



# GRAVITY FILTERING

Simple tools and techniques for filtering small batches of maple syrup

**W**hen boiling maple sap to concentrate the sugar into syrup, other compounds are concentrated as well, resulting in the formation of a gritty ‘sugar sand,’ or niter, that settles



out over time, as well as smaller particulates that remain suspended and make the syrup appear cloudy. Primarily calcium and magnesium, the amount of these contaminants that accumulates in syrup varies from season to season and from sugarbush to sugarbush, and simply can't be avoided.

To ensure that your maple syrup is the best it can be, filtering out these contaminants before packing is critical. If you skip this step, customers will experience a gritty feel on their tongue when tasting your syrup, or will notice the sediment and lack of clarity, particularly if packaged in glass containers, and buyers purchasing syrup in bulk will certainly

discover it and likely pay less for your product.

Many producers use a filter press, which uses a pressure pump to push the syrup through a series of metal plates and frames, separated by single-use pieces of filter paper

which capture the particles and result in crystal-clear syrup. The addition of food grade diatomaceous earth or diatomite to the syrup aids in the filtering process when using a filter press. For smaller producers, however, using paper and cloth filters and letting gravity pull the syrup through is an acceptable and far less expensive option.

The principle of gravity filtering is straightforward: hot syrup is poured into a canister or large flat pan fitted with several layers of paper and cloth filters, and the syrup passes through, leaving behind any niter or other contaminants.

Note that the filtering process described here is meant to remove the mineral buildup that naturally occurs as a result of the boiling process, not foreign matter like leaves or other debris. Such items should be excluded before the boiling process by filtering the sap as it is gathered and pumped into the storage tank.

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### Filter material

Filter material includes paper filters that capture large particles, and cloth filters that capture smaller ones. Cloth filters are either felted wool or synthetic



Flat filters are layered over a metal screen which is laid over a pan. The bottom filter is felted wool or synthetic Orlon, and paper pre-filters are laid on top.

Orlon, either in the shape of a bag-like cone suspended over a filter tank, or flat used in a tray over a pan. New filters should be rinsed thoroughly in hot water a few times before using, to remove any chemical odors they may have from the manufacturing process.

Filters should also be rinsed in hot water right before use, since dry filters will absorb syrup and clog immediately, rather than allowing it to pass through. Some producers use RO permeate or distilled water for this rinsing, since minerals in hard water get left behind in the filter's fibers and can darken syrup. Allow the filter to drip dry outside of the filtering canister for a while before using, since having a lot of water remaining in the filter could dilute the syrup, particularly small batches. It is essential that you do not wring out or twist the filter. Doing so will separate the fibers, leaving gaps in the material large enough to allow particles to pass through.

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### **Filtering**

Most producers use disposable paper, synthetic, or 'polyspun' pre-filters on top of the cloth filters, sometimes stacking a few of the paper ones on top of each other. This allows for the removal of the top paper filter when it has a significant amount of debris accumulated on it, and the

continued use of the remaining ones below which have remained cleaner, expediting the process. Paper filters should not be used alone. While they do an adequate job of removing large particles, smaller particles will still pass through and the resulting syrup will remain cloudy. Both paper and cloth filters should always be used with the same side facing the unfiltered syrup, and never turned inside out or flipped over, so that captured particles aren't forced out later into filtered syrup.

After assembling the flat or cone assembly with a wet cloth filter and a few layers of pre-filter papers, hot syrup is poured onto the top layer. Syrup should be at proper density before filtering. If it is not yet the proper density of syrup the minerals may still be suspended in small enough particles to pass through the filter, and if it is too dense it will quickly clog the filter. Syrup at the correct density should flow through slowly but steadily.

The more syrup added to the flat or cone filter the more pressure being put on the liquid at the bottom, and the faster it will flow through the filter. For a cone-shaped filter this pressure builds naturally, but also means that the debris is concentrated over a relatively small surface area at the bottom of the cone, clogging it up more quickly. The flat filter disperses the syrup and



When the prefilter gets clogged with debris and syrup is no longer passing through, it can be lifted out and the contents carefully poured into the next layered filter.

off carefully, with the unfiltered syrup poured onto the next remaining layer. Once the paper filters have been removed and only the cloth filter remains, the unfiltered syrup can be poured back into the evaporator or other receptacle to be reheated and filtered later. The filters need to be cleaned or set aside for later cleaning and replaced with a clean second set. Be very careful not to tip any of the unfiltered syrup into the clear syrup that has already been filtered.

Avoid the temptation to use a spoon or other tool to scrape the debris from the filter while syrup is passing through, as this will

the debris over a wider area, but works more slowly as the weight of the syrup is also dispersed.

As the filter collects particulates it gets progressively more difficult for syrup to pass through it, making the process slow down. When the syrup flow through the filter has slowed significantly, the top layer of paper can be lifted

force particles through the filter, resulting in particulates remaining in the filtered syrup.

Some filtering tanks have the capacity to hold more than one cone at a time, to allow for more rapid filtering of batches of hot syrup. While any food-grade receptacle can be used to capture filtered syrup, note that some old-

er canisters designed for filtering may have lead solder, be made of English tin, or galvanized, and should not be used for syrup.

### **Bottling**

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Once the syrup passes through the filter and is gathered in the collection tank below it is clear and ready to be bottled. Keep in mind, though, that gravity filtering does take time and that you should check the temperature of your syrup to ensure that it is between 185-190 degrees when bottling. If the syrup has dropped below that temperature, reheat

the syrup to the proper temperature before filling bottles. Some filtering tanks are insulated to maintain the syrup's temperature, and others can be placed on a burner which helps keep the filtered syrup at the correct temperature for bottling.

Reheating syrup stored in bulk before bottling can also cause the formation of additional niter, so re-filtering is recommended.

### **Cleaning filters**

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Paper and cloth filters should only be washed with hot, potable water, never with bleach, soap,



It will be obvious when it's time to change your filter. Syrup will pass through very slowly or not at all, and debris will be visible in the bottom of the cone.

or any other chemicals. Traces of those cleansers left behind will ruin any syrup that runs through the filters in the future, imparting an aftertaste even if thoroughly rinsed beforehand.

Because the largest particles accumulate on the filter's top surface, where the syrup was originally poured, it is advisable to rinse in such a way as to avoid forcing those particles into the cloth. To do so, the accumulated debris can be gently scrapped off before rinsing – use a plastic tool, rather than metal, to avoid damaging the filter – or water can be sprayed through the filter from

the bottom side, dislodging the grit away from the filter.

Once thoroughly rinsed, filters should never be wrung out or twisted to dry. Doing so damages the fibers and will allow larger particles to pass through in subsequent uses. Pressing them dry on a flat surface or using a clothes wringer with parallel rollers works well. Hanging them to dry in a well-ventilated area is best. Hang them not touching each other. Allow them to dry completely before storing them between seasons, and never store them with mothballs, cedar, or any other products that give off



Handle your filters with care, and never wring them out or twist them to dry -- hang them where there is good air circulation. Twisting them will break their fibers, which will allow particles to pass through the next time they are used.



odors, as these smells will be imparted to the next batch of syrup filtered.

### Filter Presses

Filter presses (air or electric pump actuated) use special papers and diatomaceous earth (DE) for filtering, and are a necessity for larger maple syrup producers. This results in maximum clarity and is especially effective when bottling in glass. The syrup must still be filtered hot but, the filter papers last longer between cleanings. A small amount of DE must be added to the hot syrup before filtering. The smaller producer can purchase the small hand operated filter press which uses the same papers and DE as the larger units at any maple equipment supplier. Manufacturer's instructions are provided on the use and care of these units.

To ensure that your customers get the best product possible, and that you are able to capture the highest prices for your syrup, proper filtering is a necessity and important step in making high quality maple syrup. The gravity process described here is a straightforward and inexpensive way to filter small to moderate amounts of syrup.



While gravity filtering is sufficient for small quantities of syrup, larger producers should use a filter press, which forces syrup through a series of plates lined with filter paper.

## Using a cone filter?

Take your filtering to the next level with the  
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- Use your existing cone filter, pre filters and tank.
- Filter using the largest part of the filter, not the smallest.
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**"Optimizer" in the subject line.**



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*Photos: pg. 1, 4, &5: Michal Lumsden; pg. 2: Patrick Delaney; pg. 6 & 7: Winton Pitcoff*

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*This supplement to the October 2017 Maple Syrup Digest is an educational tool developed for sugarmakers by the North American Maple Syrup Council as part of its mission to educate sugarmakers in an effort to advance and improve the maple syrup industry. Funding was provided by our 16 member associations, representing thousands of sugarmakers in the United States and Canada.*



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