

Successful Filtering

Why should you filter your beer?

It tastes the same whether it's clear or not, doesn't it? Actually, no. That certainly isn't true for beer that has yeast and other stuff in suspension - yeast obscures the malt flavor and muddies the flavor in general, and that "other stuff" (particularly tannins) contributes a harsh component to the bitterness. In answer to the question, "Doesn't filtering remove flavor?", to some extent the answer is yes - yes, it will definitely change the flavor of the beer by removing stuff that obscures the flavors you want, but done properly and with the correct filter media it removes very little malt flavor. Hop flavor and aroma in big, hoppy American beers may be another matter - filtering can bring focus and clarity to these beers, but the overall hop presence does tend to be diminished somewhat. My jury is still out on whether to filter hoppy ales or not.

Much of the filter manufacturers' recommendations for filtering beer are just wrong, probably owing to the fact that most, if not all, homebrew filtration systems were originally designed for wine makers. For one thing, wine typically calls for a much tighter (finer) filter medium than is necessary or desirable for beer. Also, winemakers typically use various anti-oxidants, so they don't appear to worry much about oxidation, which is a huge issue with beer. Beer also tends to hang onto more dissolved gas, so it should generally be filtered more slowly than wine.

Fine (1 micron) and medium (2 to 3 micron) filter pads adversely affect flavor, making the beer undesirably thin and lacking in malt character. Five to 7 micron pads (the ones labeled "coarse") are supposedly too coarse to filter out chill haze, but I have not found that to be the case; my filtered beers are usually brilliant at any temperature. A lot of the literature even says that 5 micron media won't filter out all the yeast; my experience says that simply is not correct.

While sanitation is as important to filtering as it is to all other aspects of brewing, oxidation was the one thing that gave me trouble when I started filtering. I ruined many batches of beer before realizing how terribly important it is to avoid oxygen in the filtering system. Think about it: you've got this porous filter medium that's just perfect for mixing oxygen into your beer, if there's any oxygen present in the system. This procedure is geared toward eliminating oxygen while sanitizing the system, then rinsing out the sanitizer.

Frequently asked questions

How much beer will I waste by filtering? A bit over a quart - part of one to flush the sanitizer out of the filter and the one that remains in the filter at the end. Does that sound like too much? One of my pet sayings is, "I'd rather have 4 ½ gallons of excellence than any amount of mediocrity."

What kind of sanitizer should I use? For a long time I used Iodophor with no ill effects, but I switched to StarSan. A thorough flush is the key in either case, but StarSan is considerably less toxic, so would seem the wiser choice. I was concerned that StarSan would foam excessively as it passed through the filter media, but it does not.

Which filter type should I use? The two preferred types for beer are the flat plate, dual-pad type and the standard water filter cartridge type. The dual-pad plate filter has more surface area and is easier to clean and air-dry; it's my preference, so this article is written around that type.



OK, so what's required?

Filtration requires some pressure – not much, but more than you can get from reasonable gravity setups, so a standard CO₂ keging system is generally required. You'll need:

- An existing keg setup – CO₂ tank, hose with gas-in connector, regulator
- the keg of unfiltered beer
- A sanitized keg to receive the filtered beer
- An extra keg to catch waste liquid (doesn't have to be a serviceable keg)
- A sealed gallon jug of distilled water (or at least two quarts of any water that you're SURE is sanitary)
- A filter housing with coarse (5 to 7 micron) media
- Two keg-out fittings
 - Keg-out fittings are used on both ends so you can come out of the beer keg, through the filter, then into the long dip tube to fill the receiving keg without splashing the beer.
- Hoses to connect the keg fittings to the input and output of the filter
 - I like them to be just long enough. A plate filter can be balanced atop a keg on a piece of 2 x 4, using the tension of the hoses to hold it in place
- A large container of StarSan solution – wide enough and deep enough to assemble the filter in (storage or trash bin or a wide bucket).

OK, so what are we gonna do? (these are the high points - details to follow)

- Chill the unfiltered beer
- Sanitize the complete filter assembly, including pads/cartridge, hoses and fittings, assembling them submerged to ensure that no air is in the system
- Fill the sanitized keg with CO₂ gas, then pour in the sanitary flush water
- Flush the sanitizer out of the filter by running sanitary water through it
- Connect the CO₂-filled keg to the filter outlet and filter the beer

And what are some key points?

- Try to keep the entire system free of air and filled with liquid
- Filter very slowly – anywhere from 30 to 60 minutes or even more for five gallons

Details, step-by-step

Pre-filter chilling of the beer

Put the beer to be filtered into the fridge for a while – at least long enough to get it thoroughly chilled. This allows chill haze to form, so it can be filtered out along with the yeast. A day appears to be sufficient, longer never hurts if you have the time. You may have read that chill haze can't be filtered with a 5 to 7 micron filter, but my experience disproves that (theory and practice are the same in theory, but not in practice). In general, the longer the beer is chilled before filtering, the clearer the end result will be.

Sanitizing and preparation

Fill the large container with StarSan solution. Disassemble the filter housing and put the parts into the StarSan. Immerse the hose and connector assemblies, remove the valves to fill all cavities, then reassemble. Immerse the filter pads in the StarSan and allow the air to escape from them (there will be a pretty impressive foam rush – that's the air that you don't want in your beer!), then assemble the filter and pads, making sure no air gets trapped in the assembly. Some filter pads can swell quite a bit when they get wet, making them hard to fit, but pre-assembling the pads to the filter before immersion is not recommended, as the tiny air bubbles that escape from the pads are almost impossible to dislodge. ID Carlson has pads that don't swell, so your local homebrew shop should be able to get them. Assemble everything while it's submerged in sanitizer, install the clamp bolts and button everything up. Now you can remove the assembled filter and let it sit. Sanitize the receiving keg and the gas hose and connector.

Setup

Gather the filter and hose assembly, the sanitized keg, the catch keg and the keg of chilled beer to be filtered. Isolate the CO₂ regulator from all other kegs (valve them off so they can't back-feed), then set the regulator to 0 psi.

Prepping the receiving keg

Now fill the receiving keg with CO₂. You'll need to fill from the bottom up to displace the air, and it turns out that you can push a gas keg connector (gray) just far enough onto a keg's output connector to allow gas to flow. Do that, pushing gently but firmly just until flow begins. How the heck can you tell if it's full? Sniff the keg opening. CO₂ stings the nostrils so harshly that it will make you recoil as if you've been shocked! Flow the gas in slowly – you want to displace the air, not mix with it – and sniff gently every minute or two. After five to ten minutes, you'll know when you're sniffing CO₂ instead of air ... trust me! You probably don't need to completely fill the keg with CO₂, but I always do it anyway. After it's full, open the gallon of distilled water and carefully pour it into the keg, then attach the keg lid. Some water jugs have a retaining ring that snaps free of the cap when you twist it off - be sure to remove the (unsanitized) ring so it won't fall into the keg.

Flushing the sanitizer out of the filter

Connect a gas hose to the water keg's gas-in connector. Connect a sanitized cobra tap outlet hose to the outlet. Open the picnic tap and slowly turn up the gas pressure until flow starts, then back off the pressure to near zero, vent the keg just a bit and establish a low-pressure, low-volume flow. Disconnect the picnic tap and connect the filter's input line to the water keg's out connector (a small bubble is unavoidable - don't worry about it). Connect the filter's output line to the catch keg's out connector – **not the receiving keg, but the waste keg, as we need to**

push the sanitizer out of the filter. Sanitizer should start to flow out of the filter – if not, increase the pressure slightly until flow starts. Tilt the filter in all directions and pound on the sides to loosen any trapped air bubbles. Flow two to three quarts to flush the sanitizer out of the filter – stop before emptying the water keg so the system will stay full of liquid. Disconnect from the catch keg to stop flow. Now disconnect the filter from the water keg, attach the picnic tap, open it and increase the pressure to discharge the rest of the water from the keg.

Filtering the beer

So now we've flushed the sanitizer out of the filter and we have a keg full of CO₂. Connect the gas to the unfiltered beer keg and use the picnic tap to purge the air from the dip tube. Connect the output of the filter to the receiving keg's output post and adjust the pressure for a very slow flow rate (typically 1 to 2 psi indicated).

Try to establish a flow rate of a gallon every five to ten minutes and try to keep the pressure low enough to prevent foaming. Just about any beer is going to have some residual CO₂ that will generally show itself as tiny bubbles in the filtering process, although the slower you push the beer through the filter, the less it will bubble. I don't like bubbles in my filter lines because I can't tell air bubbles from CO₂ bubbles. If you do see bubbles, make sure they're not caused by air entering through a leak in one of the connections (clamps can chafe through hoses).

Have a look into the receiving keg every few minutes to monitor the level (the CO₂ blanket will stay on the beer, so the keg lid doesn't need to be installed as long as the environment is fairly still and clean). When finished, install the keg lid, refrigerate and force-carbonate. I used to shake-carbonate the beer at 30 psi for two minutes until a friend said he'd read that shake-carbonating can damage head retention. Having tried plain forced carbonation without shaking, I would have to agree that a whole lotta shakin' goin' on is not good for your beer.

Closing remarks

Pre-chill, use coarse pads, be vigilant about excluding air, and filter slowly.

I've read some suggestions (even in manufacturers literature) that, aw heck, you probably don't really need to sanitize the pads/cartridge/whatever filter medium you're using. Do whatever you want, but I'm always going to sanitize and then flush with water.

In general, you probably shouldn't try to filter more than five gallons per set of pads. If the beer is pretty clear to start with, you can probably get away with ten gallons on a set of pads.

Filter manufacturers' recommendations and instructions are sometimes wrong for filtering beer, and they miss the critical point about oxygen so it's no wonder that filtering had a bad reputation for so long. Hopefully this article will help more people find success with filtration. While filtration cannot change a spoiled beer into a good beer, it can certainly improve the flavor of a cloudy beer.

Filtering Check List

Pre-chill the beer for at least a day

Prep/sanitization:

- Sanitize:
 - o a keg for the flush water/finished beer
 - o a keg output fitting (for the catch-keg)
 - o the filter assembly – assemble while submerged
 - Filter housing components
 - Filter pads
 - Hoses (just long enough) and good clamps (no air leaks)
 - Keg quick-disconnect fittings
- Flush the sanitized keg with CO₂
 - o Put CO₂ in through the keg-out fitting
- Pour the distilled water into the sanitized keg
 - o Take care not to drop the plastic lid-locking ring into the keg

Connections:

- Isolate CO₂ regulator from all but the keg to be filtered
- Set regulator to 0 psi
- Connect gas to flush water keg's inlet
- Connect picnic/cobra tap to flush water keg's outlet
- Increase gas pressure just until water flows when tapped
- Remove picnic tap, connect filter's inlet connector to flush water keg's outlet
- Connect filter's outlet connector to waste water keg's outlet (or bucket)

Purge sanitizer from filter:

- Turn gas pressure up to establish flow (< 1 psi)
 - o Burp air from filter
 - o Flow one to two quarts of water to purge StarSan from filter
 - o Disconnect from waste keg to stop while water is still flowing

Purge receiving keg with CO₂:

- Dump remaining flush water from sanitized water keg
- Fill keg with CO₂

Prep beer keg:

- Vent the unfiltered beer keg of any pressure
- Connect gas to unfiltered beer keg
- Connect picnic/cobra tap to beer keg's outlet, purge gas from dip tube
- Remove picnic tap from unfiltered beer keg outlet, connect filter's input connector

Filter the beer:

- Attach filter output to CO₂-filled keg
- Establish flow for minimum bubbles, 1 gallon in 5 to 10 minutes
- Monitor for bubbles and flow, adjusting pressure as required
 - o Will probably need to increase pressure somewhat as filtration progresses (5 psi max)
- Stop just before liquid level in unfiltered keg reaches bottom of dip tube
- Disconnect all, install lid
- Refrigerate and carbonate
- Odd "filter shock" flavor may take one to three days to subside