



# HOW TO STORE LENTICULAR MODULES

## For Use Between Each Filtration - Wine

### RECOMMENDATIONS

Some of the things we love about the **Seitz Supradisc II® Lenticular Filters by Pall** are that they are back flushable, hot water and steam sanitizable and storable between uses. This means you can use them over and over again without the media warping until they are full of solids or when a regeneration procedure doesn't bring the differential pressure back down.

In this excerpt, we will discuss the solutions for storing your modules correctly between uses to ensure a longer lifespan and higher total throughput. They are easily stored in a liquid solution and shouldn't be allowed to dry out as this will cause turbulence during filtration and premature fouling or bypass.

You can either store your modules inside the housing – Pall recommends steaming or hot water sanitizing them after a regeneration (backflush followed by the forward flush procedure) and then placing the drained housing under at least 1 bar (14.5 psi) and up to 1.5 bars of pressure with a food-grade gas like nitrogen. You can also use CO<sub>2</sub> but take into account that CO<sub>2</sub> is a soluble gas and it will take longer to build up the proper pressure. As long as the pressure does not drop below 1 bar, the media can be stored like this for months. *This only works if your seals are sound so that pressure cannot escape over time. Keep in mind that many housings are not pressure rated for gas pressure, only liquid pressure, so for safety sake, don't pressurize a housing without that certification in hand.*

The most common storage method is to store the modules in the housing or in a suitable container with a lid where they can be weighed down to keep them fully submerged in the storage solution. For storage in a solution for longer than two days, we recommend removing the silicone gaskets or O-rings on the modules, otherwise, they will stretch, become brittle and break up into little pieces. A brew fermentation bucket that is not tapered is suitable for the 12" modules whereas food-grade plastic trash cans or Rubbermaid totes with lids are suitable for the 16" modules.

### SOLUTIONS TO STORE MODULES IN

- **Inexpensive Ethanol (vodka - neutral, not denatured, isopropyl alcohol or methylated spirits) for 12" Modules**

Make sure you that the strength is at least 40 proof but not higher than 135 proof at which point you can start to prematurely age and crack the module cage or storage container over time. This storage solution is good for weeks to months and can be reused multiple times.

*When choosing this method, be aware that your module should be purged with gas before storage to ensure that little to no dilution of the alcohol takes place.* Remember to bring the backpressure up to 3 - 5 psi when purging to force the gas into all the pores to get most of the liquid out.

If the alcohol % of the vodka is under 20%, you will likely see spoilage organisms start to grow inside the module. Therefore, we only recommend this method for 12" modules. We see a poor distribution of the alcohol, and subsequent spoilage within the depth of a 16" module, unless the ethanol is circulated first. This requires impractical amounts of ethanol.

- **Acid Sanitizers like Nitric or Phosphoric Acid Blends**

The manufacturers of cellulose filter media advise against using phosphoric acid or nitric acid solutions or long-term contact with oxidizing sanitizers like peracetic acid. These acids tend to break down the resin that binds the cellulose media together and that can lead to a premature breakdown of the cellulose structure, which in turn can lead to the filter media landing up in your filtered product as well as inconsistent filtrate quality. *Running these chemicals through the media just before filtration is acceptable but contact time longer than recommended is detrimental to the media.* Some of them can also break down over time, change color and cause off-flavors in the media at which point bacteria can easily start to grow again.

- **Other Acids**

Acceptable acids to store media in include citric and tartaric acid but for the long term, it has to be used in combination with potassium metabisulfite (KMBS) to keep spoilage organisms from metabolizing these bio-essential acids over time. This method is commonly used in the wine industry and modules are stored this way in the long term. Periodic additions of SO<sub>2</sub> have to be maintained to keep the modules from spoiling.

- **Solutions to Avoid**

*These solutions are not recommended, not even at your own risk.* Ozone will destroy the media within minutes, as well as Iodophor, which will permanently stain the media. Caustic soda is also not recommended for a contact time of more than 6 cumulative hours, as it is difficult to remove/neutralize and it will also start to break down the cellulose structure after this amount of time.

Whatever storage solution you choose, make sure that you regularly inspect the solution to make sure that your modules are properly submerged, that the gaskets have been removed, and that your solution is still sanitary.

Here is a quick reference guide as a summary:

## LENTICULAR MODULE STORAGE SOLUTION OPTIONS

TYPE	CONTACT TIME	NOTES
Inexpensive Ethanol (Vodka)	> Months	*Keep strength above 20%/40 proof but under 67.5%/135 proof. *Do not use denatured spirits. *Not recommended for 16" modules, only 12". *Purge out water very well before submerging to avoid lowering proof < 40 degrees.
Nitric and Phosphoric Acid/Blends	Maximum 6 hours cumulative	Use at own risk. These acids damage the cellulose structure at longer contact times.
Peracetic Acid at 0.05%	≤ 3days	After this time the peroxide in the formulation will have broken down, offering little protection against spoilage. Storage at a higher concentration can lead to premature breakdown and/or damage of the media.
Citric Acid 1-2% Solution	≤ 3days	After this time bacteria will target this solution. Commonly used in wineries with 50-200 ppm of added SO <sub>2</sub> for long term storage. Periodically add more SO <sub>2</sub> by dropping in an Inodose effervescent tablet. Care should be taken if bacteria is already present in the module, then bacterial spoilage will begin within hours without added SO <sub>2</sub> .
Citric Acid 1-2% in combination with 50-200 ppm SO <sub>2</sub>	≥ 3 months	After this time bacteria will target this solution. Commonly used in wineries with 50-200 ppm of added SO <sub>2</sub> for long term storage. Periodically add more SO <sub>2</sub> by dropping in an Inodose effervescent tablet. Care should be taken if bacteria is already present in the module, then bacterial spoilage will begin within hours without added SO <sub>2</sub> .
SO <sub>2</sub> Solution without Acidifying 50-200 ppm or ≤ 1000 ppm	≥ 3 months	Not as efficient as acidifying the solution first, but still a solid choice to store your media. You can use up to 1000 ppm of SO <sub>2</sub> which helps to bleach the media if your intention is to remove color. The lower the pH of the solution, the more effective the SO <sub>2</sub> will be. Add more SO <sub>2</sub> periodically (Inodose effervescent tablets) to make sure the solution stays effective.
Sulfuric Acid 2% Solution	6 weeks +	Recommended by the manufacturer for long term storage.
Caustic Soda (NaOH or KOH 1-2%)	≤ 6 hours	Difficult to neutralize, longer contact time weakens cellulose structure.
Ozone Water/Gas	Not recommended by the manufacturer	Instant destruction of media.
Iodophor or other Iodine-based Sanitizers	Not recommended by the manufacturer	Permanent staining and impossible to remove.