

Clear it up

Step by step, how to filter your wine

by Tim Vandergrift

Kit wines are designed to produce clear, stable wine in a relatively short time, fermenting to dryness and falling clear with the winemaker only needing to follow the instructions. One thing that can enhance your kit wine, however, is filtering. This article will deal with the practical concerns of filtering a kit wine with the three most popular machines on the market: the hand-pump filter, the mini filter, and the larger “super” filter.

Many readers will be familiar with the filter models discussed here. There are other models available, but they all operate on the same basic principle: they use a system to force wine through a set of cellulose pads, which retain solid materials and allow clear wine to flow through.

A word on cartridge filter systems: A decade of experimenting with them in applications ranging from filtering a single 3-gallon batch to filtering 300 12-gallon batches has led me to conclude that most hobbyists are better served with plate-and-frame filters. Cartridge filters do have one advantage over plate-and-frame filters, in that it's easier to do a sterile filtration with them, removing all yeast cells and bacteria from the wine. However, for most of us, sterile filtration is unnecessary, and the kind of absolute micron-rated cartridges necessary to achieve sterility are relatively expensive.

Filtering is the last thing you should do to your wine

Filtering clears wine by removing fermentation debris and some of the yeast. This prevents the material from breaking down during aging, which in turn increases the wine's stability.

Stable wines are less likely to change their appearance or taste with time. When a significant number of the mi-

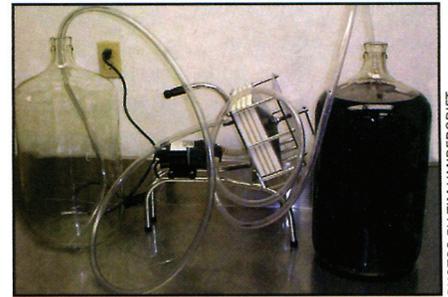
croscopic organisms that could restart Fermentation are removed, the amount of preservatives can be reduced. For the purposes of this article, we won't be discussing sterile filtration. It isn't necessary for kit wines.

Filtering also pushes the wine along in its evolution. As wine ages, compounds combine and settle out, leaving sediment. This eventually leaves the wine with a smooth, clean flavor. Because filtration prevents the formation of this sediment, it “force-ages” the wine, which tastes smoother while still young.

If your wine is very cloudy, a filter will clog too quickly to effectively clarify it. The large particles in a very young or very cloudy wine block the filter pads, causing the pressure inside the filter plates to rise. This in turn causes the wine to spray out the sides of the filter and puts stress on the pump and hoses. You can only filter a wine that is nearly clear already. Before filtering, your wine should have already been filled and racked. Filtering is literally the last thing you should do to your wine, just before you bottle.

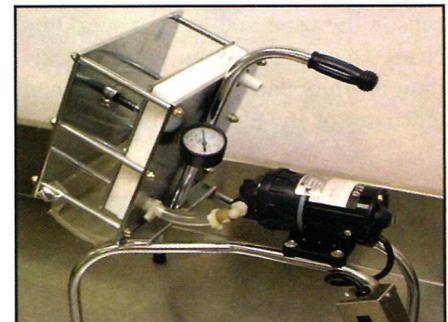
Successive filtering (filtering first with coarse pads and moving on to finer pads) isn't necessary with kit wines. Kit wines have low levels of dissolved solids, so if you've followed the filling instructions carefully, they will only need that single pass through a filter to be nicely polished.

Your wine must be properly sulfited before it goes through the filter. There is a chance that filtering can introduce oxygen into the wine, but the correct level of sulfite will prevent oxygen from damaging the flavor and color. The wine should be at 35- 50 ppm of free sulfur dioxide prior to filtering. This is equivalent to about one-half teaspoon of metabisulfite powder per

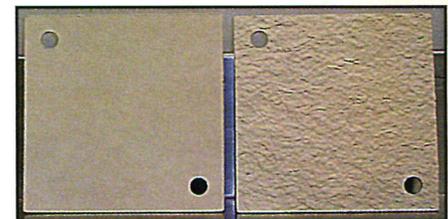


PHOTOS BY TIM VANDERGRIFT

Once the filter and hoses are sanitized, attach the intake tube to a racking cane and dip it into the wine. Don't forget the anti-sediment tip. The output hose runs from the outlet on the back of the filter plates into an empty, sanitized carboy.



The Buon Vino Super Jet (above, minus hoses for clarity) can clear six gallons of wine in five minutes.



The coarse side of the cellulose filter pad (right) faces the incoming wine.



The pads must be soaked until saturated in a citric acid and sulfite solution.

6 US gallons (3 grams per 23 liters). Note: This is the total amount of sulfite that the wine should have, so don't add an extra half-teaspoon to a kit that's already been correctly processed!

Which pads to use

Choosing the right pad is important: too coarse will leave your wine cloudy, too fine will clog too quickly. Different suppliers have different names or numeric designations for their pads, so we'll refer to them by the general designations of "coarse," "medium" and "fine."

Coarse filter pads are too coarse for use with kit wines. The holes in the pads are just too big to effectively remove any haze-causing particles, as they're intended for other applications.

Medium pads are usually recommended for red wines. After filtration, wine will show a significant improvement in clarity and brightness.

Fine pads are usually used for white wine, although they do a good job on reds as well. One pass through the pads will remove most of the yeast cells in the wine and leave it sparkling clear. They will clog up more quickly than medium pads, but the measure of efficiency of any filter pad is whether it effectively retains the materials clouding the wine, not how much wine will go through it.

Stripping wine

Some people worry that filtering will "strip" wine of color or flavor. Consumers have been egged on to this idea by marketing wonks touting unfiltered wines as superior products. While there's nothing wrong with unfiltered wine, and if you try hard enough in a commercial winery you can actually over-filter wine, this doesn't wash among home winemakers. There is currently no home system available with filter pads fine enough to "strip" flavor, color or aroma out of wine.

Let's think about wine going through a filter. If we visualize a color or aroma molecule as being the size of a piece of

spaghetti, then the passages in the filter pads would, in relation, be bigger than the Houston Astrodome.

What actually happens inside the filter is this: proteins and yeast cells, saturated with color compounds, are captured on the pads, staining them with pigment. This isn't color that would be left in the wine; it's already bound to a substance that isn't going to stay in suspension anyway.

Second, the terpenes and esters that give wine its delicate aroma are disturbed by the vigorous jostling of the filter. This causes some of them to go into hiding, binding to other compounds, and reducing the aroma and flavor of the wine. This "filter shock" doesn't mean the wine is permanently damaged. It will recover after a few weeks in the bottle, better than ever.

Can filtering harm wine? Sure, if the sulfite levels are too low and the filtering introduces enough oxygen to cause spoilage, or if the filter and all the hoses and connectors are not absolutely sanitary.

Using a hand-pump filter

1. Sanitize all surfaces that will come in contact with the wine. Dip the filter plates in a sulfite solution (or use a trigger spray bottle to coat them with your sulfite solution). Circulate sulfite through the pump reservoir and hoses. Rinse all surfaces thoroughly.

2. Soak your pads in a solution of one quart (one liter) of cold water with an eighth of a teaspoon (0.75 gram) of metabisulfite and one teaspoon (3.5 g) of citric acid dissolved into it (see page 55). If you don't have any citric acid you can substitute two teaspoons of lemon juice. Soak each pad in this solution, allowing it to saturate. Some pads will take longer than others; when they no longer float, they are fully saturated. Do not over-soak them.

3. Follow the instructions that come with the filter for assembling the pads into the plates. If your machine doesn't have instructions, use the following (some plate designs are different, so

work it out as you go). Place one filter pad, rough side up, onto the bottom plate (the one with the bolts sticking up out of it). Place the separator ring onto the pad, ensuring that the inlet port is arranged opposite to the outlet port on the bottom plate. Place the second filter pad onto the separator ring, rough side facing down, and then put on the top plate, making sure that the outlet port lines up with the one on the bottom plate. As assembled, it will look like this from the bottom up:

Bottom plate

Pad

Separator ring

Pad

Top plate

The pads will have both rough sides facing the middle of this stack.

4. Slip the washers over the bolts and tighten the nuts down. Be careful to torque the nuts down opposite to one another, like tightening the bolts on a car engine, or on a wheel: If you tight-

ABOUT FACE: PROPER PAD PLACEMENT

All filter instructions stress putting the pads in exactly the right way, and insist that the wine go through the coarse side of the pad and come out the smooth side. If you accidentally put the pads in backwards, you'll notice a marked decrease in filter efficiency. What gives?

The pores in the filter pads are not perfectly circular tunnels (they're not even remotely tunnels, but that's the best way to describe them). The pores are effectively funnel-shaped, with the big, open end of the funnel on the coarse side of the pad, and the tiny outlet on the smooth side. This design allows the pads to catch large volumes of wine and squeeze it down, retaining the solid material. If the wine goes through the pads backwards, it slows the flow. If you visualize trying to fill a jar with an inverted funnel, this becomes immediately apparent. So line up those pads!

en one too much before the others, you could crack the plates.

5. Fill the tank with fresh, cold water, about 2 gallons (7 liters). Connect the outlet hose of the tank to the inlet port of the plate assembly (it's on the separator ring). Connect the outlet hoses to the ports on the top and bottom plates.

6. Screw the pump handle onto the tank, place the plate assembly in a sink or bucket to catch drips, and gently pump the tank to force the water through the assembly. Don't attempt to over-pump the tank. Wine should flow out at a rate of about a quart (one liter) every 30 seconds.

7. If the plates leak, gently tighten the nuts until they stop.

8. Continue to pump the tank as the flow slows down, until all of the water has gone through the pads.

9. Empty the pressure tank and rack it full with your wine to be filtered. The pressure tank holds only a couple of gallons, so you will need to refill it at least three times. It isn't necessary to sanitize the filter between fills, as one set of pads should be sufficient to filter an entire 6-gallon batch. Don't over-pump the tank, but keep the flow rate steady and even.

Using an electric system

1. Sanitize all surfaces that will come in contact with the wine. Dip the filter plates in a sulfite solution (or even better, use a trigger spray bottle to coat them with your sulfite solution). Run sulfite through the hoses and pump motor, and rinse everything. Return the plates to the machine, making sure the semicircular tabs are on top and aligned with each other.

2. Soak your pads in a solution of one quart (one liter) of cold water with an eighth of a teaspoon (0.75 gram) of metabisulfite and one teaspoon (3.5 g) of citric acid dissolved into it. If you don't have any citric acid you can substitute two teaspoons of lemon juice. Soak each pad in this solution, allowing it to saturate. When they no longer float, they are fully saturated. Do not

over-soak them.

3. Put the pads into the machine. The coarse side of the pads faces towards the incoming wine and the holes in the pads line up with the holes in the plates.

4. Once the pads are in and lined up you can gently tighten the plate assembly. Over-tightening this will damage the plate-frame unit, and may ruin the threads on the screw handle (Super-Jet) or the tightening knobs (Mini-Jet). Never use any sort of tool to tighten the handles. This voids your warranty!

5. Make sure all of the hoses are in place and tight. On the Super-Jet the intake hose attaches to the upper right side of the machine as it faces away from you. The transfer hose goes from the left-hand side of the motor into the lower left corner of the plate assembly. The outlet hose attaches to the top right hand side of the plate assembly. On the Mini-Jet the intake hose attaches to the right side of the pump, the output hose goes from the left side of the pump to the bottom of the first plate, and the output hose comes out of the top left-hand side of the front plate.

6. To catch small drips, place the machine in a sink or in a shallow pan large enough to extend under the pads, then run six gallons (23 liters) of cold water through the machine. This will wash any cardboard dust off the pads and remove the remaining traces of sulfite and citric acid. Check the machine for leaks as it runs (gently tighten to eliminate sprays or strong discharges of water) and empty the drip pan.

Filtering your wine

1. Dip the intake tube into the wine to be filtered. If there is any sediment in the container you should attach a siphon rod (with a siphon tip) to the end of the intake hose. This will prevent sediment from getting into the pads and clogging them prematurely.

2. The filter works best if all containers are on the same level, or if the wine being filtered is slightly higher than the receiving carboy. This reduces the amount of work that the pump motor

has to do.

3. The first half-quart (1.2 liter) of liquid that comes out of the filter will be the water used to rinse the pads and should be discarded.

4. If you are filtering more than one kind of wine, don't change the pads for each batch. Instead, go on to the next wine, but you should filter light whites first, then heavier whites, sweet whites, light reds, heavy reds, and finally port. Rinse the machine with a gallon of fresh water between every filtration. Three pads is sufficient to filter at least one 6-gallon batch of wine, and more often can do two or three.

On the Super Jet, the pressure gauge will indicate when the pads have become too clogged to filter any more. When you are running water through the filter, the gauge will usually not show any pressure. When filtering, the pressure will gradually rise from 1-2 psi to 18-20 psi. When it reaches this level, the pads need to be changed. On the Mini Jet, the flow will slow to the

WHAT'S WITH THAT WACKY SOLUTION?

The solution for soaking filter pads is designed to accomplish three things. First, the combination of citric acid and sulfite sanitizes the pads while leaving very little residue behind. Second, the acid helps take away the papery taste of the filters. Third, the pads are impregnated with compounds that help trap particles inside the channels and also attract particles through an electrochemical charge. Literally, they have a kind of "static cling" that makes haze-causing compounds stick to them. But this doesn't come into play until the pads are below a certain pH. If you just used water to treat the pads, or water and sulfite, the pads wouldn't "work" until some wine had passed through, and you'd sacrifice efficiency. By pre-treating with an acidulated solution, the pH of the pads drops and you get this effect right away—and clearer wine as a result!

point where it becomes faster to change to a set of clean pads than it is to watch the slow trickle from out of the machine.

Troubleshooting

Wine does not move when pump turned on: Positive displacement pump filters, like the ones described above, are capable of self-priming when new. But as they get older, the valves that move the mechanism weaken and can't start the filtering action on its own. This is normal wear and tear. To start the pump, prime it by filling the intake hose with water. Connect it to the machine, dip the end into the wine, and turn on the pump. If it doesn't begin to go immediately, there may be something blocking the pump. Call your retailer.

Excessive leaking: Filter systems will typically leak about 5% of the wine being filtered. For a six-gallon batch this amounts to about 4 cups (1

liter). If you are getting significantly more leakage than this there may be something wrong. It may be that the plate assembly is not properly aligned or is not assembled correctly. The pads might be too fine, or simply plugged.

Flow stops after a few gallons:

The wine is probably too cloudy to be filtered, or you've chosen the wrong grade of pads. Stop filtering and assess the wine. It may need fining, or you might have to use a coarser filter pad.

Pressure gauge never moves:

The reading on the gauge will move during filtering. If it doesn't display any activity it may be blocked by a bit of debris. Ask your retailer for advice on clearing it or on obtaining a replacement gauge.

A few filtering tips

- Don't turn the filter on and off while filtering wine. This disturbs the structure of the pads and diminishes efficiency. Try to make sure you filter an

entire batch in one go.

- Don't try to fill bottles directly from the filter. To do that you either have to turn it on and off (see above) or you have to pinch off the flow from the output hose. This will result in huge back-pressure on the pad assembly and can cause wine to spray everywhere.

- If you filter a wine and see later that it has thrown a sediment, this is usually a fault of the fining and racking process rather than filtering. Most protein-based fining agents (gelatin, isinglass) will sail through a filter pad, and while they may not be visible in solution immediately, after a week they'll settle out as a milky haze in the carboy. Remember, you can only filter wine that is almost completely clear already.

- Carefully dispose of your pads as soon as possible, sealing them tightly in plastic. They are a smorgasbord for fruit flies, who bring along *Acetobacter* (vinegar-producing bacteria).