CRAFT BREWERS CONFERENCE

& BrewExpo America®

HARDER, BETTER, FASTER, STRONGER

DRAUGHT BEER QUALITY MANUAL V.4 UPDATES

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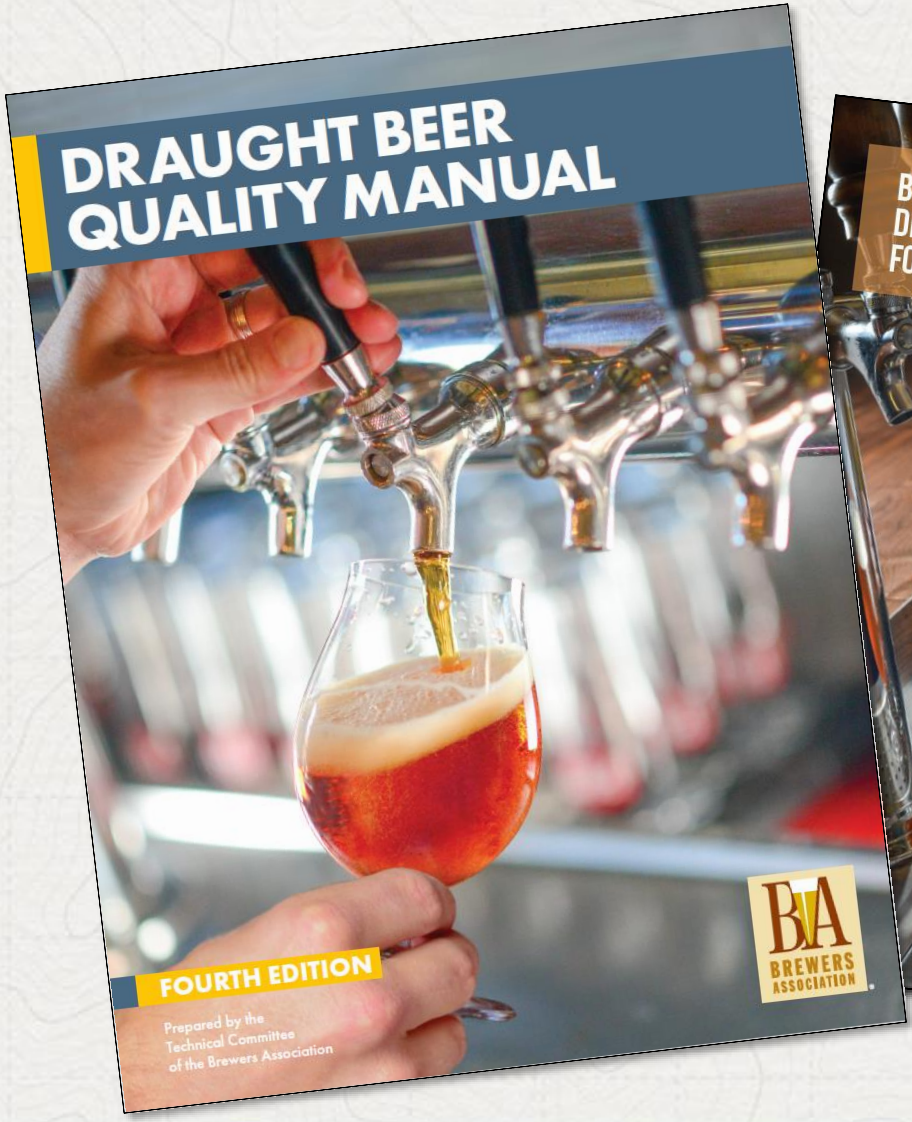

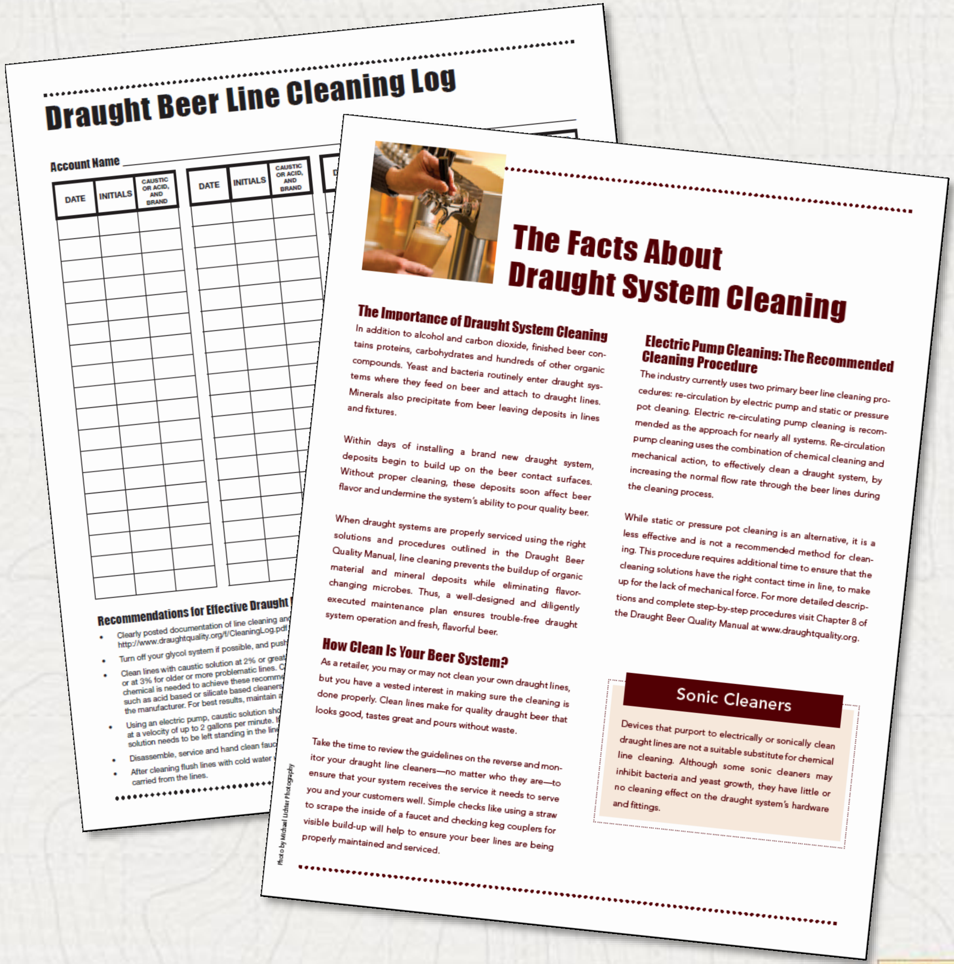

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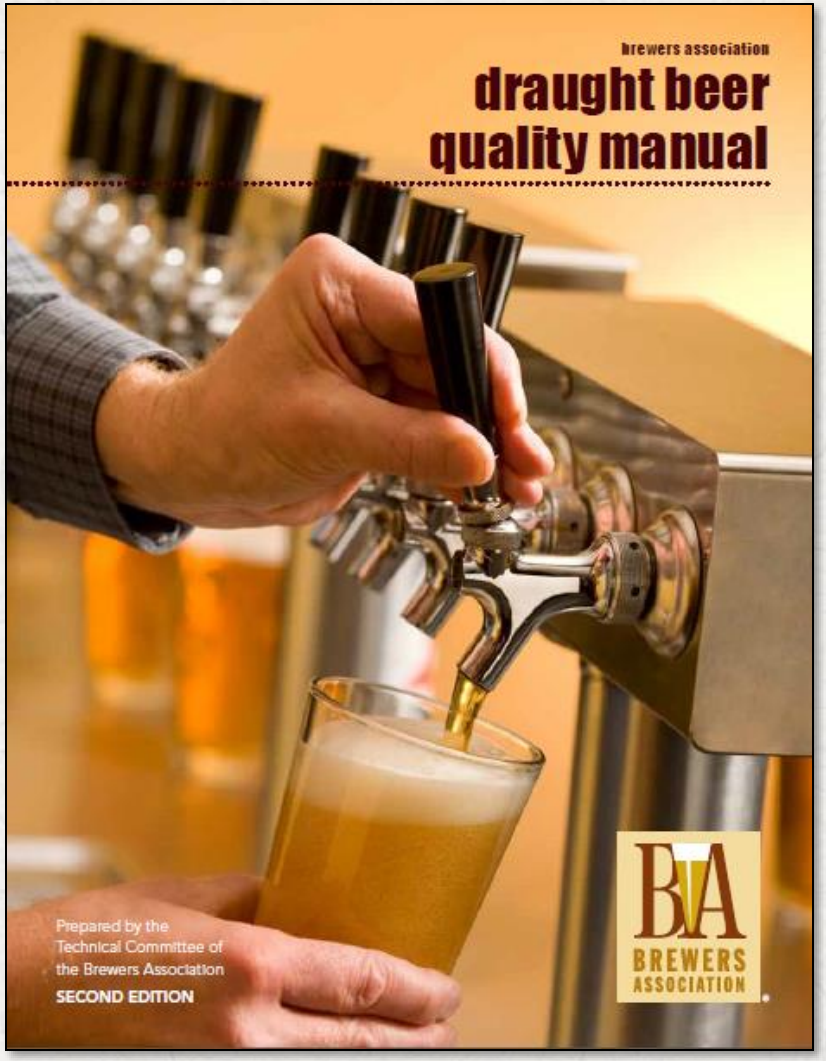


- **Consistent language and terminology (e.g. coupler, Sankey, tapping device, tap head, etc.)**
- **Additional images and diagrams**
- **Safety: With version 3 we added safety call-outs through-out the manual**
- **In version 4 more safety additions were added**
  - Single-use kegs
  - CO2 monitors
- **Overall: More content!**
  - v1: 56, v2: 80, v3: 87, v4: 107

BREWERS ASSOCIATION

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

Chapter 1 & 2

Speaks to ESSENTIAL & TEMPORARY (components)

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

SINGLE-USE KEGS

A fast growing segment in keg technology is the single-use keg. Single-use kegs should not be reused, for beer or any other purpose. They should be depressurized and disposed of correctly after being emptied. There are many types of single-use kegs available on the market, and some require specialized filling and/or tapping couplers that may require specific training to use.

To prevent keg rupture, use a pressure regulator and properly sized relief device with the pressure source to which the keg is connected. Filling and dispensing systems should be set and checked regularly to maintain a pressure lower than the weakest component. Single-use kegs should never be cleaned using any keg cleaning equipment. The pressures, chemicals, and temperatures used for keg cleaning may compromise the structural integrity of a single-use keg.

Figure 1.4. Examples of single-use keg configurations.

Addition of Single-Use Kegs

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS


DRAUGHT BEER QUALITY MANUAL

FOURTH

1

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

As a prelude to studying different draught system designs, let's review the equipment commonly found in all draught dispensing setups, from the backyard hand pump to the ballpark beer vendor. Here we cover nine components:

- Refrigeration/Cooling
- Kegs
- Couplers
- Tail Pieces and Connectors
- Beer Lines
- Faucets
- Gas Source
- Gas Lines
- Regulators

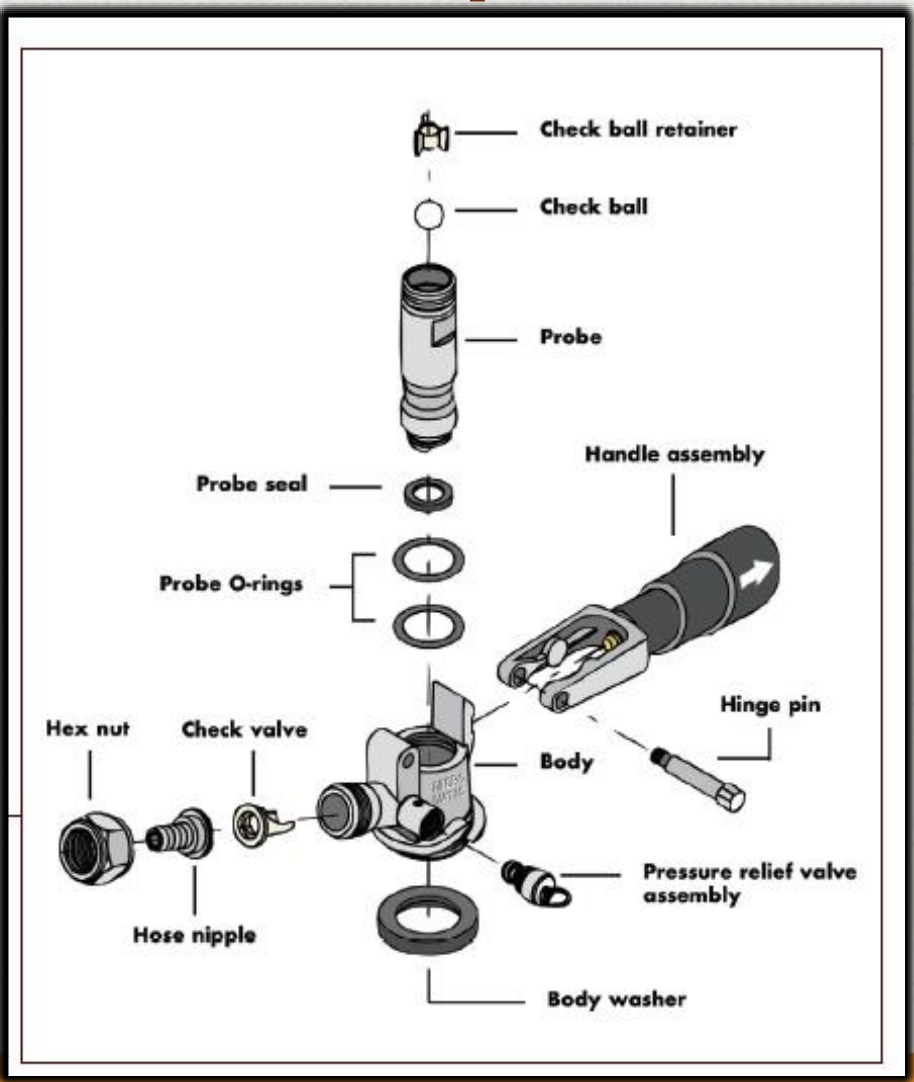
REFRIGERATION/COOLING

Dispensing beer in a consistent and controlled manner requires that the beer traveling from keg to glass be maintained between 34°F and 38°F. While temporary systems may employ ice for cooling, most permanent installations employ refrigeration systems.

Cold box refrigeration systems can provide cooling for a small **direct-draw** box cooler or a large walk-in. The refrigeration itself can either be self-contained, with the compressor and condenser mounted on the unit, or use a remotely mounted compressor and condenser. Remotely mounting the compressor can benefit the installation by removing the source of heat from inside a room or building;

5

"Blew Out" Coupler



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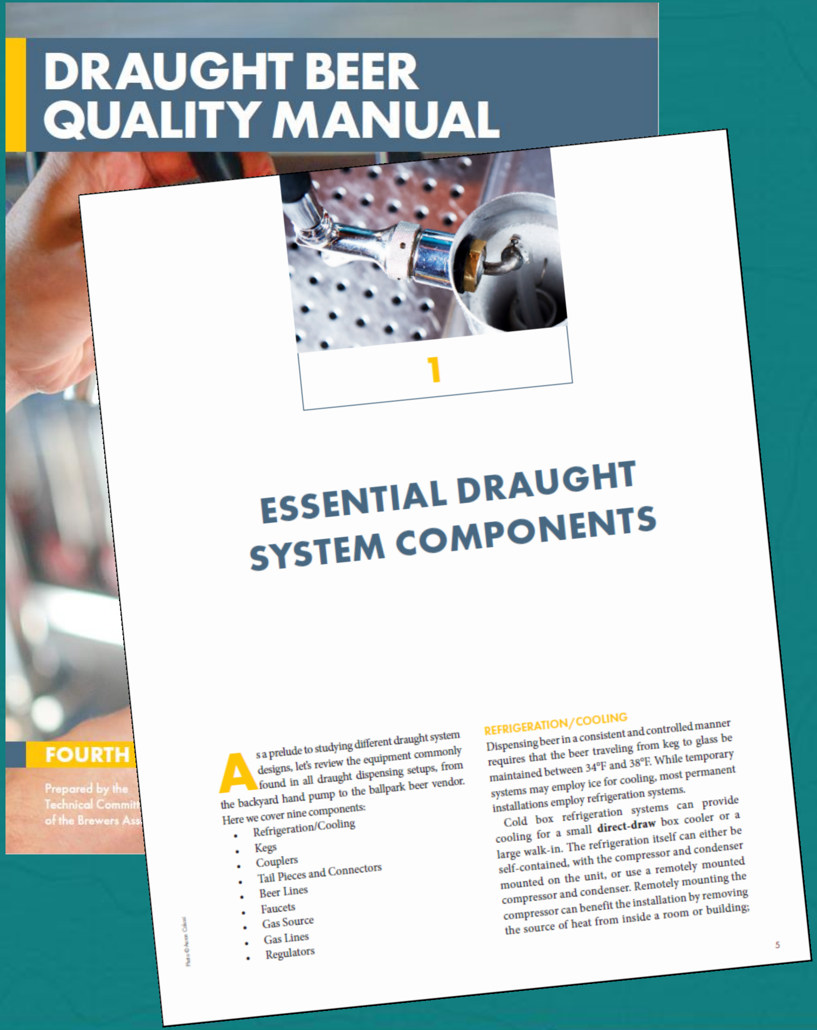
SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS



DRAUGHT BEER QUALITY MANUAL

FOURTH

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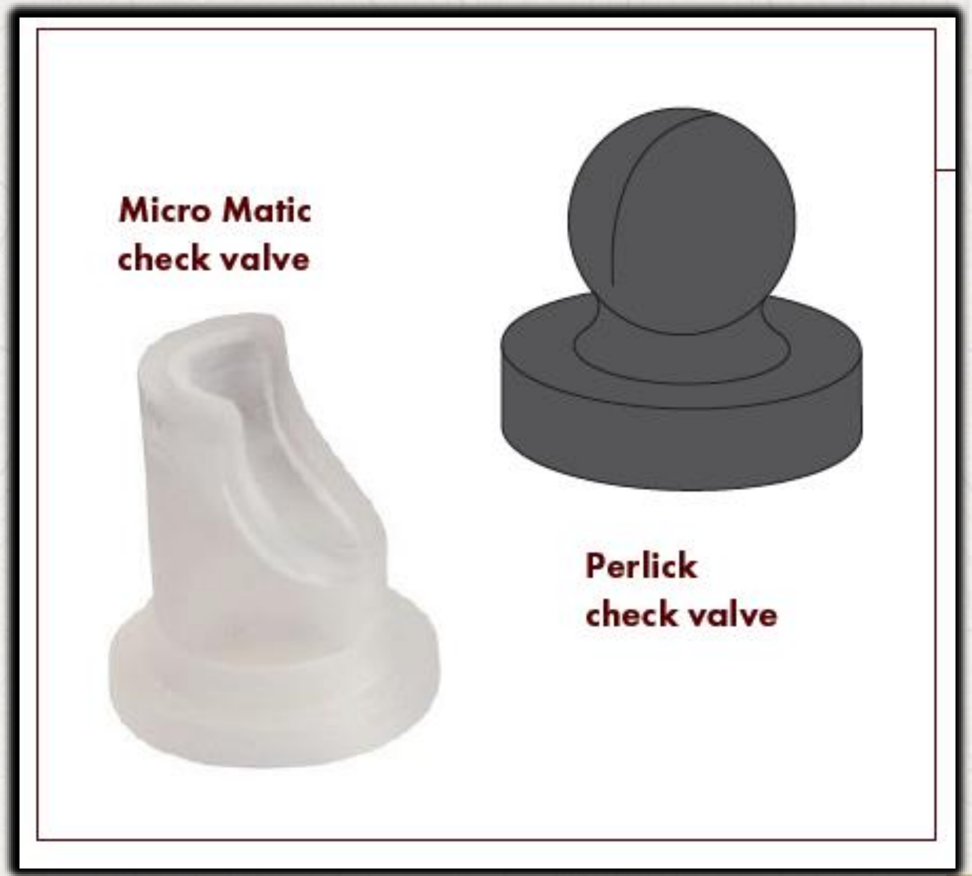
Added check valve image



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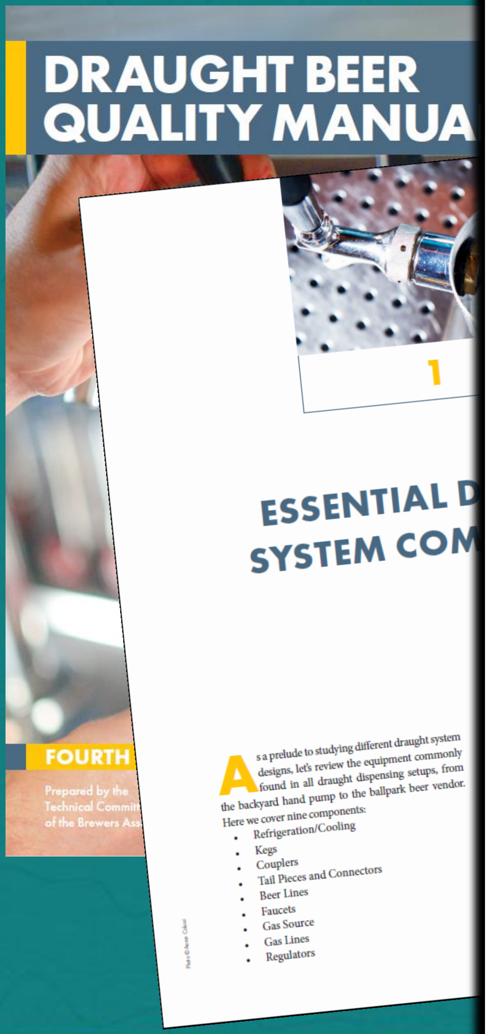
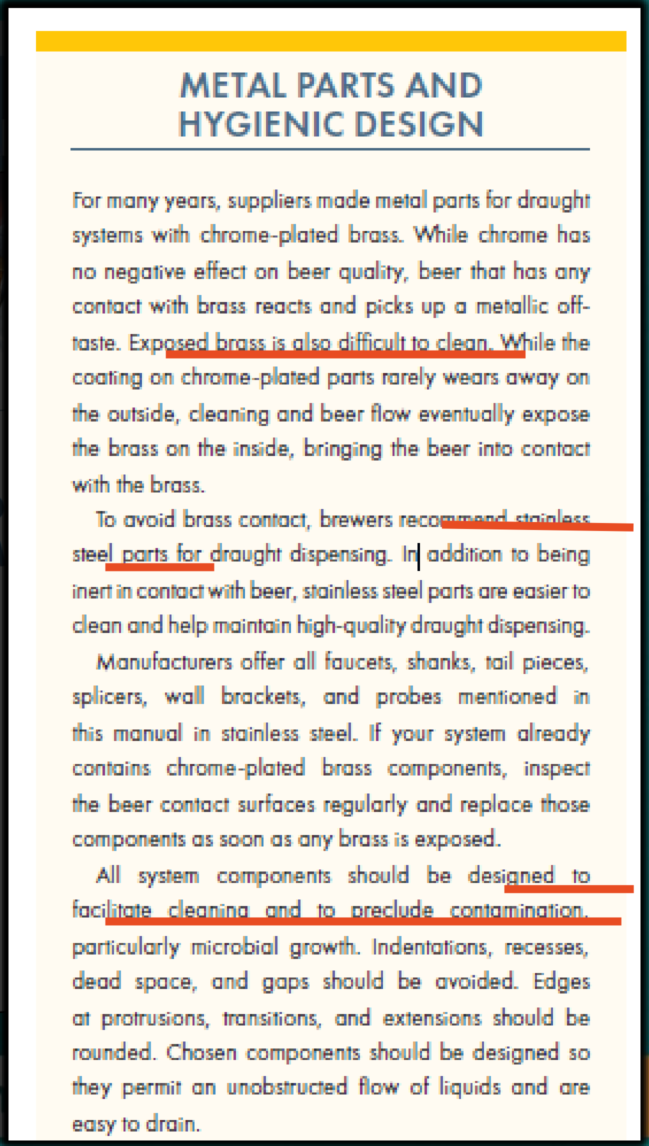
SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS





METAL PARTS AND HYGIENIC DESIGN

For many years, suppliers made metal parts for draught systems with chrome-plated brass. While chrome has no negative effect on beer quality, beer that has any contact with brass reacts and picks up a metallic off-taste. Exposed brass is also difficult to clean. While the coating on chrome-plated parts rarely wears away on the outside, cleaning and beer flow eventually expose the brass on the inside, bringing the beer into contact with the brass.

To avoid brass contact, brewers recommend stainless steel parts for draught dispensing. In addition to being inert in contact with beer, stainless steel parts are easier to clean and help maintain high-quality draught dispensing.

Manufacturers offer all faucets, shanks, tail pieces, splicers, wall brackets, and probes mentioned in this manual in stainless steel. If your system already contains chrome-plated brass components, inspect the beer contact surfaces regularly and replace those components as soon as any brass is exposed.

All system components should be designed to facilitate cleaning and to preclude contamination, particularly microbial growth. Indentations, recesses, dead space, and gaps should be avoided. Edges at protrusions, transitions, and extensions should be rounded. Chosen components should be designed so they permit an unobstructed flow of liquids and are easy to drain.

Added section:

Metal Parts and Hygienic Design

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SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

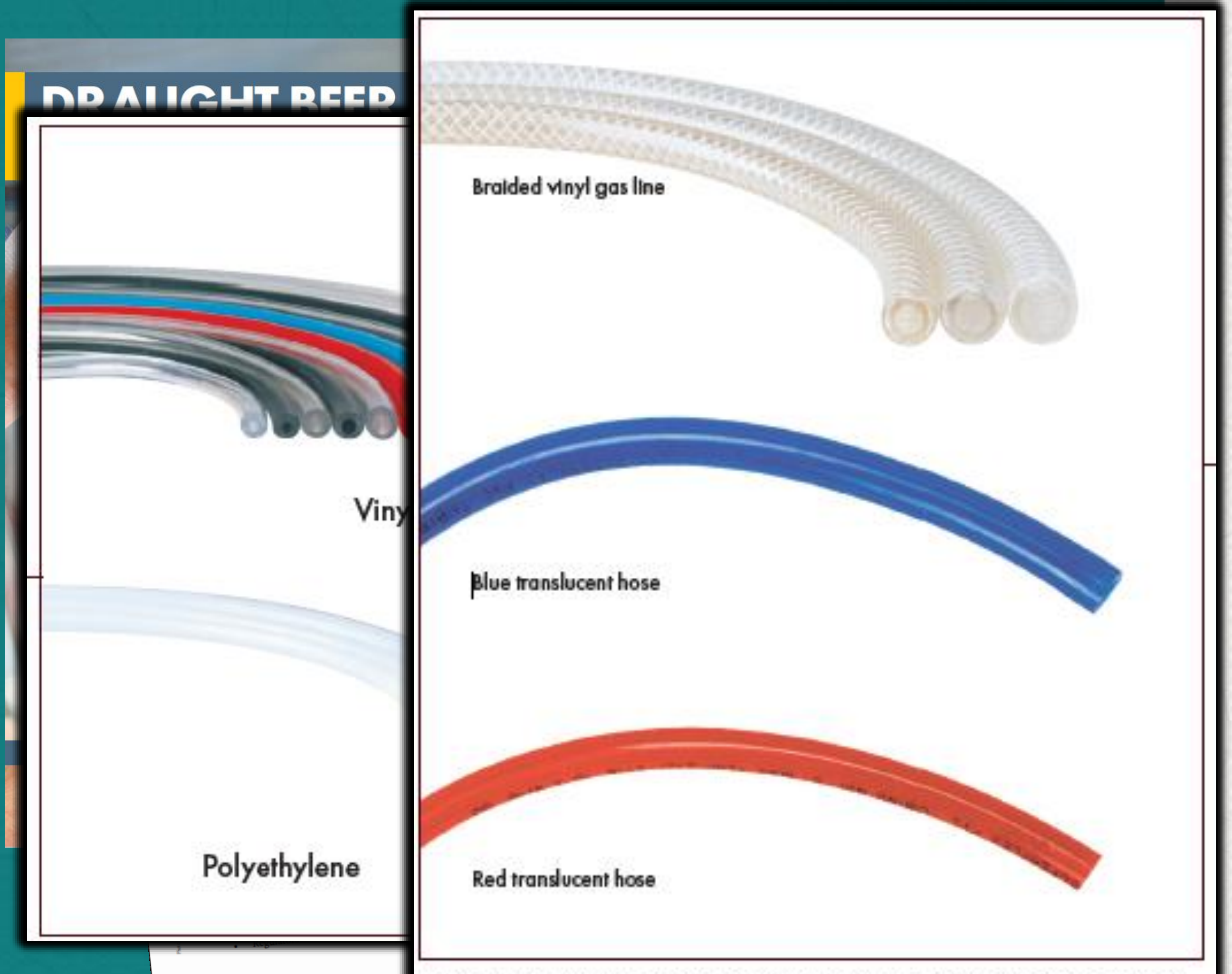


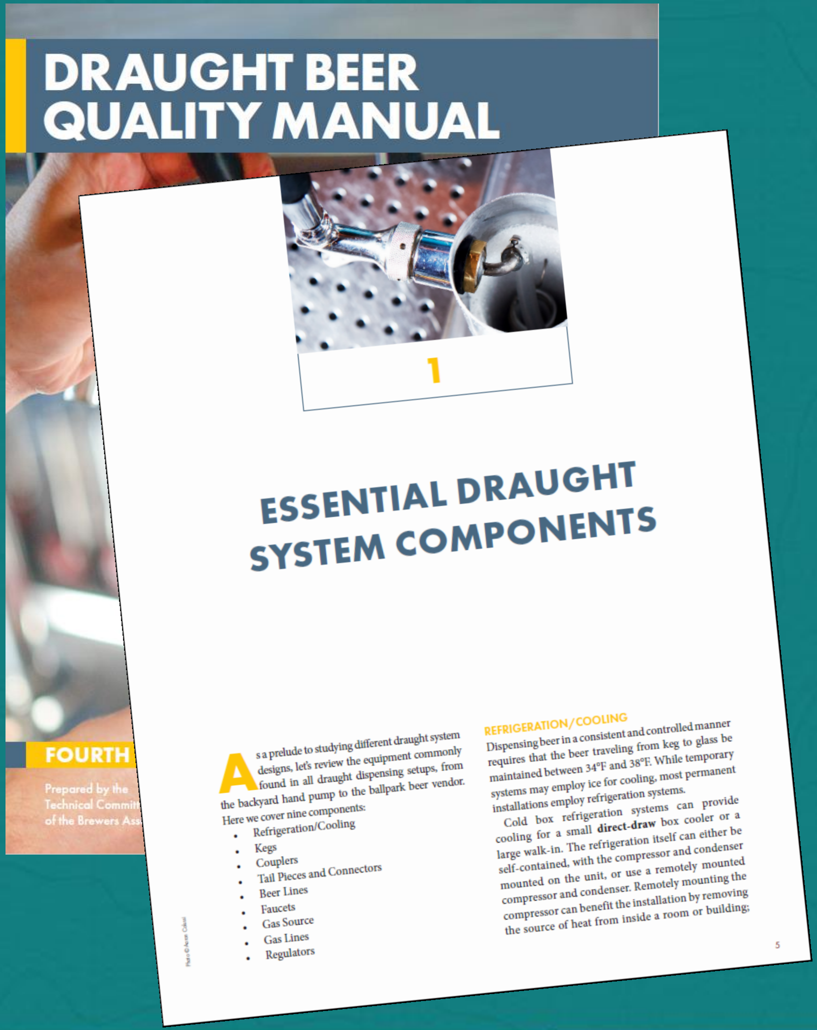
Figure 1.19. Examples of tubing used for gas lines. Red translucent hose is used for CO_2 and blue translucent hoses run N_2. However, best practice is to use translucent line so any growth can be seen with visual inspection of the gas line.

Moved Stainless steel to Beer Line Section

Expanded Gas line discussion

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS



Added nitro faucet blow out

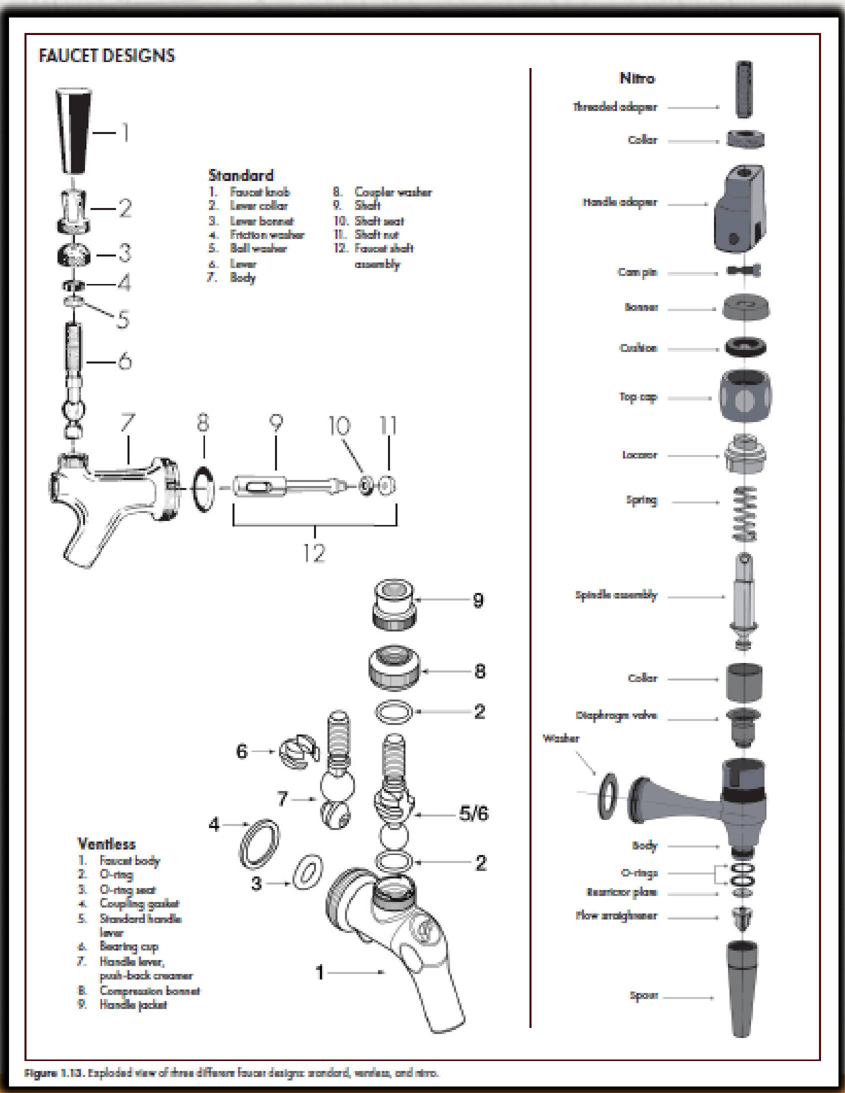


Figure 1.13. Exploded view of three different faucet designs: standard, ventless, and nitro.

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SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

Moved and expanded images on Shanks

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

Gas Filters

Beverage grade CO_2 comes from many commercial
and industrial opera
uses besides bever
welding, food proce
contaminated by p
can be contaminate
valve malfunctions
back into an empty
helps reduce the li
in the gas reach th
periodically per the
sure to follow man
filter maintenance.

Gas Leak Detectors

Gas leaks in a draught system not only cost money in lost gas, but may also cause pressure drops that can lead to foamy beer. In enclosed spaces large CO_2 leaks can be extremely dangerous and even deadly. Gas leak detectors are available that are plumbed directly into the gas supply line to the draught system. When no beer is being poured, a float inside the device will rise if gas is leaking.

Dialog added on:
Gas Filters
Gas Leak Detectors

SECTION 1, CHAPTERS 1 & 2

ESSENTIAL DRAUGHT SYSTEM COMPONENTS

Expanded Regulator section

added “gaugeless regulators”

SECTION 1, CHAPTERS 1 & 2

TEMPORARY DRAUGHT SYSTEM COMPONENTS

Draught beer goes great with outdoor events, but the temporary setting prohibits use of traditional direct-draw or long-draw draught equipment. Instead, we usually use one of two different systems, hand pumps or jockey boxes.

HAND PUMPS

Hand pumps allow draught beer to be dispensed for a one-day occasion or event. These systems compromise accepted standards of draught dispensing in order to offer a simple method for serving draught beer.

In the simplest systems, the beer flows to a simple faucet attached to a short section of vinyl hose (fig. 2.1 *left* and *middle*). Gas pressure comes from compressed air introduced by way of a hand-operated pump integrated into the coupler.

Since these simple systems introduce compressed air into the keg, they are suitable only for situations where the beer will be consumed in a single day. Also, these dispensing systems typically do not produce the best serving results, since balancing the correct top pressure is very imprecise. For best results, the keg must be kept in ice and consistently—but not excessively—pumped as the contents are dispensed. Pumping the keg with the faucet closed will only serve to build up pressure in the head space, encouraging the absorption of oxygen into the beer.

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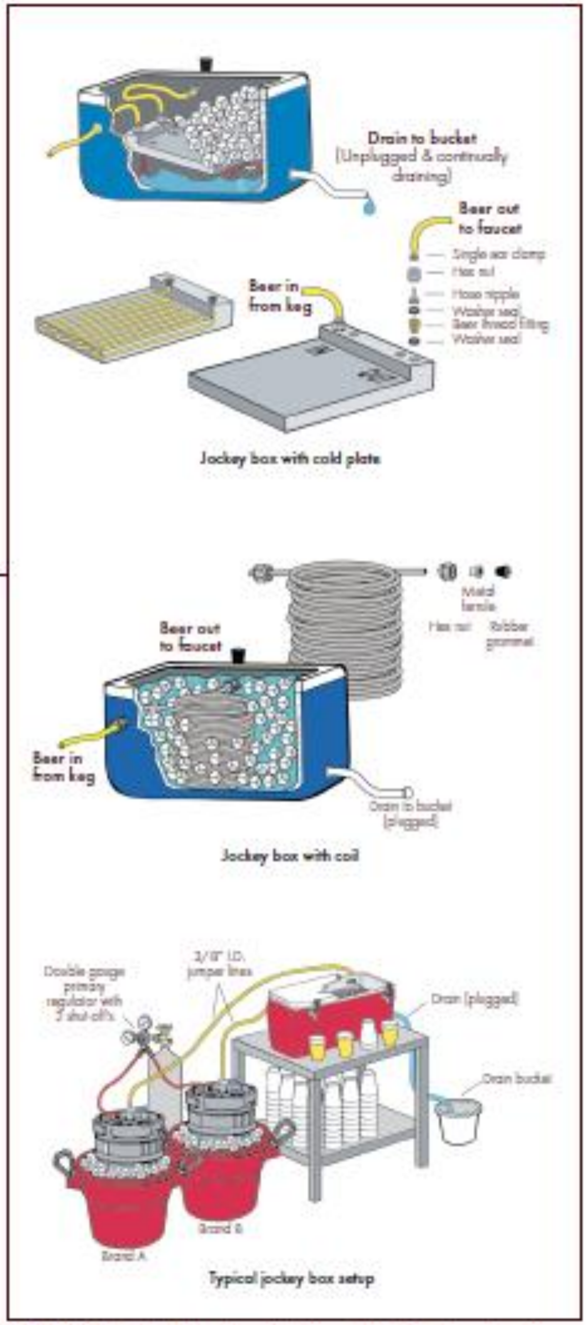


Figure 2.3. Water should be allowed to drain out of the jockey box when using a cold plate. A coil should be submerged in ice water during use.

New graphic on Jockey box operation

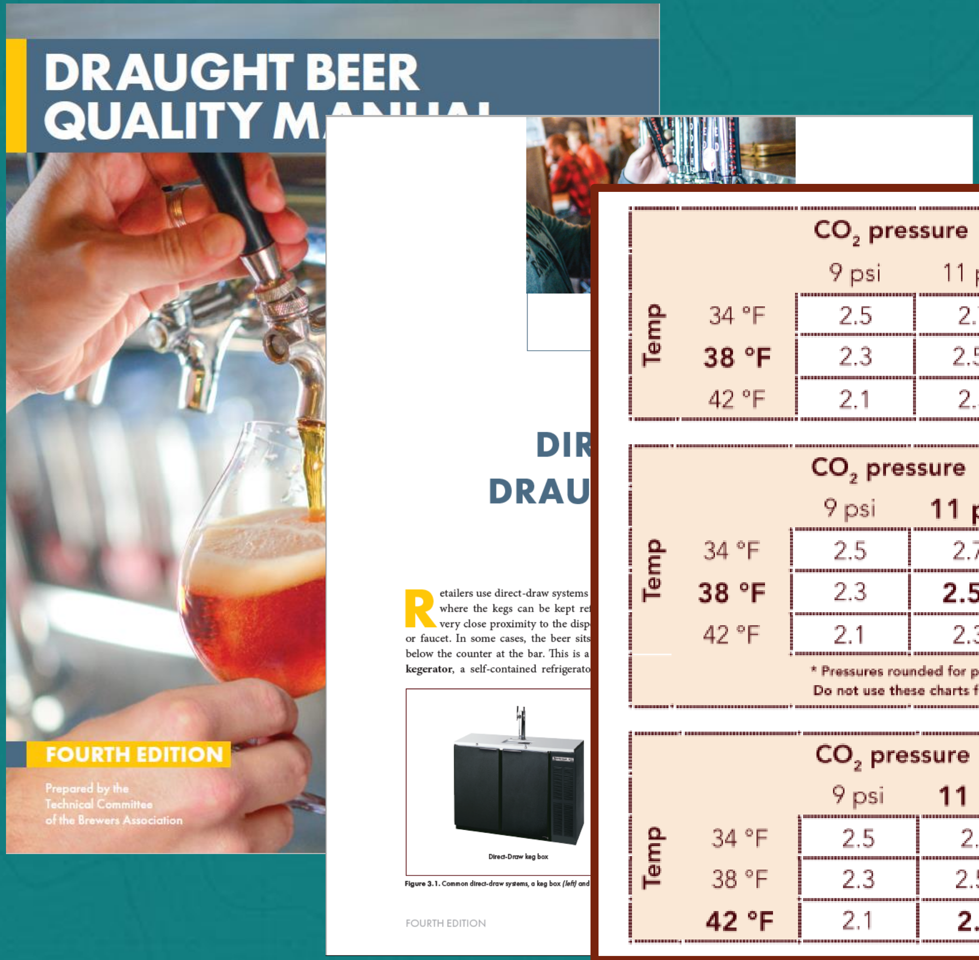
SECTION 1, CHAPTER 3
DIRECT DRAW DRAUGHT SYSTEMS

Incorporation of Ch. 5 content (v3)

<u>Chapter 5 – A Matter of Balance</u>

- Components of Balance
- Units of Carbonation
- Carbonation Dynamics
- CO_2 % Adjustment
- Applied Pressure Adjustment
- System Balance
- Designing for Resistance
- Mixed Gas
- Dispense Goals
- Balancing Draught Systems

DIRECT DRAW DRAUGHT SYSTEMS



Temp	CO₂ pressure 9 psi	11 psi	**13 psi**
34 °F	2.5	2.7	2.9
38 °F	2.3	2.5*	**2.7**
42 °F	2.1	2.3	2.5

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* Pressures rounded for purposes of illustration. Do not use these charts for system adjustment.

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42 °F	2.1	**2.3**	2.5

- **Simplified Carbonation Dynamics charts**
  - Additional descriptive wording added

TABLE 3.1. BEER CARBONATION AT SEA LEVEL IN VOLUMES CO_2 AS A FUNCTION OF SYSTEM TEMPERATURE AND CO_2 PRESSURE*

Temp (°F)	CO_2 pressure (psi) 9	11	13
34	2.5	2.7	2.9
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SECTION 1, CHAPTER 3

DIRECT DRAW DRAUGHT SYSTEMS

3

DIRECT-DRAW DRAUGHT SYSTEMS

Retailers use direct-draw systems in situations where the kegs can be kept refrigerated in very close proximity to the dispensing point or faucet. In some cases, the beer sits in a cooler below the counter at the bar. This is a **keg box**, or **kegerator**, a self-contained refrigerator where the number of kegs accommodated varies based on box and keg size. The other common direct-draw system is a walk-in cooler that shares a wall with the bar, keeping the kegs close to the dispensing point so that beer can be drawn directly through the wall from the keg to the faucet.

Direct-Draw keg box

Walk-in Cooler

Figure 3.1. Common direct-draw systems, a keg box *(left)* and walk-in cooler *(right)*.

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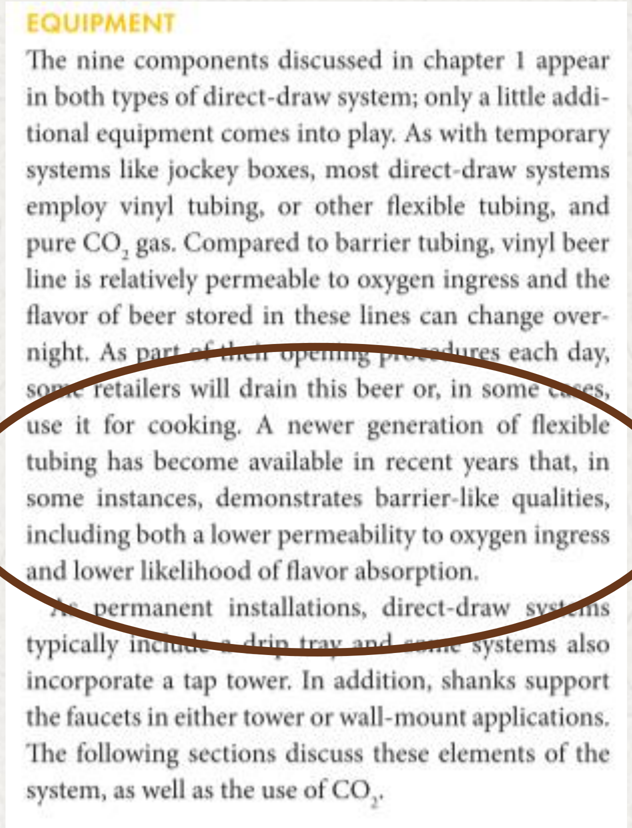
- **New generation of flexible tubing**



EQUIPMENT

The nine components discussed in chapter 1 appear in both types of direct-draw system; only a little additional equipment comes into play. As with temporary systems like jockey boxes, most direct-draw systems employ vinyl tubing, or other flexible tubing, and pure CO_2 gas. Compared to barrier tubing, vinyl beer line is relatively permeable to oxygen ingress and the flavor of beer stored in these lines can change overnight. As part of their opening procedures each day, some retailers will drain this beer or, in some cases, use it for cooking. A newer generation of flexible tubing has become available in recent years that, in some instances, demonstrates barrier-like qualities, including both a lower permeability to oxygen ingress and lower likelihood of flavor absorption.

As permanent installations, direct-draw systems typically include a drip tray and some systems also incorporate a tap tower. In addition, shanks support the faucets in either tower or wall-mount applications. The following sections discuss these elements of the system, as well as the use of CO_2.

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SECTION 1, CHAPTER 4

LONG DRAW DRAUGHT SYSTEMS

The most complex draught systems fall into the long-draw category. Designed to deliver beer to bars well away from the keg cooler, long-draw systems usually employ equipment not seen in temporary and direct-draw setups. From around 1990 to 2010, the average long-draw system had doubled in complexity from roughly five faucets to more than 10 faucets. Today it is common to find very complex draught systems at retail with dozens of faucets. While long-draw systems offer designers the option to put beer far from the bar, allowing more flexibility with keg handling or layout, the distances they cover can cause problems and increase costs for equipment, cooling, and beer waste. As with all systems, it is important to minimize line length and diameter where possible to reduce beer loss and facilitate cleaning.

Here we will consider long-draw systems by focusing on the three main components of a draught dispensing system: beer line, gas, and cooling.

BEER LINE

While exceptions exist, most long-draw systems still push beer from kegs. Beer exits the keg through a coupler and usually enters a vinyl or other flexible beer line, just as we have seen with temporary and direct-draw systems. But in long-draw systems the flexible tubing does not last long. It typically goes about six feet before connecting to a wall bracket that serves as a transition to specialized barrier tubing. Designed for minimum resistance and superior cleanliness, barrier tubing should carry beer most of the distance from keg to faucet in long-draw systems. Barrier tubing is not the end of the journey;

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Incorporation of Ch. 5 content

<u>Chapter 5 – A Matter of Balance</u>

- Components of Balance
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Evolution of CO_2 Content Management

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Version 2

- Added Blend Adjustment
- Added Pressure Adjustment

Version 3

- Added Flow Control Faucet content
- Added Nitrogenized beer content

SECTION 1, CHAPTER 4

LONG DRAW DRAUGHT SYSTEMS

- **Stronger wording on use of vinyl/polyethylene tubing**

Choker Line

Choker line, also known as restriction tubing, is a section of 3⁄16" ID vinyl or flexible tubing of variable length installed at the tower end of a long-draw system (fig. 4.3). The purpose is to add to the overall system restriction and thus achieve the target flow rate at the faucet. Choker line is connected at one end to the barrier tubing in the trunk housing with a reducing splicer, and at the other end to a hose barb on either the back side of the shank inside the tower or to the stainless tubing extending from the tower.

Wherever possible, vinyl tubing should not be used as choker tubing between barrier tubing bundles and faucet shanks. In this more permanent application, vinyl tubing is very difficult to regularly replace. Alternatives to vinyl should be explored, which might include using alternative, higher-quality flexible tubing or other means of adding resistance. See the "System Balance and Achieving Flow" section below for more information.

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SECTION 1, CHAPTER 4

Improved Graphics


DRAUGHT BEER
QUALITY MANUAL
FOURTH EDITION
Prepared by the
Technical Committee
of the Brewers Association

4

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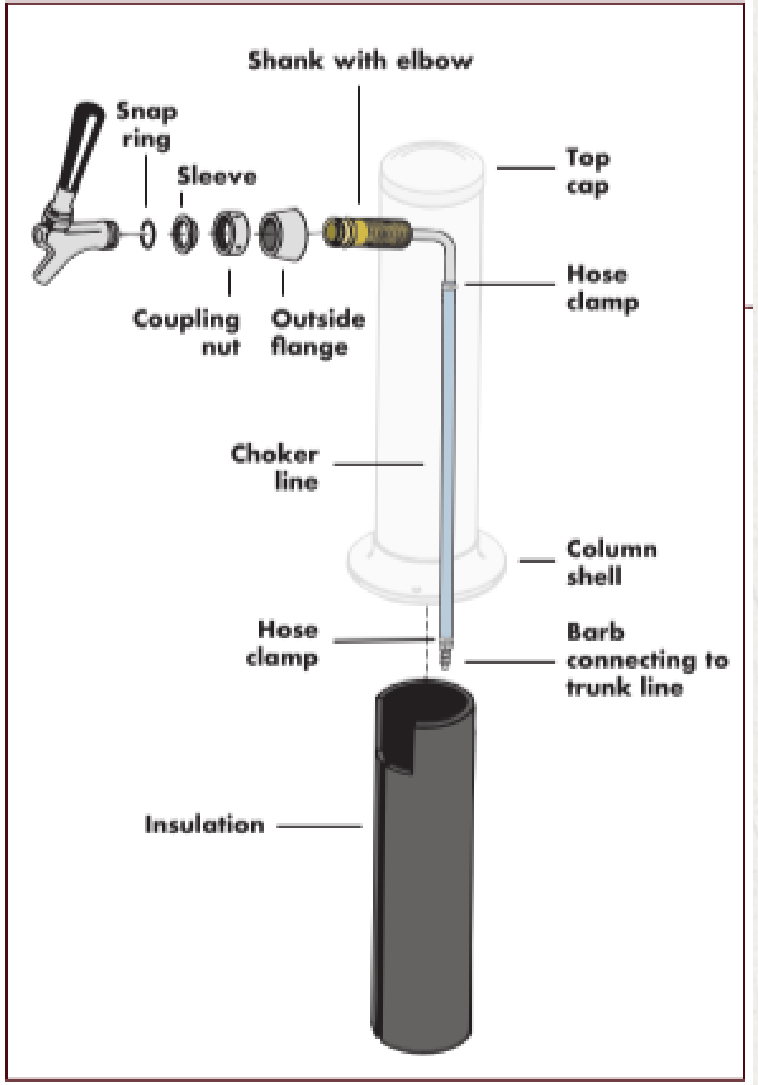

Figure 4.3. Choker line within faucet tower.

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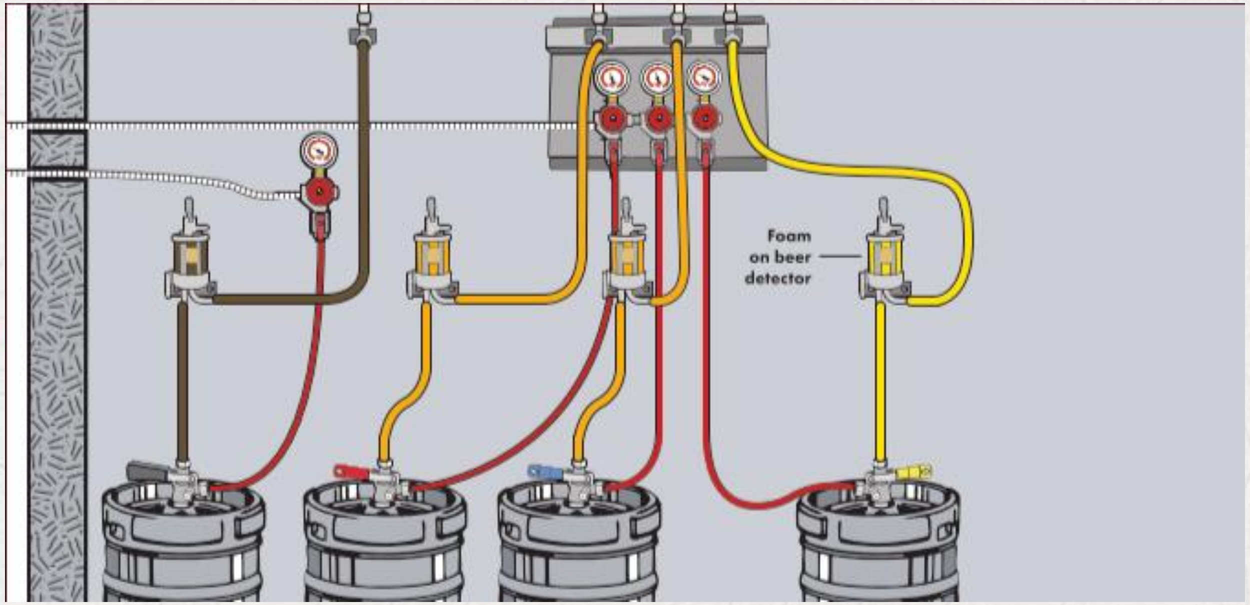
FOBs



Improved Graphics

4

LONG-DRAW
DRAUGHT SYSTEMS

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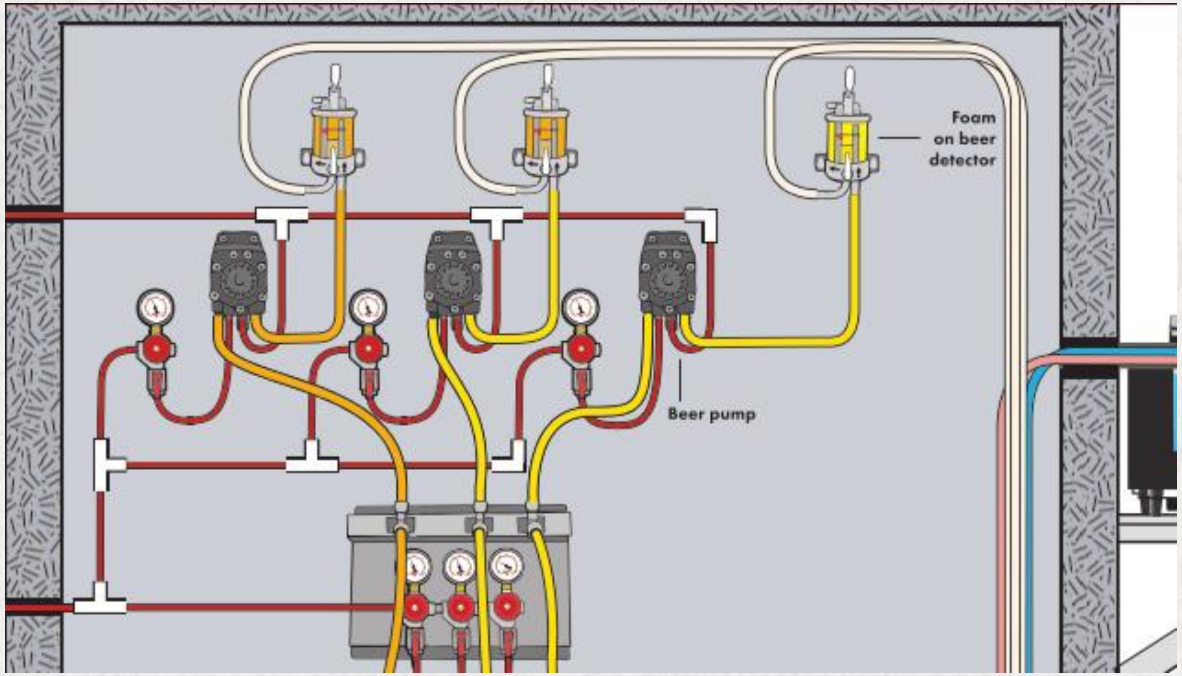
Beer Pumps



Improved Graphics

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Figure 4.9. Examples of quick-connect fittings.

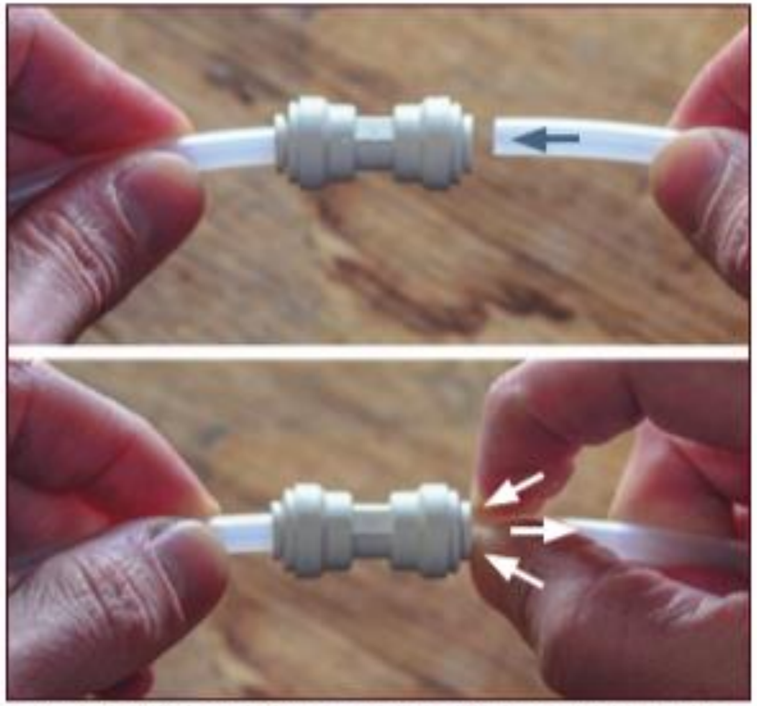
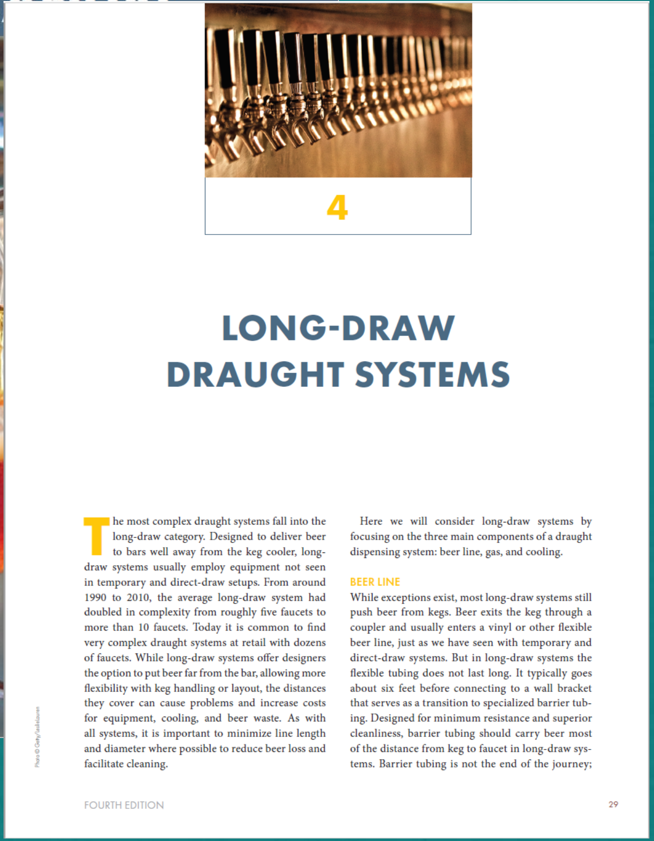


Figure 4.10. Tubing can simply be inserted into quick-connect fittings to make a connection. For removal, a collet must be depressed as the hose is pulled out of the fitting.

SECTION 1, CHAPTER 4

Improved Graphics



4

LONG-DRAW DRAUGHT SYSTEMS

The most complex draught systems fall into the long-draw category. Designed to deliver beer to bars well away from the keg cooler, long-draw systems usually employ equipment not seen in temporary and direct-draw setups. From around 1990 to 2010, the average long-draw system had doubled in complexity from roughly five faucets to more than 10 faucets. Today it is common to find very complex draught systems at retail with dozens of faucets. While long-draw systems offer designers the option to put beer far from the bar, allowing more flexibility with keg handling or layout, the distances they cover can cause problems and increase costs for equipment, cooling, and beer waste. As with all systems, it is important to minimize line length and diameter where possible to reduce beer loss and facilitate cleaning.

Here we will consider long-draw systems by focusing on the three main components of a draught dispensing system: beer line, gas, and cooling.

BEER LINE

While exceptions exist, most long-draw systems still push beer from kegs. Beer exits the keg through a coupler and usually enters a vinyl or other flexible beer line, just as we have seen with temporary and direct-draw systems. But in long-draw systems the flexible tubing does not last long. It typically goes about six feet before connecting to a wall bracket that serves as a transition to specialized barrier tubing. Designed for minimum resistance and superior cleanliness, barrier tubing should carry beer most of the distance from keg to faucet in long-draw systems. Barrier tubing is not the end of the journey;

Photo © Getty/IaakeLauren

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Figure 4.14. A Perlick flow-control faucet.

Figure 4.15. A flow-control faucet allows the bartender to maintain a manageable flow rate for highly carbonated beers.

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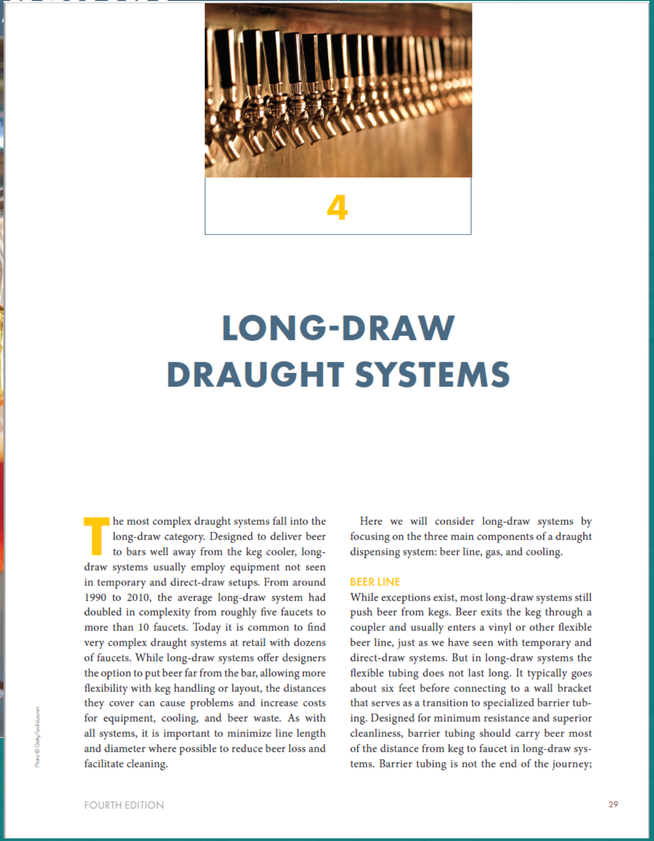
SECTION 1, CHAPTER 4

Improved Graphics



4

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Photo © Getty/LeslieLauren

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Figure 4.16. Nitrogenized beer "cascades" when dispensed correctly.

Figure 4.17. Specially designed nitro faucets create turbulence to encourage nucleation of dissolved nitrogen gas upon dispense.

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SECTION 2, CHAPTERS 5 & 6

PREPARATION TO POUR
SERVING DRAUGHT BEER

Chapter 5 & 6

POUR PREP
(behind the scenes)
&
SERVING
(glassware / growers/ hygiene)

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BREWERS ASSOCIATION

SECTION 2, CHAPTERS 5 & 6

PREPARATION TO POUR
SERVING DRAUGHT BEER

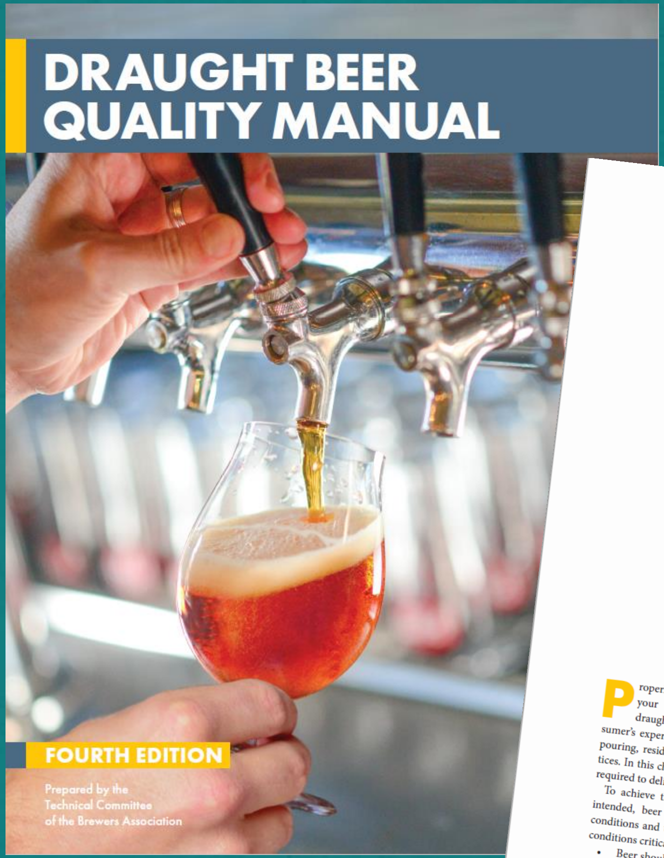
Recommended dedicated beer coolers with no food

Inside the Cooler

1. Air temperature inside the cooler should be 36–38°F.
2. Liquid temperature thermometer should read 36–38°F.
3. Draught beer lines should be full of beer and free of bubbles or kinks.
4. Draught beer on tap is within the brewer's freshness window for dispensing (varies by brewer). Beer flavor in kegs that have been on tap for longer than 45 days may have changed compared to the intended flavor.
5. Check the cooler is free of beer leaks, drips, or spills.
6. Check that all FOBs in the system are in the pouring position.
7. Check that all FOB drains are empty and free of buildup.
8. Visually check all gas pressure gauges are operating at the ideal pressure setting:
   a. Direct-draw system using 100% CO_2 for ales and lagers = 12–15 psi
   b. Long-draw system using blended 60–80% CO_2 (rich blend) for ales and lagers = 22–25 psi
   c. Premixed 25% CO_2/75% N_2 blend (for nitrogenized beers only) with restrictor faucet = 30–35 psi
   d. For precise settings, refer to the McDantim app (Figure 4.18) discussed in chapter 4.
9. Visually check that gas valves are in the open position.
10. Listen and feel around gas connections for leaks; large leaks will make an audible hiss.
11. Ensure all food products are stored away from kegs and beer lines. Dedicated beer coolers are recommended.

SECTION 2, CHAPTERS 5 & 6

PREPARATION TO POUR SERVING DRAUGHT BEER



6

SERVING DRAUGHT BEER

Properly designed and appropriately operated, your draught system will dispense perfect draught beer from its faucets. But the consumer's experience can still be ruined by improper pouring, residue in glassware, and unsanitary practices. In this chapter, we review the serving practices required to deliver high quality draught beer.

To achieve the consumer experience the brewer intended, beer must be served following specific conditions and techniques. Let's review some of the conditions critical to proper draught dispense.

- Beer should be stored between 34°F and 38°F.
- Beer should be served between 38°F and 44°F.
- To accomplish proper temperature control, the glycol lines that cool the beer lines in a long-draw system should be set between 29°F and 32°F.
- The draught system should be balanced (pressure = resistance).
- The normal flow rate should be 2 fl. oz./sec.

GLASSWARE CLEANING

A perfectly poured beer requires a properly cleaned glass. As a starting point, glassware must be free of visible soil and marks. A beer-clean glass is also free of foam-killing residues and lingering aromatics such as sanitizer.

A freshly cleaned glass should be used for every pour. We recommend that retailers never refill a used glass, a practice that may also violate local health codes.

Two systems deliver effective beer glass cleaning: manual cleaning in a three-tub sink, and dedicated automatic glass washers. Each approach requires specific techniques and a certain degree of discipline. Let's look at what's involved with each one.

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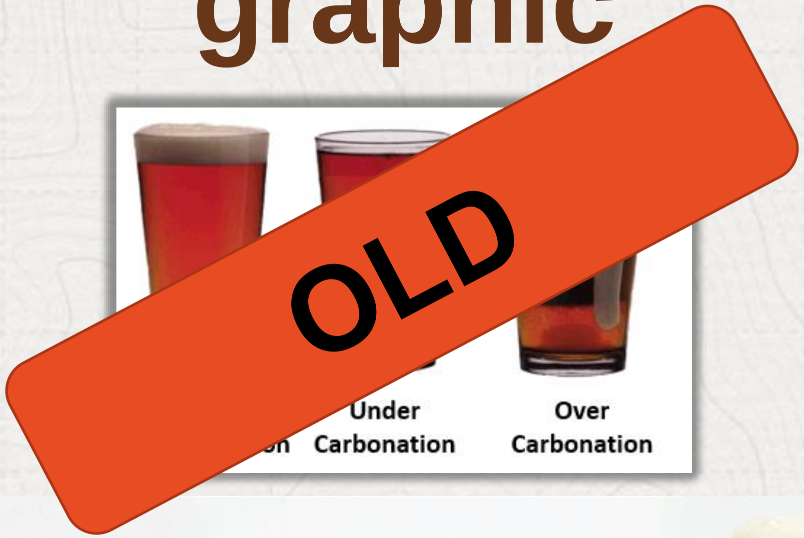
Better glass graphic



SECTION 2, CHAPTERS 5 & 6

PREPARATION TO POUR SERVING DRAUGHT BEER

Greatly expanded growler section

GROWLERS

Growlers are a great way to bring draught beer with you. The practice of bringing draught beer home started in the late 1800s. Patrons would bring a galvanized pail to their local watering hole and have it filled with beer. A lid was placed on the pail and the sound of the escaping carbonation was said to "growl."

Today we have many clean and hygienic ways of transporting draught beer, including glass, ceramic, stainless steel, and aluminum. The lids can be flip-top or screw-on. The size can vary from 32 to 64 fl. oz. It is important to make sure that the vessel you choose is pressure rated and designed to be used for carbonated liquid. The lid is important also. As will be explained later, a softer seal is safer than a firm, rigid seal. For instance, the rubber gasket on a flip-top bottle allows any excess CO_2 to escape, providing a pressure relief valve. The Brewers Association recommends that you consider using plastic screw tops instead of metal for the same reason.

If a glass bottle is being used it should be brown, not clear, to help lessen the amount of light that can potentially "skunk" or "light strike" its contents. Small neck ceramic bottles are problematic because you cannot easily see inside the bottle to check for cleanliness. Stainless steel growlers are typically large-mouth, making it easier to view the cleanliness, and light-struck beer is alleviated. There are stainless steel growlers that can be charged with CO_2, potentially extending the life of the product in the vessel—they are designed specifically for this purpose.

Aluminum cans (crowlers) are another option and they will maintain the carbonation level that the brewer intended. Crowlers keep light out and have some give to make up for any pressure increases. They require additional equipment to seal the lid after filling, which requires proper maintenance. Crowlers are a single-use product, recyclable, and are handy for consumers who do not want to purchase a growler. They cannot, however, be capped and reused later.

Other single-use containers are made of plastic (PET), which are typically filled using a specially designed faucet that holds the bottle in place during filling. Cardboard containers, much like a milk container with a removable cap can be tube... Plastic bags that have little or no oxygen and... filled directly off the faucet are available also.

Growler Container C...

Retailers are ultima... any container is san... ing. Consumers also... and care for growl... concepts mirror t... cleaning section of t...

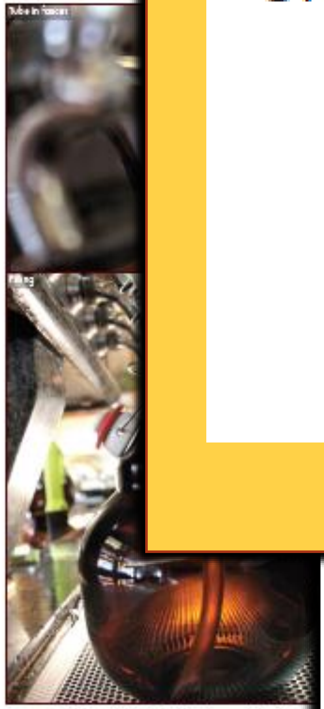


Figure 6.7. Beverage tubing (vinyl, flexible, or barrier tube) is often used... growlers.

TABLE 6.1. GROWLER PRESSURE CHANGE AS FUNCTION OF TEMPERATURE

	Temperature	psig	barg
Refrigerated	38	13.1	0.90

GROWLER SAFETY NOTES FOR RETAILERS AND CONSUMERS

growler is not consumer friendly.

After filling, the growler should be rinsed off with fresh water and sealed with tape or heat shrink. A label identifying the contents of each growler (IBU, ABV, and name) should be attached. The Brewers Association has a template that can be used: https://www.brewersassociation.org/educational-publications/important-information-for-growler-tags/.

Figure 6.8. Growler tags are available to download at https://www.BrewersAssociation.org; they include best practice tips and safety information.

Consumer Education, Post-Filling Quality

Draught beer is a lot like bread, best when enjoyed fresh. Growlers should be consumed within 24–72 hours of filling and should be finished within hours of being opened (enjoy responsibly). In cases where growlers have been pre-filled, ensure your growler has been filled that day for optimal freshness. Brewery studies show that beer quality begins to suffer almost immediately after filling. Within 24 hours, carbonation, mouthfeel, and the hallmark flavors of the beer begin to degrade, and within 72 hours stale flavors become obvious.

Helpful hints:

- Keep filled growlers cold and dark. Remember, an increase in temperature will increase pressure and could cause a growler to burst. Light can damage beer by skunking.
- Growlers should be thoroughly cleaned, sanitized, rinsed, and allowed to air dry immediately after emptying. After cleaning, growlers should be stored with the lid off.
- Laws vary from state to state, so check before starting a program. Some states require that establishments can only fill growlers with their logo or that they have sold.
- Prerinse the growler before filling with fresh water run through a cold plate to prechill the growler prior to filling.
- Keep a container of sanitizer for the fill tubes behind the bar.
- Keep extra seals for either style cap behind the bar in case a customer brings in a different type of growler.
- Use brown bottles instead of clear glass. Brown glass will protect beer from the harmful effects of light.

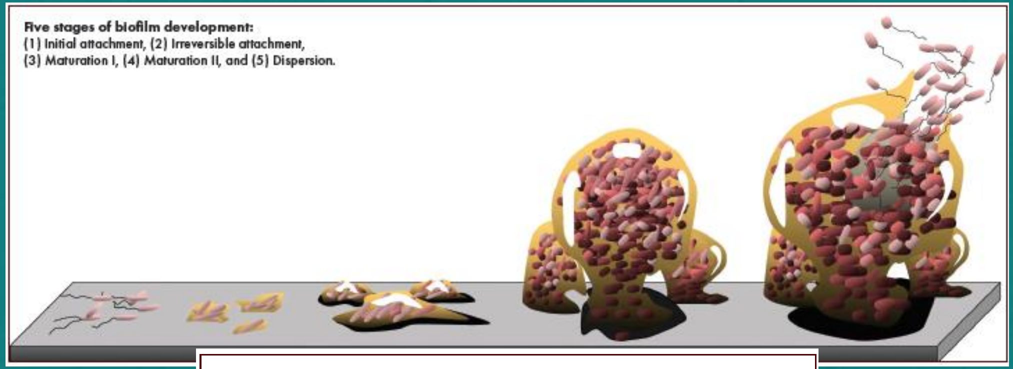
For more information on growlers, search Growlers on http://www.BrewersAssociation.org.

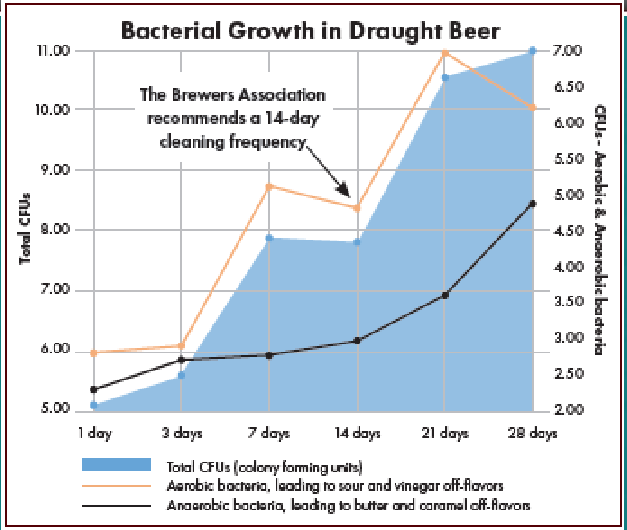
SECTION 2, CHAPTER 7

SYSTEM MAINTENANCE AND CLEANING

- **Inclusion of biofilm talking points and images**
- **Bacterial Growth chart from E. Storgards study, *Microbiological Quality of Draught Beer – Is there Reason for Concern?***

SYSTEM MAINTENANCE AND CLEANING





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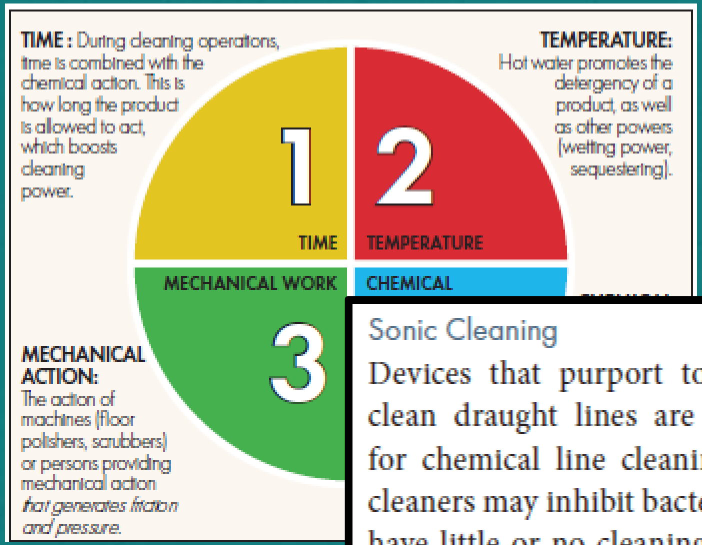
SECTION 2, CHAPTER 7

SYSTEM MAINTENANCE AND CLEANING



Sonic Cleaning

Devices that purport to electrically or sonically clean draught lines are not a suitable substitute for chemical line cleaning. Although some sonic cleaners may inhibit bacteria and yeast growth, they have little or no cleaning effect on draught system hardware and fittings. The efficacy of sonic cleaners can be affected by the beer style and length of system, and can be interrupted by metal components in the system, such as faucets and couplers. Sonic cleaners may add some benefit to deter certain types of bacteria while having little to no effect on others. A maximum two-week chemical line cleaning cycle is recommended on all draught systems regardless of the use of a sonic cleaner.

- Further discussion of the “Sinners Circle”
- Added talking points to “Sonic Cleaners”

SYSTEM MAINTENANCE AND CLEANING

Figure 7.24. Example fittings for constructing a three-way cleaning adapter.

Figure 7.9. Recirculation pump equipment.

Figure 7.15. Ensure that cleaning solution is added so as to achieve the correct strength.

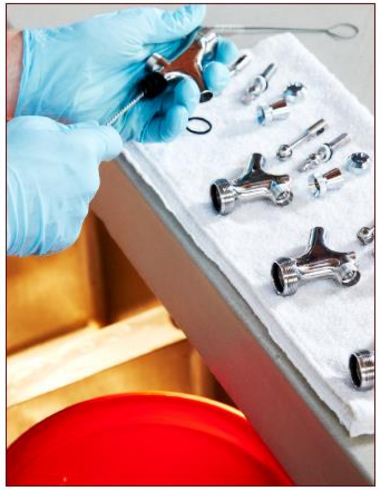


Figure 7.16. Faucets should be cleaned every time lines are cleaned.

- **Strengthened wording around the recommendation of recirculation pump cleaning vs. canister cleaning**
- **Additional details and recommendations on the pump cleaning procedure**
  - Clearer terminology
  - Priming the pump
  - Proper chemical dilution practices
- **Added images to provide visuals for the step-by-step cleaning procedure**
- **Building components used with recirculation cleaning**
  - Custom couplers
  - Three-way couplers

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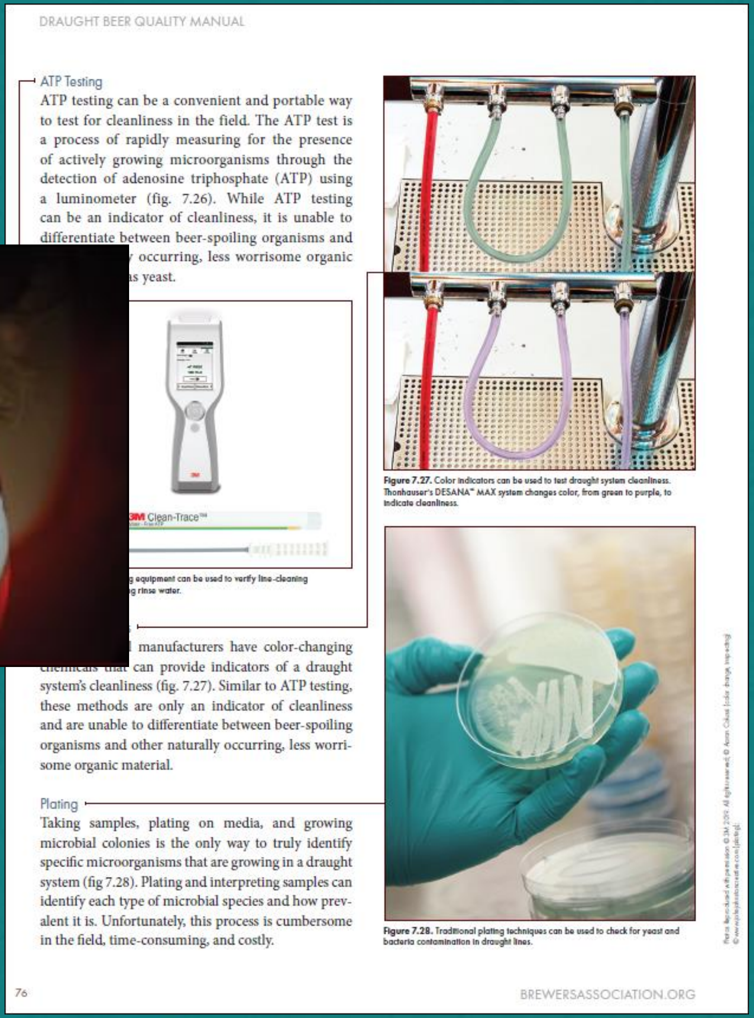
SECTION 2, CHAPTER 7

SYSTEM MAINTENANCE AND CLEANING


DRAUGHT BEER QUALITY MANUAL

ATP Testing

ATP testing can be a convenient and portable way to test for cleanliness in the field. The ATP test is a process of rapidly measuring for the presence of actively growing microorganisms through the detection of adenosine triphosphate (ATP) using a luminometer (fig. 7.26). While ATP testing can be an indicator of cleanliness, it is unable to differentiate between beer-spoiling organisms and ... y occurring, less worrisome organic ... as yeast.

... g equipment can be used to verify line-cleaning ... g rinse water.

... manufacturers have color-changing ... can provide indicators of a draught system's cleanliness (fig. 7.27). Similar to ATP testing, these methods are only an indicator of cleanliness and are unable to differentiate between beer-spoiling organisms and other naturally occurring, less worrisome organic material.

Plating

Taking samples, plating on media, and growing microbial colonies is the only way to truly identify specific microorganisms that are growing in a draught system (fig 7.28). Plating and interpreting samples can identify each type of microbial species and how prevalent it is. Unfortunately, this process is cumbersome in the field, time-consuming, and costly.

Figure 7.27. Color indicators can be used to test draught system cleanliness. Thonhauser's DESANA™ MAX system changes color, from green to purple, to indicate cleanliness.

Figure 7.28. Traditional plating techniques can be used to check for yeast and bacteria contamination in draught lines.

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- **Addition of a "Testing for Cleanliness" section and added supporting graphics**
  - Sensory Evaluation
  - ATP Testing
  - Color-Indicators
  - Plating
  - Visually Inspecting for Cleanliness

SECTION 2, CHAPTER 7

SYSTEM MAINTENANCE AND CLEANING

Figure 7.29. Faucets and couplers should be inspected visually to ensure that proper line-cleaning frequency and procedure is being followed. Straws can be used to look for soil inside faucets. Line cleaning logs should be maintained.

Visually Inspecting for Cleanliness

Visually inspecting a draught system for cleanliness (fig. 7.29) is another good indicator of the health of the draught system.

- *Cleaning log.* It is recommended that all draught system cleaners keep a cleaning log that is clearly visible to the retailer, the wholesaler, and the brewer. An example log is shown on page 79. The cleaning log should show the last cleaning having occurred within the last two weeks and an overall two week line-cleaning cycle.
- *Faucets.* Visibly inspect the inside, outside, and vent holes of each faucet. The interior of a faucet can be scraped with the hard edge of a bar straw. Vinegar or butter aromas will indicate a bacterial infection.
- *Couplers.* Visibly inspect the exterior of the coupler. Kegs can be untapped to allow the entire coupler to be inspected. Vinegar or butter aromas will indicate a bacterial infection.
- *FOBs.* Visibly inspect sights glass, vent, and FOB stop. All components, inside and out, should be free of visible build-up. Sight glass should not have any haze and should be completely clear.
- *Jumper lines.* Visibly inspect the flexible tubing in the draught system cooler. The exterior of the tubing should be free of any visible build-up. The tubing should be clear and free of color-staining. Vinyl jumper lines should be replaced every two years.
- *Spill trays.* Visibly inspect the grate and body of the spill tray. The entire spill tray should be free of any visible build-up. Vinegar or butter aromas will indicate a bacterial infection.

Note: Stainless steel is the recommended material for all metal components. Stainless steel will remain cleaner and is a more durable, longer-lasting material.

At this point there are few reliable and realistic ways to test for draught system cleanliness in the field. Because of this, the draught system cleaning and maintenance recommendations from this chapter are designed to be preventive. Once a draught system becomes infected, it becomes extremely difficult—if not impossible—to completely remove. The best defense against bacterial growth is to prevent it with recommended routine hygiene practices.

- **Visually Inspecting for Cleanliness:**
  - Cleaning Log
  - Faucets
  - Couplers
  - FOB’s
  - Jumper Lines
  - Spill Trays

SECTION 2, CHAPTER 7

SYSTEM MAINTENANCE AND CLEANING

DRAUGHT BEER LINE CLEANING LOG

ACCOUNT NAME: ____________________

DATE	INITALS	CAUSTIC OR ACID, AND BRAND	DATE	INITALS	CAUSTIC OR ACID, AND BRAND	DATE	INITALS	CAUSTIC OR ACID, AND BRAND	DATE	INITALS	CAUSTIC OR ACID, AND BRAND

This line-cleaning log can be found at https://www.brewersassociation.org/educational-publications/draught-beer-line-cleaning-log/.

- **Addition of a beer line cleaning log**
- **Also available at www.draughtquality.org**

APPENDIX – Cask Ale

8

TROUBLESHOOTING

Correctly dispensed draught beer is the result of proper temperature, gas pressure and mixture, and a well-maintained draught system. It's easy to take all the variables for granted when beer is pouring well, but improperly pouring beer can be very frustrating and can result in loss of sales. This chapter is intended to provide useful troubleshooting steps anyone can follow to solve draught beer dispensing problems.

The single most common cause of problems encountered in draught dispensing systems is temperature control. The first step in solving any dispensing problem is to confirm that the liquid temperature of the beer in the keg is where it's supposed to be. The next step is to check the temperature of the beer being delivered to the faucet, confirming that the cooling systems used to maintain proper beer line temperature are working properly.

The troubleshooting steps that follow are organized by the type of draught system and how the systems are cooled. Direct-draw systems and long-draw systems cooled by air or glycol each have unique features, which are addressed in this chapter. Other steps addressed include gas pressure and supply, beer supply, and mechanical issues.

Figure 8.1. Properly carbonated draught beer that is pouring well should have a head *(left)*. Problems with your draught system can cause undercarbonation *(middle)* and overcarbonation *(right)* when pouring.

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Spiles

DISPENSING CASK ALE

Cask ale is normally dispensed from a cask located relatively close to the bar, or even on the bar or back bar. Most modern casks are metal, although a few wooden varieties are sometimes still found. Most casks contain two openings that are filled with wooden or plastic plugs called shives (for letting gas in) and keystones (for tapping and removing beer). The cask is placed on its side with the shive up and the keystone down. A spile is used to vent the cask through the shive. There are two kinds of spiles available: soft spiles, which are porous, and hard spiles, which are made of denser, harder wood. The soft spile is used initially in order to allow gas to escape the cask during fermentation. Once this process is complete, the soft spile is replaced with a hard spile in order to prevent gas from exiting the cask. Cask ale is dispensed without top pressure, meaning that it either pours from the cask through a faucet-like tap directly into the glass using gravity, or the beer is pumped a short distance using a pump called a beer engine (fig. D.1).

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BREWERS ASSOCIATION

APPENDIX – Cask Ale

DRAUGHT BEER QUALITY MANUAL

FOURTH EDITION

Prepared by the Technical Committee of the Brewers Association

8

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Cask Breathers

pressure to fill the head space. A device called a "cask breather" can be used to top-off the head space as the beer is dispensed, which prevents the ingress of air and potential beer spoilers (fig. D.2). Carbon dioxide is preferable to air in terms of preserving the beer, but there is some disagreement about whether this practice is "proper" because it is not traditional. This manual is not the forum for that discussion.

Figure D.2. Cask breather.

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BREWERS ASSOCIATION

QUESTIONS?

THANK YOU!

KEN SMITH

Beer Education

BOSTON BEER COMPANY

MATT MEADOWS

Director of Field Quality

NEW BELGIUM BREWING

NEIL WITTE

Owner

CRAFT QUALITY SOLUTIONS

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