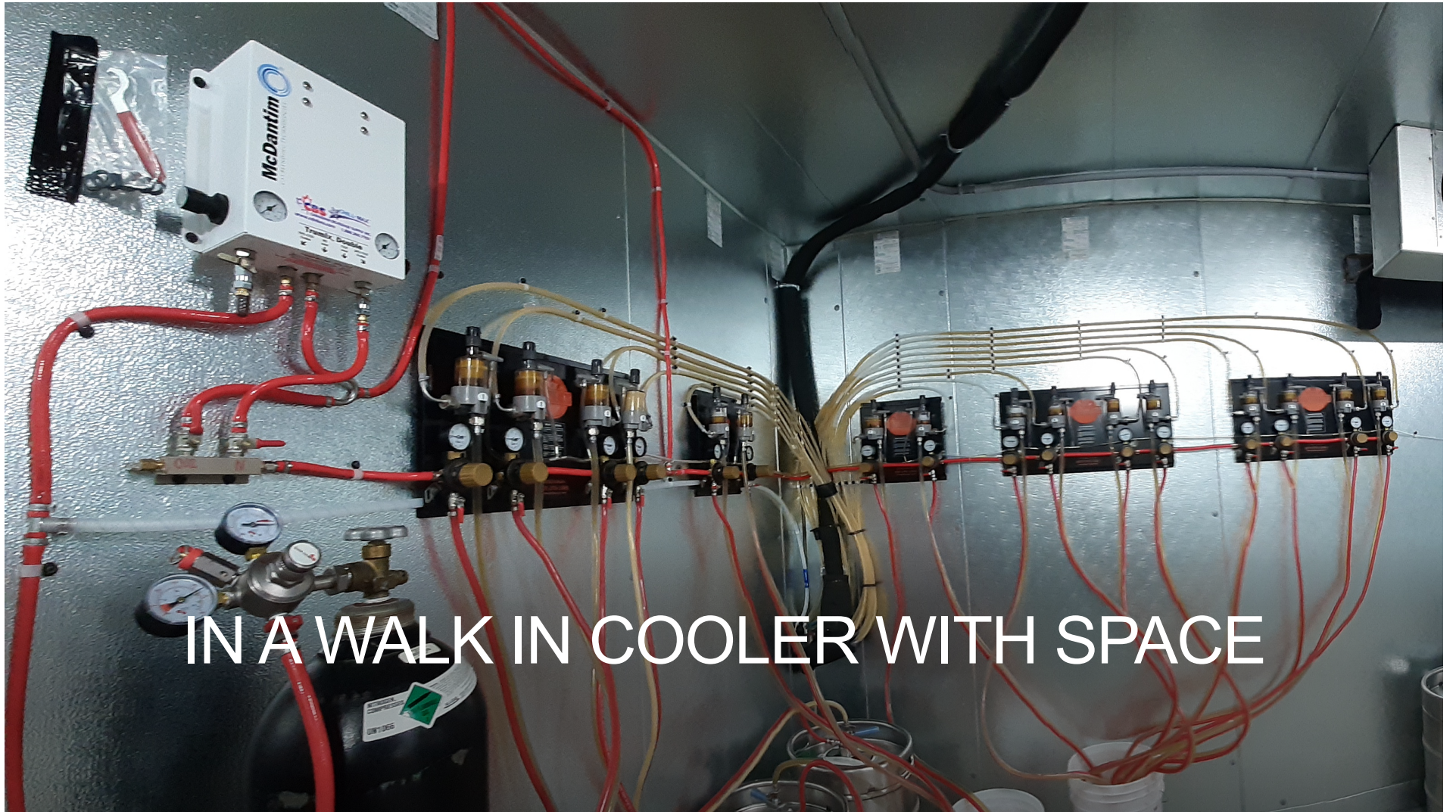
Typical Long Draw System



- | | |
|---------------------------|-----------------------------|
| A. Glycol Cooling Unit | E. Draft Tower |
| B. Glycol Pump | F. CO ₂ Cylinder |
| C. Insulated Trunk Lines | G. Walk-In Cooler |
| D. Insulated Glycol Lines | H. In-Line Regulator |

Complex Design

- Trunk line.
- Draft Tower.
- Glycol Chiller
- Gas Blender
- Multiple Regulators.



IN A WALK IN COOLER WITH SPACE

Trunk Line

- Insulated beer line with glycol loop.
- O₂ impermeable material with low resistance.
- Difficult installation.





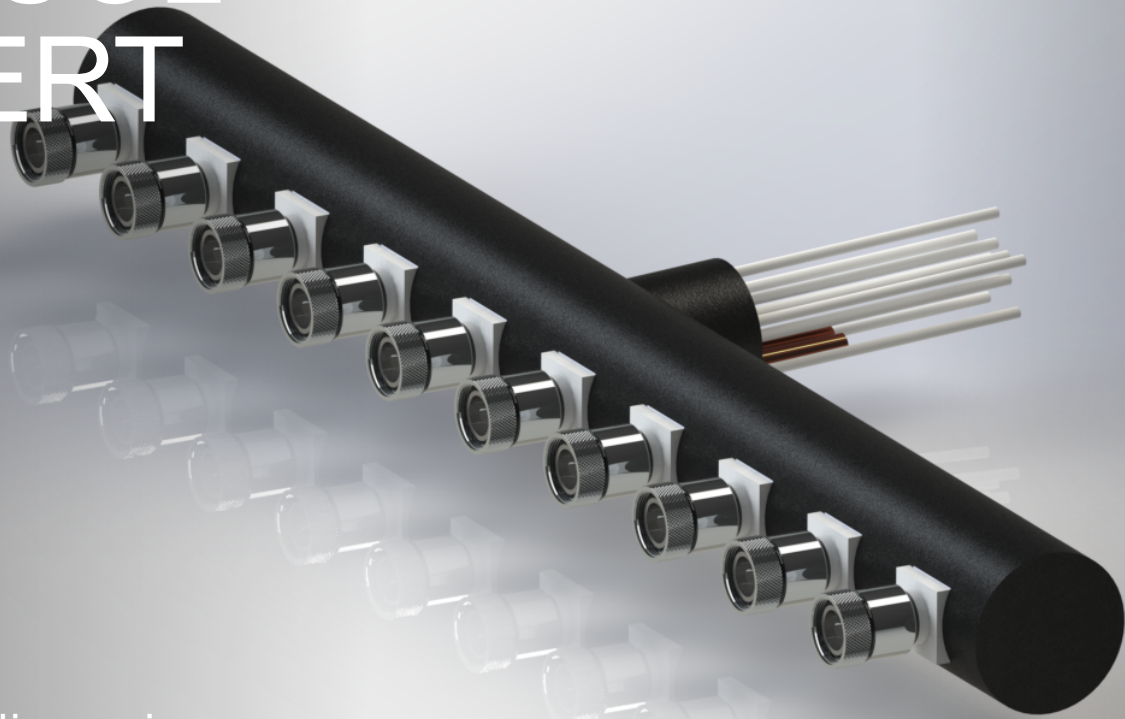
Glycol Draft Tower

Has glycol chilled blocks on the shanks.

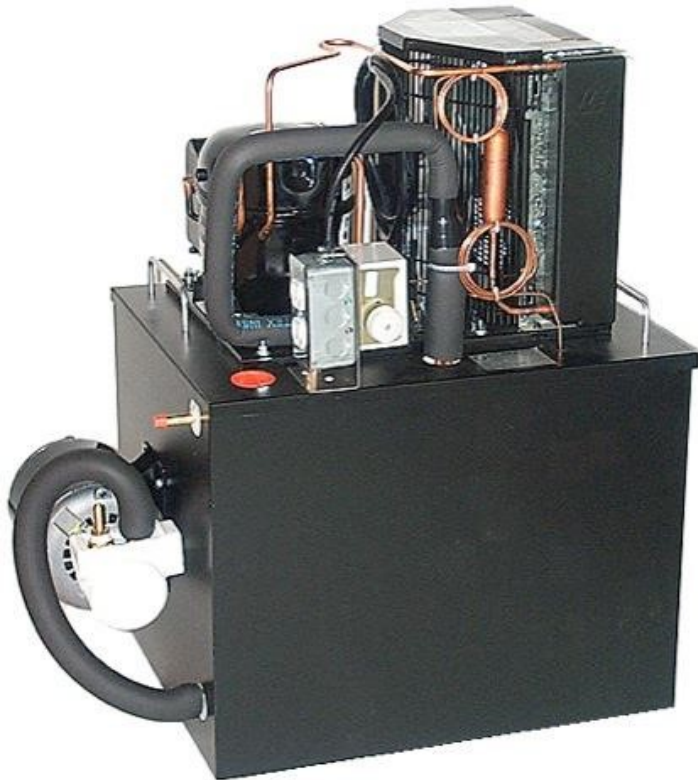
Quality towers are expensive.

Not very DIY friendly; your brother is really not that great of a welder.

GLYCOL INSERT



Standard dimensions.



Glycol Chiller

- Recirculates food grade antifreeze through trunk line at 28 to 34 degrees Fahrenheit (-2.2 to 1.1 Celsius).
- Operates 24/7.
- Requires periodic maintenance.
- Can be a DIY project.

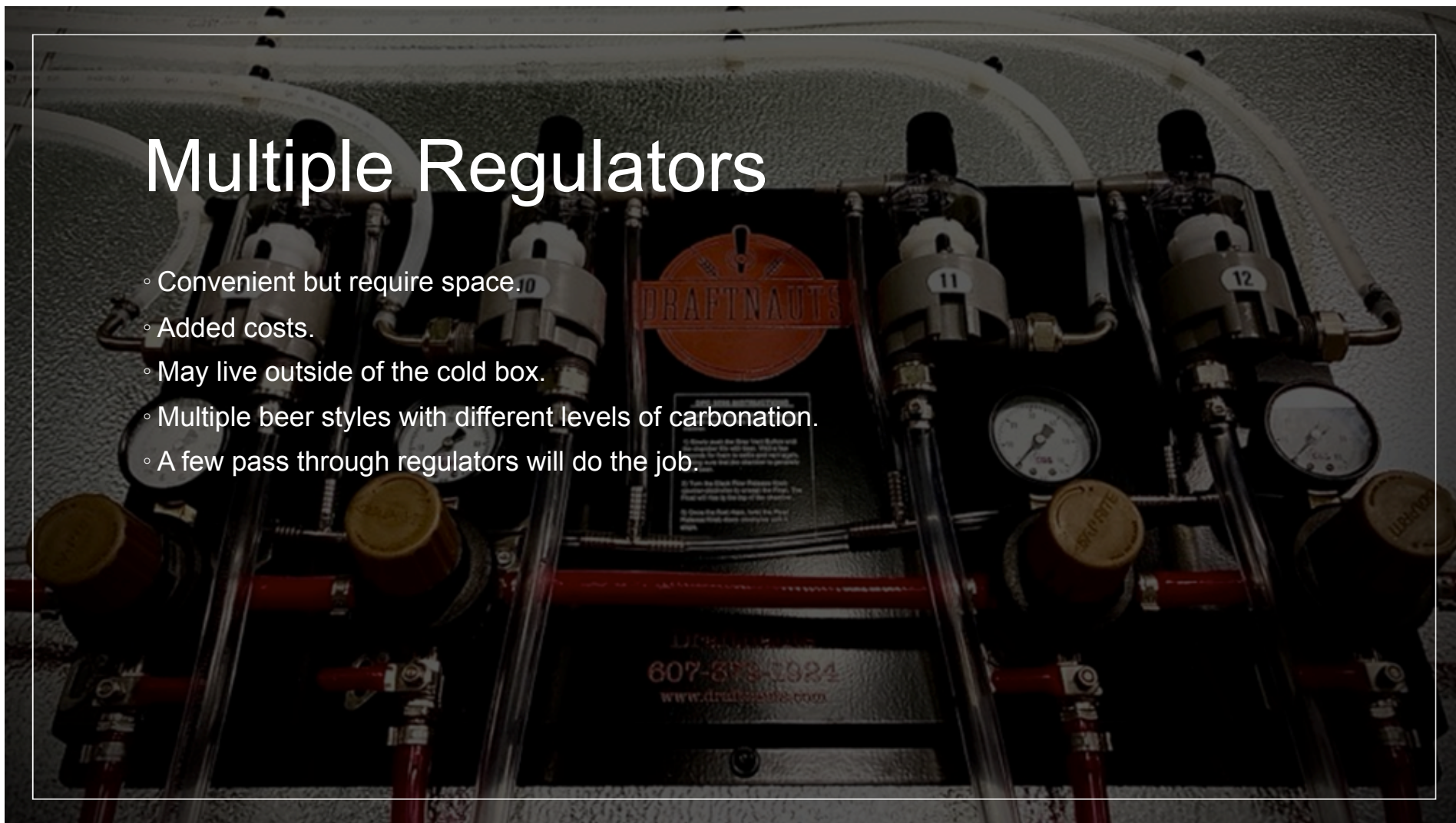
Gas Blender

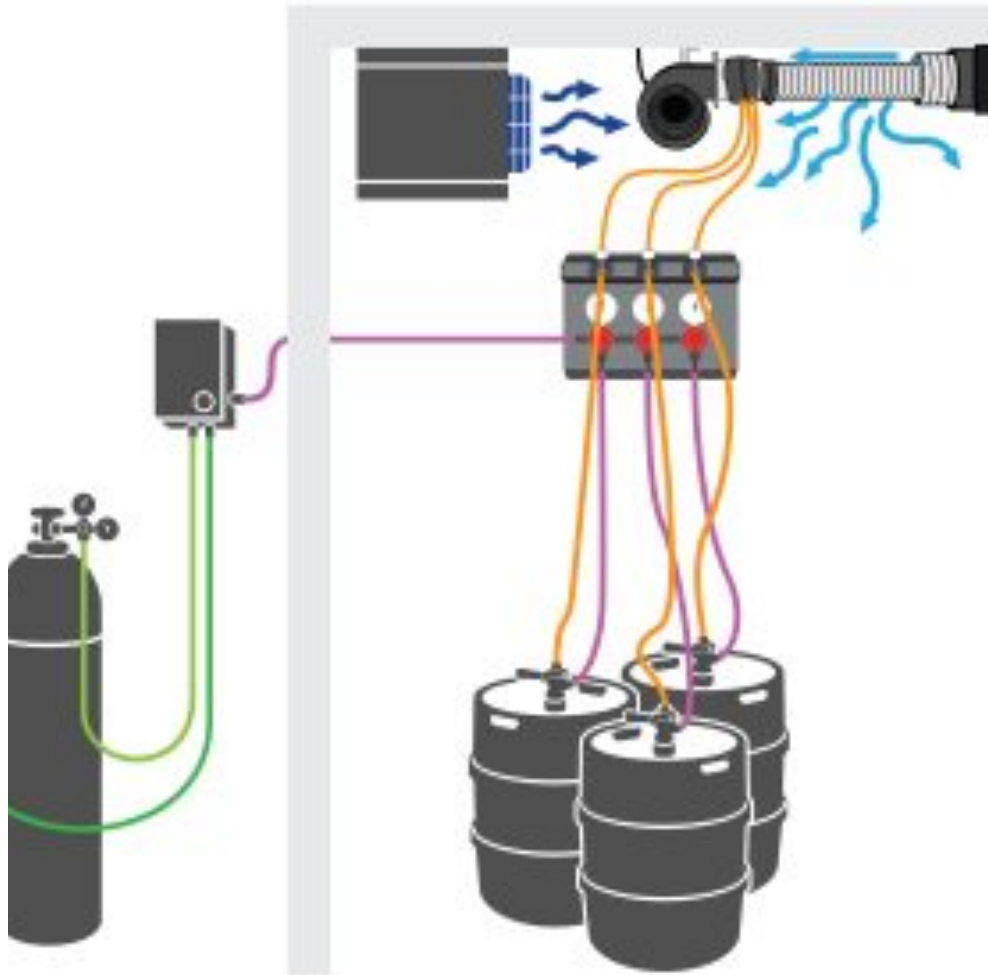
- Expensive, \$600 to \$1,000.
- Not needed for relatively short runs without more than about 15 feet of elevation lift (4.6 meters).
- Not a DIY.
- Multi blends, including 75%N/25%CO₂ available.



Multiple Regulators

- Convenient but require space.
- Added costs.
- May live outside of the cold box.
- Multiple beer styles with different levels of carbonation.
- A few pass through regulators will do the job.





Air Cooled

- Design limitations to a few feet.
- Not significantly cheaper than glycol chilled.
- Easier to design and install than glycol.
- Acceptable for a few feet.



THE ADDED PARTS

Blower, shaft and shaft insulation.

SHAFT LAYOUT

One out and one back is better than one shaft inside a larger return shaft which is better than one shaft with no return.



Blower/Fan

- Operate 24/7.
- Can be noisy.
- Limit cfm (cubic feet per minute) to 100 or less (2.8 cubic meters).
- An inline fan will work.
- “Grow house fans” are on Amazon
- Squirrel Cage fans are bulky.



HAPPY HOUR

Q and A

Bill Jablonski
and Corey
Brown are
Draftnauts
LLC

Ithaca, NY

◦ Bill@Draftnauts.com

Thanks for participating
today.

