

From Flat to Foam

The Joys and Terrors of Draft
Beer at Home

Ray Daniels





Draft System Anatomy



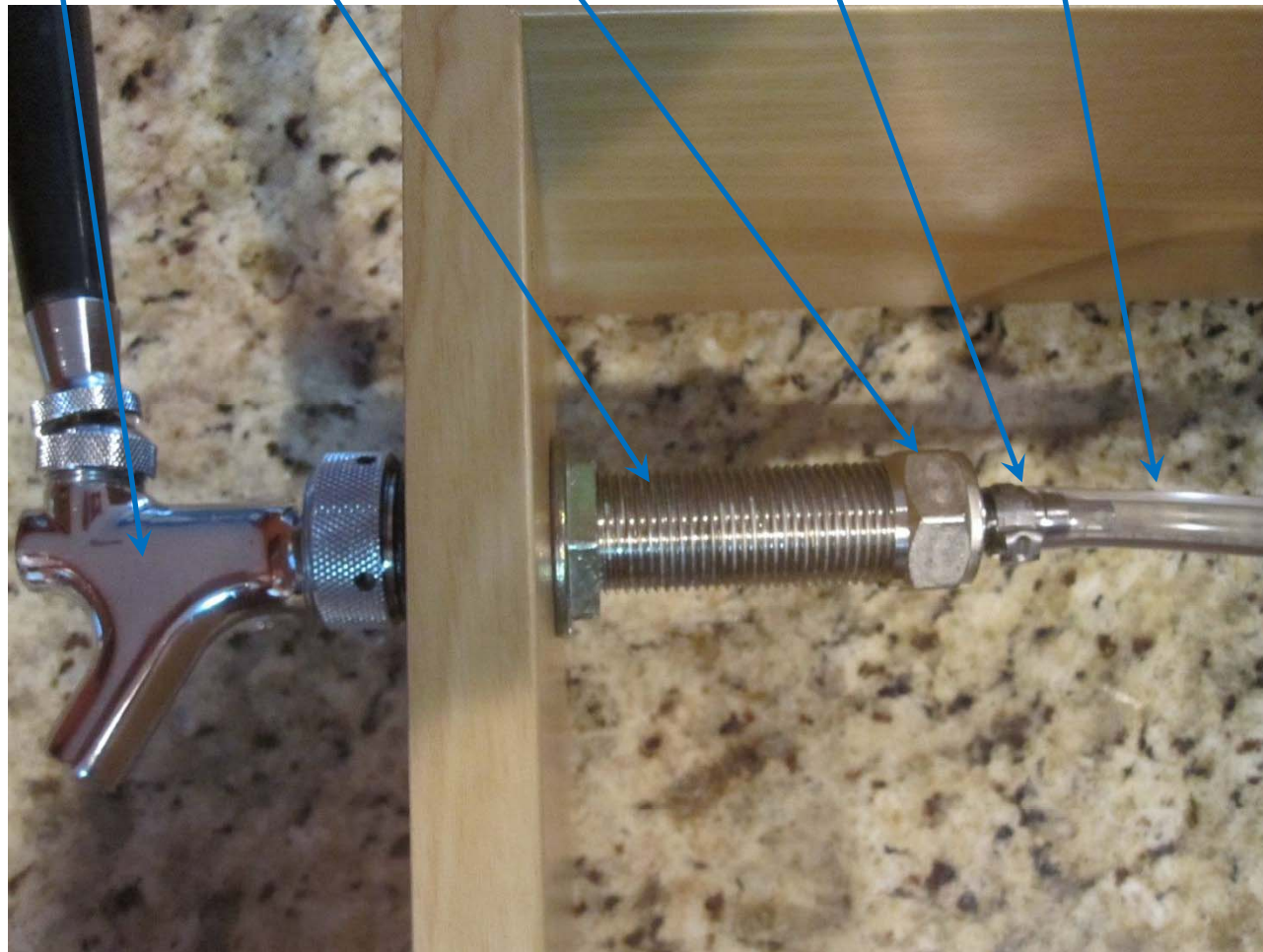
Draft System Anatomy

Faucet

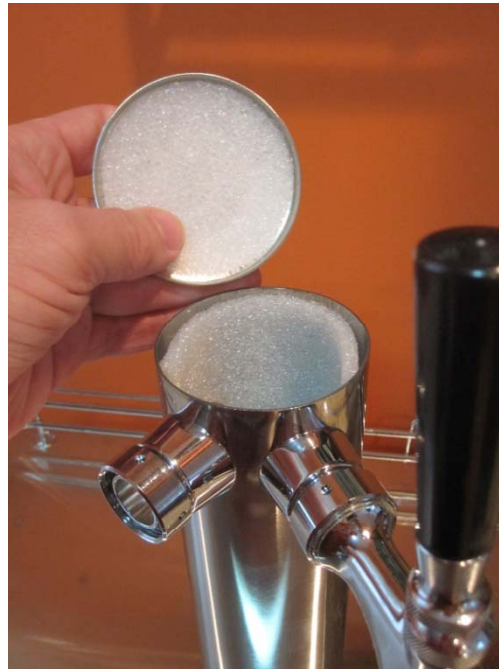


Draft System Anatomy

Faucet ► Shank ► Shank Nut ► Hose barb ► Hose



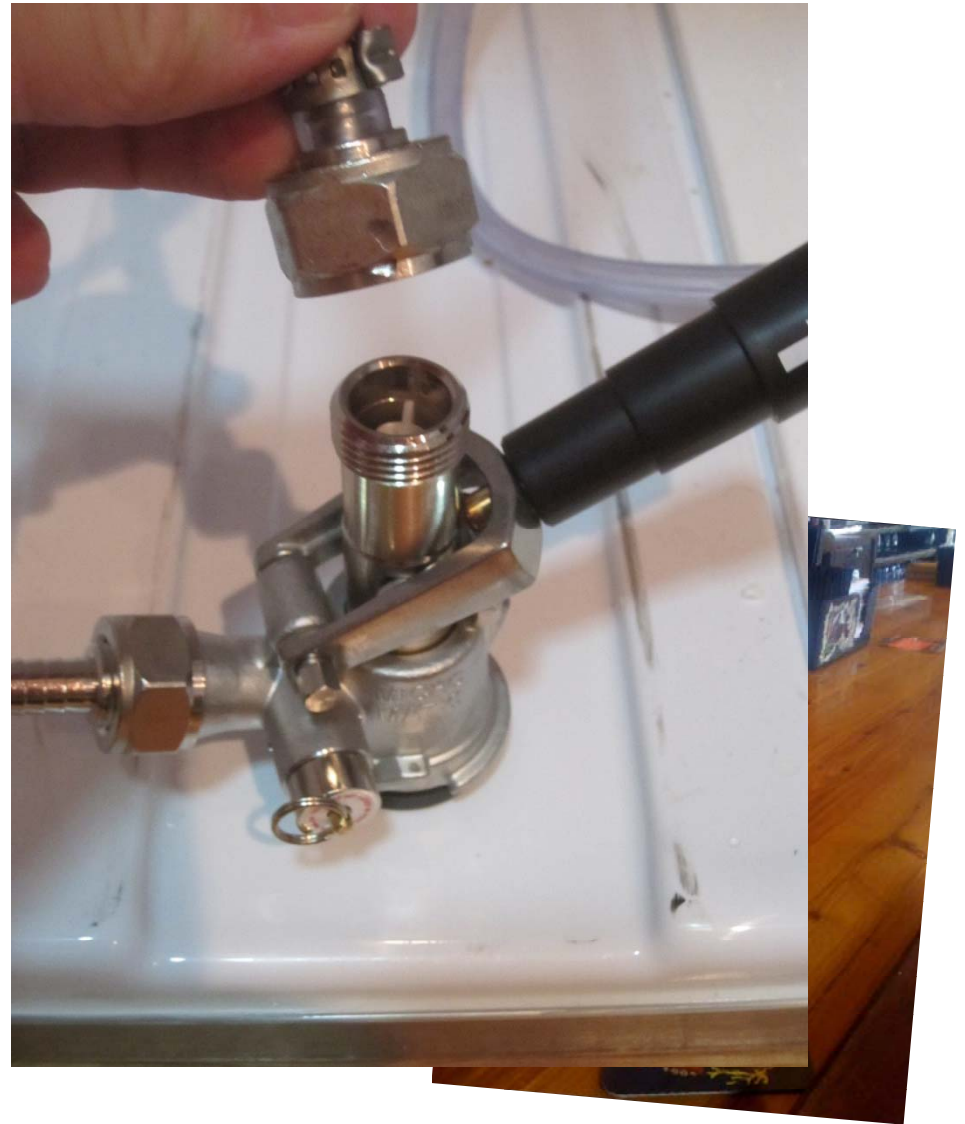
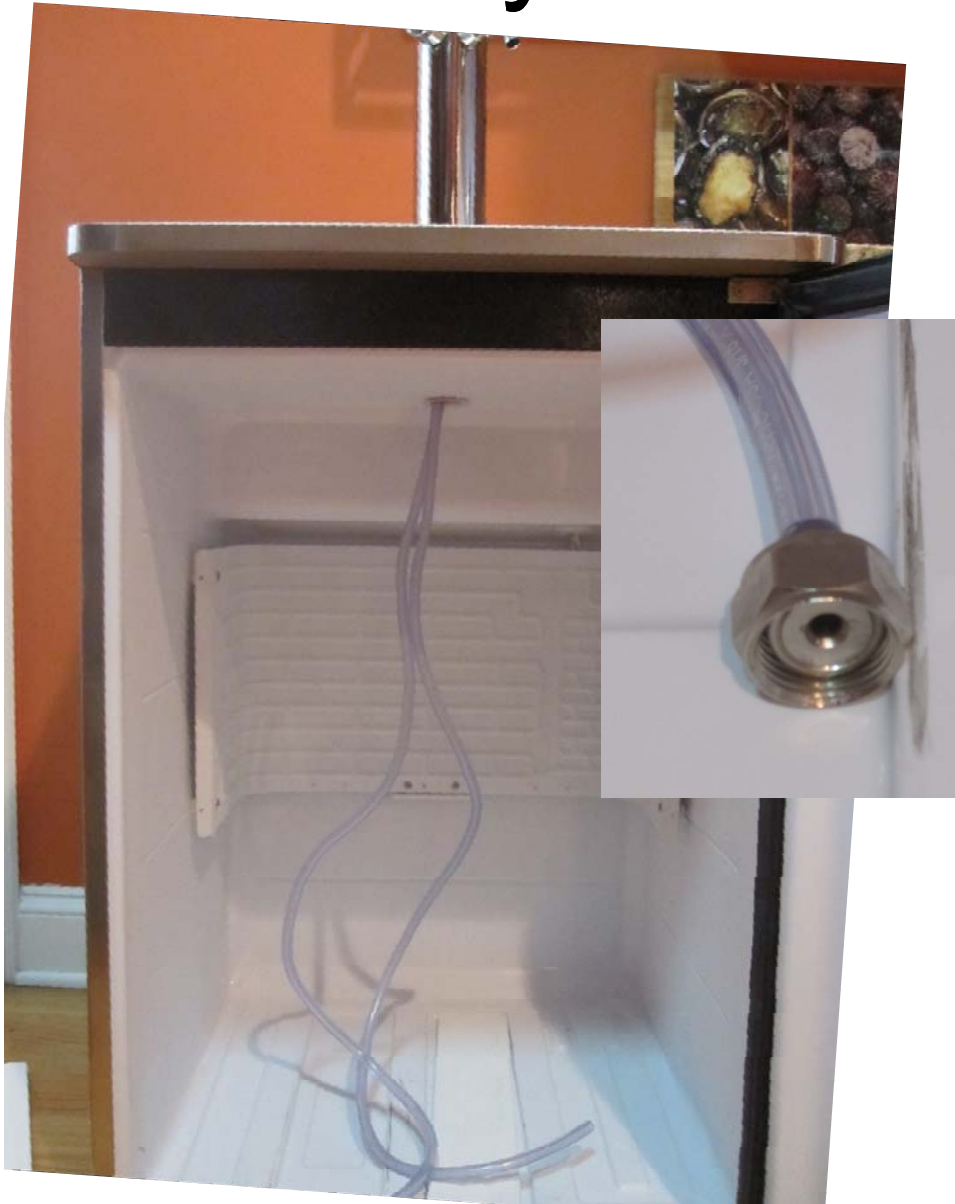
Draft System Anatomy



Draft System Anatomy



Draft System Anatomy





Pouring Draft Beer

Goals:

- Beer Flow of 2 oz/second, ~ 1 gal/minute
- Proper carbonation & head
- Without foaming or waste!



Pouring Draft Beer

Beer from the faucet

Should look like

Beer from a bottle!



Pouring Perfect Draft



Draught System Operation

ABCs of Draft Success:

- **A**ccurate Carbonation
- **B**alanced System
- **C**lean Glassware
- **D**ispense Technique
- **E**ffective Cleaning



Accurate Carbonation

- Chill beer for 24-hours
- Check temp: glass in fridge
- Read the chart ...



Accurate Carbonation

Table 1. Determination of CO₂ application pressure given volumes of CO₂ and temperature

Vol. CO₂	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
Temp. °F	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI	PSI
33	5.0	6.0	6.9	7.9	8.8	9.8	10.7	11.7	12.6	13.6	14.5
34	5.2	6.2	7.2	8.1	9.1	10.1	11.1	12.0	13.0	14.0	15.0
35	5.6	6.6	7.6	8.6	9.7	10.7	11.7	12.7	13.7	14.8	15.8
36	6.1	7.1	8.2	9.2	10.2	11.3	12.3	13.4	14.4	15.5	16.5
37	6.6	7.6	8.7	9.8	10.8	11.9	12.9	14.0	15.1	16.1	17.2
38	7.0	8.1	9.2	10.3	11.3	12.4	13.5	14.5	15.6	16.7	17.8
39	7.6	8.7	9.8	10.8	11.9	13.0	14.1	15.2	16.3	17.4	18.5
40	8.0	9.1	10.2	11.3	12.4	13.5	14.6	15.7	16.8	17.9	19.0
41	8.3	9.4	10.6	11.7	12.8	13.9	15.1	16.2	17.3	18.4	19.5
42	8.8	9.9	11.0	12.2	13.3	14.4	15.6	16.7	17.8	19.0	20.1

•Chart assumes sea- level altitudes. Add 1psi for every 2,000ft. above sea level.

Accurate Carbonation

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36	6.1	7.1	8.2	9.2	10.2	11.3	12.3	13.4	14.4	15.5	16.5
37	6.6	7.6	8.7	9.8	10.8	11.9	12.9	14.0	15.1	16.1	17.2
38	7.0	8.1	9.2	10.3	11.3	12.4	13.5	14.5	15.6	16.7	17.8
39	7.6	8.7	9.8	10.8	11.9	13.0	14.1	15.2	16.3	17.4	18.5
40	8.0	9.1	10.2	11.3	12.4	13.5	14.6	15.7	16.8	17.9	19.0
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Accurate Carbonation

- Apply CO₂ to downtube
- Shake, Rattle, Roll ...
 - Or just be patient!

Result:

- Beer carbonated to a known level in volumes of CO₂



Accurate Carbonation

Finally:

- Maintain carbonation level throughout dispense.

- How?

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Balanced System

- **System Balance**

What happens when a draught system is out of balance?

The beer foams!

- Over pressure & under pressure give same results!



Balanced System

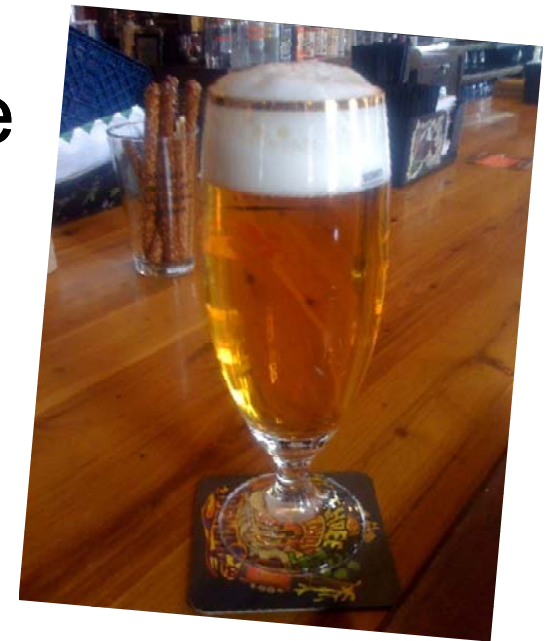
Resistance = Applied Pressure
(at a specific temperature)



Draught System Operation

Resistance = Applied Pressure
(at a specific temperature)

- **Applied pressure = Gas pressure**



Draught System Operation

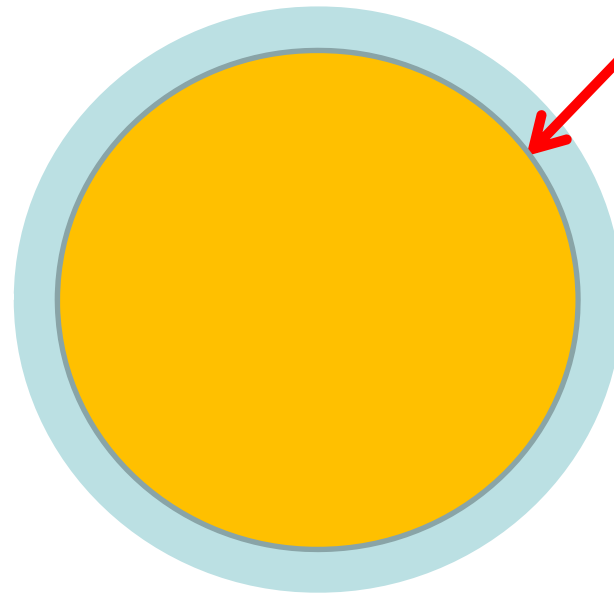
Resistance = **Applied Pressure**
(at a specific temperature)

- Resistance
 - Beer Lines
 - Elevation Change (uphill)



Balanced System

When liquid flows through a tube ...



Friction at surface slows the beer.

This friction is known as resistance.



Balanced System

How Much Resistance in Beer Lines?

Type	size (id)	resistance (psi/ft)
Vinyl	3/16"	3.00
Vinyl	1/4"	0.85
Polyethylene	3/16"	2.20
Polyethylene	1/4"	0.50



Draught System Operation

Resistance = Applied Pressure
(at a specific temperature)

- Resistance
 - Beer Lines
 - Elevation Change (uphill)



Balanced System

- **What pressure should be applied to your keg?**
- **The pressure needed to MAINTAIN the carbonation level!**



Draught System Operation

- Direct Draw System
 - 12-15 psi needed to maintain carbonation
 - 4-5 feet of 3/16" i.d. vinyl tubing (3# / ft)



Draught System Operation

- **3/16” vinyl tubing**
 - 3 lb / ft resistance
 - For 12 psi system
 - $12/3 = 4$ feet of hose
- **1/4” vinyl tubing**
 - 0.85 lb / ft resistance
 - For 12 psi system
 - $12/0.85 = 14$ feet of hose



Draught System Operation

Toss Out!

- Beer hose greater than 3/16" internal diameter!
- Tell your homebrew store to buy the right stuff!



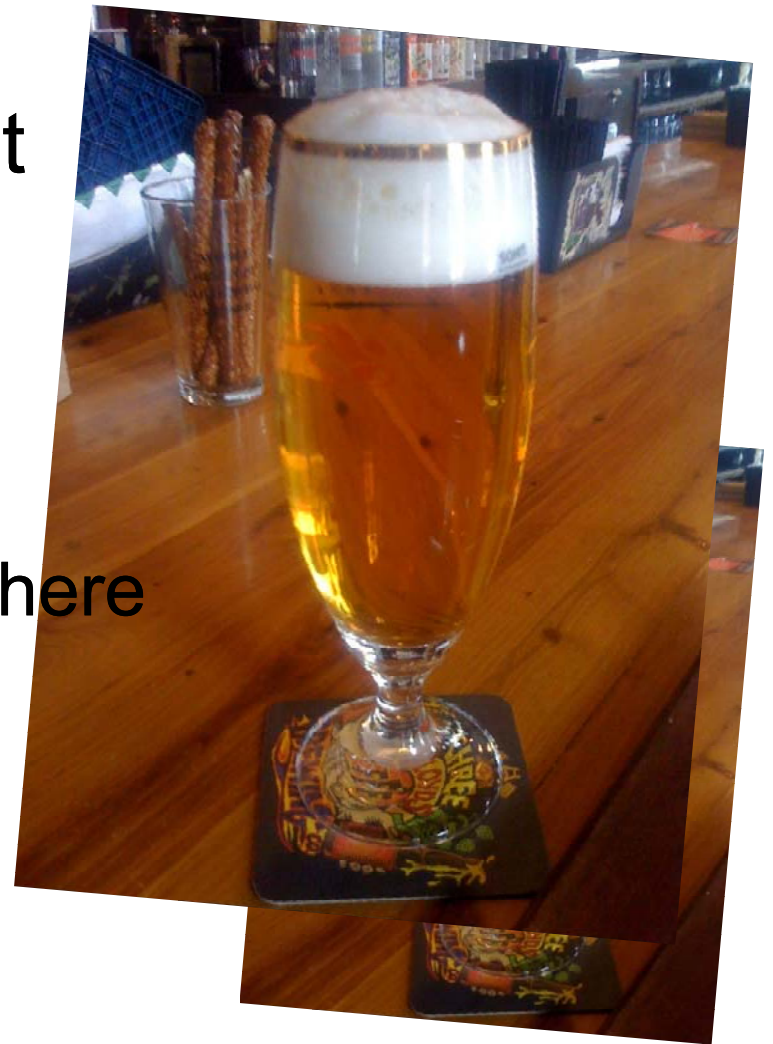
Beer Clean Glass

- Beer Clean: free of residue
- No bubbles cling to sides!
- Non-petroleum-based detergent
- Don't wash beer glasses with your regular dishes!



Beer Clean Glass

- Testing for Beer Clean
- Water sheets off, does not spot
- Salt test:
 - Wet and shake
 - Salt should adhere everywhere





Draught System Cleaning

- Frequency
 - Every two weeks with caustic
 - Every eight weeks with acid
- Caustic strength $\geq 2\%$
- Recirculation for 15 mins
- Rinse with Water, not Beer
- Manually Clean Faucets, Couplers, FOBs



Draught System Cleaning

- Homebrew Systems
 - After every use?
 - At the end of every keg, at least!
 - Caustic is good
 - Take stuff apart!
 - Replace hose when it stops looking brand new!



Resources

- Micromatic
 - Website (micromatic.com)
 - Classes (\$)
- Brewers Association (soon)
 - PDF/Web



CICERONE™

CERTIFICATION PROGRAM

The logo for the Cicerone Certification Program. It features the word "CICERONE" in a large, black, serif font. The letter "O" is replaced by a detailed illustration of a hand holding a beer glass filled with beer. Below "CICERONE" are the words "CERTIFICATION" and "PROGRAM" in a smaller, black, serif font, separated by the hand-and-glass illustration.

- Five Areas of Knowledge
 - Beer Storage, Sales and Service
 - Beer Styles and Culture
 - Beer Tasting and Flavors
 - Brewing Ingredients and Processes
 - Pairing Beer with Food



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- Three Levels of Certification
 - Certified Beer Server
 - Certified Cicerone™
 - Master Cicerone™

More at: www.cicerone.org

