

QUALITY ASSURANCE

Many brewpubs—and small breweries in general—fail to institute a quality control program because they don't have the financial resources—or necessary space—for a lot of sophisticated lab equipment. But even without the latest equipment, you can still focus on quality assurance—the proactive side—and do the work correctly in the first place.

At a basic level, the two measures of quality for beer at your brewpub should be that it is:

1. Free from contamination.
2. Consistent in acceptable flavor.

You can achieve this level of quality with investments in time, effort, and a small outlay of money that may not be much more than the ingredient cost of one batch of beer. To start, cleaning and sanitation will help ensure that your beer is free from contamination. Some basic lab equipment that every brewer should have can be used to help ensure beer quality from a consistency angle.

WHY CLEAN?

Adherence to high cleanliness standards pays dividends in the perceived and actual quality of your beer. A clean brewery is a marketing tool, especially for brewpubs where the brewery is usually on constant display. Customer perception is a reflection of your brand, and people will think “If the brewery is clean, then the beer must be clean, too.” And guess what? They're usually right. Cleanliness in the brewery leads to clean tasting beer.

You will save money with thorough cleaning, including avoiding sending beer down the drain because of contamination leading to off-flavors. This was all too real for me in a previous job where we sent every batch of beer, both in the fermenters and serving tanks, to the sewers. Lack of cleaning created severe contamination issues. The beer simply was not sellable. Had we focused better on the front end of cleaning, we would have saved a lot of cash. Along with preventing beer loss, a good cleaning program will also save money on equipment. Clean equipment exposes small problems sooner, allowing you to fix the issue now and reduce what might be more costly maintenance at a later date if the problem had not been detected.

Reduced labor is a benefit of making cleaning a priority. It is much easier to work in a clean and organized environment versus a messy and dirty brewery. Keeping equipment and spaces clean on a regular basis is much less work than trying to break through layers of dirt and scum. Clean now, because once the crud dries, much more effort is required to return to a pristine state.



IN THE BREWPUB

BY LARRY
CHASE



A forced wort stability test provides information about your cleaning regime.



A SAMPLE BREWERY AUDIT

According to Joe Dirksen, senior technical coordinator at Ecolab, most micro quality issues are sanitation issues. Four rules that Dirksen follows when he does brewery audits are:

1. “Dead legs” will kill quality. Dead legs are any section of brewery tubing that dead ends and the distance is two times or more than the diameter of the tube. When liquid flows near one of these dead legs, there is not enough turbulent flow to adequately clean the surfaces, leading to a buildup of contaminants. The simple solution is to eliminate dead legs.
2. Eyes can be deceived, yet the nose knows. Many times something may look clean on visual inspection, yet hidden sections could be harboring a buildup of bacteria. So give things a sniff test. Your nose will tell you if something is fouling and creating a micro issue.
3. Brush washing is important. Many parts and pieces, especially gaskets, in a brewery have incomplete flow coverage of cleaning and sanitizing solutions. Removing these parts and brushing them clean is vital to ensure proper equipment maintenance. If you need to turn a tank quickly, then have a spare part on hand so that you can immediately replace the dirty part to be brushed with a clean one.
4. Fix leaks. Wherever something leaks out, there is a potential for a contaminant to work its way back in.

When I landed at a new brewing job years ago, one of the first things I did was to take apart the brewhouse equipment to inspect it. Upon removing the oxygenation stone, I was amazed at the growth of slime on and around the stone. Under those conditions, the beer was not even given a chance toward quality. The same held true in many other areas of the brewery—buildup of crusted and dried beer behind gaskets, *braunbette* adhered to PRVs and rupture disks, a reddish-brown hue on the underside of mash screens. When you pay attention to cleaning every day in the brewery, you give your beer an excellent opportunity to be what you want it to be.

In his book *Standards of Brewing*, Charles Bamforth comments on two overriding rules of brewing, the first one being to keep the equipment clean. “Beer is a foodstuff and, frankly, I am appalled at the state of hygiene in many breweries. In short, the whole place should be such as to give your aged aunt a warm feeling of all things being well scrubbed. As for the insides of vessels and pipes, they should be pristine. A properly designed caustic or acid cleaning regime followed by good rinsing and use of a hypochlorite or peracetic acid-based sterilant is critical. The key is more good design and process management (QA) than swabbing and plating (QC).”

WHAT YOU NEED TO CLEAN

One of the first things you need, especially if you are the only brewer in a small pub, is the involvement of other people. If you’re the brewer, you should be leading the effort, but you shouldn’t do it alone. Ownership and management should be involved to show commitment from the top. FOH and BOH employees’ involvement can help reduce the overall workload.

One of the most important aspects you need is ease. If you are a brewery in planning or will be adding capacity to your existing brewpub, then design into the brewery the ability to make cleaning easy. Consider interior tank and pipe cleaning, equipment placement in the room, and methods of cleaning. Include this topic in your discussions with equipment manufacturers, engineers, architects, and others as you design your brewery.

Regardless of how big or small your brewery is, you need a system in place that includes checklists, standard operating procedures, and an audit. The all-important checklist ensures that you and others follow the same process to help create consistency.

Mark Fischer of New Belgium Brewing has highlighted a system called “5S” for “sort, straighten, sweep, schedule, and sustain.” Us-



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ing this system, New Belgium over five years realized benefits including better organization, use of less space, and getting things accomplished with less effort. Their systematic approach led to a higher level of both internal and external cleaning and organization.

Another system to consider is HACCP (Hazard Analysis and Critical Control Points). While this system might seem overwhelming and only for large producers, the concepts behind it are a good starting point for developing your quality system. Karl Ockert, technical director for the Master Brewers Association of the Americas (MBAA), along with Jim Kuhr, director of brewing operations and brewmaster for Matt Brewing, are developing a menu of HACCP templates specific to brewery operations that will be available to MBAA members and can be used by breweries of all sizes.

“Everyone should understand that HACCP is about food safety, not quality,” said

Kuhr. “Certainly, the same concepts can be used for quality items. There is a definite connection between the two efforts. The mindset that goes along with gaining a detailed understanding of your individual processes and its food safety risks forces you to look at each step and determine if it has a risk and if it does, is it a risk to the consumer or a risk to the quality of the beer.”

Given that brewpub brewers have few resources in both time and money at their disposal, Kuhr is considering a goal of having a more complete, plug-and-play program for them. Ockert said working templates should be available in late fall for MBAA members.

HOW TO MAKE CLEANING HAPPEN

As mentioned earlier, brewers can't do it alone. Chemical vendors are an excellent resource. “I can survey the overall sanitation needs of the brewery, assist with writing sanitation procedures, and provide a second set of eyes for sanitation in the brewery,” explained Joe Dirksen, senior technical coordinator at Ecolab. Chemical vendors are specialists in cleaning, so it makes sense to tap into their help.

One of our bartenders handles all of our tap line cleaning at Standing Stone, so we now have another employee who knows how the tap system works as well as the importance of clean beer lines. Interns can also be very helpful—one of our former interns, Acacia Baldner, got us started with written procedures for the tasks that we do every day.

Focus on cleaning every day to really make it happen. Walk into work every day with this question in your head: What needs to be cleaned today that is best for the beer? Remaining focused every day keeps cleaning a priority. You'll do cleaning tasks in small increments instead of letting them build up to an overwhelming pile of tasks. Use your checklists and SOPs to help you focus.

Follow my 30-second rule: It's easier, cheaper, and requires less time to take the extra 30 seconds right now to clean than to re-brew because you did not clean. I developed this rule after learning that, under American regulatory parlance, sanitizers must kill 99.999 percent of specified test bacteria within 30 seconds under conditions of the Official Detergent Sanitizer Test.

If you are going to invest in one piece of equipment, purchase a microscope for counting yeast cells.



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So if a gasket falls on the floor, drop it in sanitizer for 30 seconds. Whether it takes 30 seconds or 30 minutes to get something accomplished, that's way shorter than an eight-hour day to brew again, not to mention the cost of dumping beer down the drain.

Finally, track your progress with an audit. To build an audit, divide the brewery into distinct areas and do a walk-through self audit with other people (include your chemical vendor and/or someone who is not in the brewery every day—that “fresh set of eyes”). When listing the items you want to include, follow a key component of quality assurance: only list it if you will do something about it after measuring it. As for scoring, keep it simple. Assign 1 point for items that meet the standard, 0 points for items that do not meet the standard, and -1 point for items that still have not met the standard since the previous audit. For certain critical items, assign higher point values to indicate their importance.

Ideally, audit the space monthly and at a minimum quarterly. Doing the audit at more regular intervals ensures that potential issues are found sooner. Someone who is not specifically responsible for doing the actual work should be the scorekeeper. Incentivizing the audit is the best way to ensure follow-up and follow through. Set a minimum expectation and reward for surpassing. Include the audit scores in regular performance appraisals. And while money is the most standard reward, use your imagination and ask what would be of value to your brewer.

Cleaning well is within the realm of every brewer regardless of financial resources. Doing so will achieve the first basic expected quality measures of your beer being contamination-free. Of course this goes hand-in-hand with acceptable flavor, the second basic quality measure. Some basic lab equipment can help you attain *consistent* acceptable flavor.

BEYOND CLEANING TO THE LAB

One bit of lab work you should always do is a forced wort stability test. Remember the moldy oxygen stone? This simple test will help you catch these kinds of issues. The necessary equipment—sterilizable glass containers or WHIRL-PAK® Sterile Sampling Bags if you don't have a sterilizer—is well within a brewpub's budget and provides valuable information about your cleaning regimen. Basic information about performing this test can be found at www.wyeast-lab.com/com-qc.cfm.

If you've cleaned well enough to avoid contamination and its associated off-flavors, then maintaining flavor consistency is the

next key. To help achieve consistency, you probably already keep a record of various brewhouse processes—ingredients, recipe, temperatures, gravities, and pH to name a few. If you are going to invest in one piece of lab equipment, purchase a microscope and use it for counting yeast cells to increase your beer's consistency.

“Lots of variation comes in fermentation depending on your pitch rate,” said Jim Crooks, quality control manager at Firestone Walker. “Underpitching is bad and while overpitching might be better, it can be bad as well for consistency.” Dialing in pitching rates goes a long way toward creating quality beer. In Crooks' view, brewers at all levels should spend as much time and money on the cellar side of treating the yeast correctly as they do on the brewhouse side of tracking the process.

“We are control freaks when it comes to the brewhouse, yet often when it comes to fermentation, many brewers simply don't treat the yeast with the care it needs,” Crooks lamented. “To create the best and most consistent beer you can, you need to pay attention to the yeast.”

Microscopes are not out of the financial realm of brewpubs when you think of it in terms of the cost of a batch of beer. A workable microscope can be found for \$250-\$300. Add in a hemocytometer and some basic glassware, and you'll approach no more than \$500. Then all you need to find is a little bit of tabletop workspace. Many resources, including your yeast supplier, are available to help demystify yeast counting.

Ken Jones, brewer at Glenwood Canyon Brewing in Glenwood Springs, Colo. since the late 1990s, purchased a microscope as soon as he was able, and it immediately provided valuable information. “We were definitely underpitching,” Jones realized. “Once we started doing cell counts and viability tests to achieve a correct pitching rate, our flavor quality went up.”

Another investment that Glenwood Canyon made was a Zahm & Nagel tank carbonation tester. “We learned our carbonation levels were all over the place,” said Jones. “The Zahm really helped us improve the consistency of our carbonation levels. And while it might seem expensive for a brewpub, it really pays off to invest in the business.”

RESOURCE

Bamforth, Charlie. *Standards of Brewing: A Practical Approach to Consistency and Excellence*. Brewers Publications, 2002.

Larry Chase is brewmaster at Standing Stone Brewing Co. in Ashland, Ore. ■

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