

Clarifying Your Wine – Fining and Filtration

Clarifying your wine to produce a clearer, brighter, more impressive finished wine can be accomplished through fining of your wine using wine clarifiers or through wine filtration.

Fining is a chemical method in which a clarifier, also known as a fining agent, is added to the wine to attract and settle out suspended particles. Fining requires more time and may not achieve the level of clarity that filtration can, but it will produce a significantly clearer and more polished final product. It is an economical clarifying method that makes sense for most home winemakers and is much faster than waiting for natural settling to complete. It can also be used for initial clarification of a wine before first filtering to settle larger particulates and make more economical use of filter media.

Filtration is a mechanical means of clarifying where the wine is pumped through a filter medium that catches particulates. Filtering is a very fast, efficient and highly effective, but more expensive, method of clarification that can produce wines of striking clarity and brilliance. Filtration can clarify a large volume of wine in a very short time and is a better method for most commercial winemakers; it can make sense for certain home winemakers as well.

Fining Agents

There are several types of fining agents available to the winemaker which are simple to use, and are fairly specific in their effect on a wine. Fining differs from filtration by being able to alter the chemical stability of a wine at the molecular level, allowing in addition to basic clarification, the removal of elements that are causing a haze or instability in the wine. These elements may be too small to be trapped by even the tightest wine filter, and are therefore not always removable by filtration.

Fining agents are usually added to a wine in the form of a slurry or liquid to allow them to be evenly and quickly dispersed. Once this occurs, two things start to happen: they adsorb, or react with, components of the wine (causing other molecules to stick to them); and they then begin to settle out of solution. The first action—adsorption reactions—often begins immediately upon addition. The second action—settling out—can take up to a week. The chemical and physical nature of each fining agent is different, making them selective in what they interact with in the wine. This allows the winemaker to select fining agents to control what components are removed, whether for stability, clarity or flavor modification. Here are some common fining agents, their properties, and uses:

<u>Fining Agent</u>	<u>What it is</u>	<u>How it works</u>	<u>Application</u>
Bentonite	Clay	Carries negative charge; attracts positively charged particles	General clarification and stability
Sparkolloid	Algae derivative	Carries positive charge; attracts negatively charged particles	General clarification and stability
Casein, gelatin, albumin and isinglass	Animal-derived proteins	Binds with polyphenols (tannins and pigments)	Tannin, browning and polyphenol reduction; enhancing of fruit aroma

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PVPP	Polyvinyl polypyrrolidone	Binds with phenols and polyphenols	Reduction of browning and bitterness
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Fining can also be an effective way to minimize the amount of filtration that is required to produce a brilliant wine, thus reducing the costs of filtration. Both bentonite and Sparkolloid remove suspended particulates from the wine, reducing the size and amount of particles needing to be removed by the filter. Fining for this purpose is generally done at the first racking when most of the heavy solids have settled out after fermentation.

It may sound like fining agents are magical additives that will quickly give you brilliantly clear wines, but care must be exercised when using them. Adding too much may strip desirable flavor components from the wine; adding too little may not give you the desired result. For this reason, it is recommended that you always run a bench test—a trial on small samples of wine using different rates of addition of the fining agent—to determine the best quantity to use without adversely affecting wine quality.

Wine Filtration

Filtration is used by many winemakers to produce wines with brilliant clarity. Most wine will clarify quite nicely on its own if given enough time, but that can be too long for many winemakers. Filtering wine is typically more important to the commercial producer than to the amateur because of time, volume, and marketing demands. In addition, the initial investment in a filter unit can be substantial. Contrary to some popular notions, since filtration is a mechanical rather than a chemical process, little or no flavor or color is lost or gained using filtration. Keep in mind that filtration of any type will not necessarily prevent future instabilities or the later precipitation of color pigments in red wines. It should also be noted that filtration most likely won't improve the inherent quality of the wine, although the attractiveness of a brilliantly clear wine can add to one's appreciation of it and to better commercial marketability.

Wine filtration systems consist of two parts – **filter unit** and **filter media**. Filter units consist of the hardware components - motor, pump, media housings, fittings, hoses & stand - that direct and push the wine through the filter media. The filter media (in the form of pads or cartridges) is that material which the wine passes through to have suspended particles trapped and taken out of the wine. Filter media come in various tightnesses, or porosities, which indicate the smallest particle size that will typically be stopped by the filter. Refer to our Filter Media Explained page for more detailed information about filter media.

Filter Units (hardware):

Filter units are designed and configured to use either cartridge or pad filter media. Cartridge type units are typically more cost effective for annual production levels up to around 10,000 to 15,000 gallons and Plate & Frame or Cross Flow units, which use pads, can be more economical for larger production operations. Plate & Frame and Cross Flow units are very expensive but the pad filter media can be less expensive per piece than cartridges and they generally filter faster. Even for larger operations, having a cartridge unit may still be desirable to use for finishing/polishing filtration using an absolute membrane cartridge. We do not sell Plate & Frame or Cross Flow filter units but we do carry filter pad media for use with many of those systems.

We now offer three options for filter units for our customers:

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1. **Buon Vino Jet Filters** – These are small units with their own size of pad media. These units are suitable for smaller volumes only - up to around 20 gallon batch sizes - and are a good option for home winemakers who want to try filtration affordably. We offer the [Buon Vino Mini-Jet](#), which is good for 5-10 gallon batch sizes and the [Buon Vino Super-Jet](#) Filter, which is better for batch sizes in the 12-20 gallon range. The units tend to leak a little, but they are an economical filtration option and we have many satisfied amateur winemakers who use them.

2. **Enolmatic Filter** – [The Enolmatic Vacuum Bottle Filler \(VBF\)](#) is an excellent and convenient bottle filler for the home winemaker or small-scale commercial winery. A vacuum pump automatically starts a siphon and automatically shuts off when the bottle is filled. Since the wine is moved by vacuum created suction rather than being pumped, there is less potential oxygen exposure for your wine. The Enolmatic operates on a continuous duty cycle with a fast, adjustable fill rate that can bottle up to around 180 bottles per hour. In addition to bottling, the VBF can be set up to function as a transfer pump for racking. The Enolmatic VBF system allows addition of an optional [in-line filter housing \(VBF-FH\)](#) that can be purchased separately and added to the unit in front of the fill spout, allowing the wine to be filtered as it is bottled or racked. The Enolmatic filter unit is a cartridge unit that uses 10” M6 style single open end (SOE) filter cartridges.

3. **PIWC Cartridge Filter Unit** – [See all available units here](#). Presque Isle Wine Cellars’ in-house designed and fabricated filter units are a simple, economical, durable, and time-tested filtration unit that will get the job done for many small and medium production commercial operations and can even be suitable for some high volume home winemakers as well. These complete units come with motor, pump, and filter housing on a convenient platform and use cartridge type filters. We also carry a wide range of cartridge filter media for use with these units. See our [Filter Media Explained](#) page and our [Filter Cartridge selection table](#) for help in selecting cartridges.

We have been making and using these units for over 45 years and have many satisfied customers. We stock several popular configurations but the units are customizable to suit your needs – pump and motor size, housing size, housing type, housing material, number of housings, etc. If you need something other than our stock units, please call us (814-725-1314) and let our technical experts help you configure the right custom unit for you.

We assemble these units ourselves from component parts we purchase. The units are very rugged and are suitable for commercial wineries or enthusiastic amateurs producing up to 10,000 to 15,000 gallons per year and typical batch sizes of 500 gallons or less. The PIWC unit consists of a positive displacement self-priming pump with either an internal or external pre-screen, carbonator motor, cartridge housing, stand, hoses, and connectors. They are ready to use as soon as a filter cartridge is inserted. See our [PIWC Filter Unit Instructions](#) page for more information on how to best use your filter.

See all available PIWC Cartridge Filter Units [here](#).

Configuring Your PIWC Cartridge Filter Unit

To configure your unit you will need to decide on the pump size and on your housing and fittings configuration. Pump selection is pretty straightforward. Housing configuration selection is a bit more complicated.

Filter Pumps

Two pump sizes are available. The FP100 is brass only and must be the choice with a 10” housing/cartridge. Its throughput is 100 gallons per hour (1.67 gal/minute). Any faster than that could compromise the integrity of 10” cartridges. The FP100 can be used with 20” housings/cartridges but is

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rather slow. The 240 gallon per hour (4 gal/minute) pump is available in both brass (FP240) or stainless steel (FP240SS) and is recommended for use with 20” cartridges. This bigger pump is probably not cost effective until your production reaches around 2,000-3,000 gallons annually. If the juice or wine is relatively clean and clear of large particles, these pumps can be used as simple transfer pumps by bypassing the cartridge. Freshly pressed juices likely will have larger particles that will very quickly and constantly clog the strainer screen creating a frustratingly slow transfer. Even the slow speed in clean liquids can be a frustration. These pumps should never be used without the strainer screen in place as that could allow abrasive particles to damage the pump. Failure to have the screen in place would void any warranty.

Filter Housing Configuration

The key to determining the best housing configuration lies in understanding what you want to accomplish with filtration, the types of cartridges you want to use, the volume of wine you will be filtering in total and per batch. There are five things to consider pertaining to housing selections:

1) **Number of Housings** - You will need to decide if you can get by with one housing versus having more than one. The advantage of multiple housings is that you can set up a ‘cartridge train’ from coarser to finer and filter with fewer pump passes to save time and oxygen exposure to your wine. Having only one housing would require passing the wine through the pump each time you change porosity level of the cartridge filter. The tradeoff between saved time and expense for the additional housings will need to be considered in your decision. The home winemaker and small volume wineries can probably get by with only having one housing. Keep in mind that housings are available separately and can easily be added on to your unit if you decide you need additional housings later.

2) **Housing Material** - You will need to decide on the material of your housing. Plastic is less expensive but not quite as sanitary because scratches are more likely to occur in the material over its life which then can serve as a hideout for microbes, etc. Stainless steel is more expensive but is also more durable and provides a higher level of sanitation. Stainless steel housings can also be machined to create a better sealing surface for the cartridge, and are therefore recommended for the tightest cartridges.

3) **Size of Housings** – There are two sizes of housing available – 10” and 20” – to accommodate 10” and 20” cartridges, respectively. 10” housings are less expensive but the cartridges will have less throughput. A 20” cartridge will more than double your throughput. It is inefficient and less sanitary to change cartridges in the middle of a filtration, so the expected typical batch size should be considered. Again the choice involves evaluating the tradeoff between equipment cost and time.

4) **Housing Fittings** – Housing fittings determine how the housings are opened for cartridge insertion and cleaning and how hoses are connected to the housings. Threaded only housing fittings are the least expensive but make it more difficult to disconnect hoses and clean the unit. A combination of threaded & tri-clamp fittings are mid-range on cost and a total tri-clamp fitting set up is by far the most expensive. Tri-clamp fittings offer the best sanitation protection and can be very handy when quick connection and disconnection of parts including hoses is desired. Presently we don’t stock total tri-clamp housings but we can get them special order if our customers want them. Using tri-clamp fittings also allows easy connection of multiple housings and has some significant advantages.

5) **Cartridge End Configuration** – [Cartridges](#) are available in two types of end configurations, Double Open End (DOE) and Single Open End (SOE). You will need to select a housing that is compatible with the type of cartridge you want to use. A DOE cartridge is open on both ends of the core and has gaskets that compress and seal against the housing at top and bottom. An SOE cartridge is open only on one end. The closed end is inserted into a receiver in the housing and it uses a double o-ring system to

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seal against the housing at its open end. As long as the wine can't slip past the seal on the ends of the cartridge it must pass through the media to get to the core and exit the housing. If the seals fail, then bypass occurs and some the wine is not filtered. DOE cartridges have very good and reliable seals but not quite as good as SOE cartridges. SOE compatible housings had been significantly more expensive, although we are now working with a new manufacturer and are pleased to be able to offer SOE housings that, while still more expensive than DOE, are more affordable than in the past.

A pressure gauge is included with each housing to monitor the cartridge while filtering. When a new cartridge is installed, the pressure difference across the filter should be about 2 psi. The pressure difference will rise as the cartridge traps particles, plugging it up until it reaches its capacity. Generally, a cartridge is considered to be at capacity when the pressure reaches 30 psi.

We work closely with our manufacturers to get the best filtration housings and filter media available for our customers and we have access to their technical and engineering expertise. Please feel free to contact our sales and technical representatives to help you figure out the best filtration system for your needs.

Filter Media ([pads](#) & [cartridges](#)):

Filter Media is what actually catches and removes the particles and impurities from the wine. Filter Media is available in cartridge format or pad format. Cartridges are used in our PIWC Brand filter units and in our Enolmatic filter units. Pads are used in commercial Plate & Frame or Cross Flow filter units as well as in our Buon Vino Jet filter units. While we do not carry Plate & Frame or Cross Flow units, we do carry pad filter media that is compatible with many units on the market. We carry a wide array of cartridge filter media that is compatible with all the filter units we sell. Refer to our Filter Media Explained page for more detailed information about filter media and check our [Filter Cartridge Selection Chart](#) for help identifying the right filter media for your needs.