White Wine Tank Maturation Techniques

Purpose:
Using tank fermentation and aging techniques to match flavor and character profiles of barrel fermented white wines.

Approach:
Ferment on toasted oak in the form of StaVin Beans, Segments or Staves to help integrate oak flavors in a similar way to barrel fermentations. As a wine's fermentation slows, oxygenation may be used to encourage completion of the fermentation. Begin slow, but complete mixing of the yeast lees in the tank. Mixing must be done carefully to prevent boiling over of the tank from loss of dissolved CO_2. Once primary fermentation has completed, inoculate for MLF. Oxygen additions can be made to encourage completion of MLF. The addition of oxygen is done after mixing – usually no more that 0.5 ppM in a 24 hour period. Once MLF has completed, add SO_2 to a free level of approximately 25 ppM or you normal addition for barrel program. Mixing or stirring of the tank will continue on a weekly basis for a minimum of 3 months. Oxygen additions can be made following stirring – up to 0.5 ppM in a 24 hour period. The winemaker will determine if the oxygen addition is to be made. The determination is best made just prior to mixing. Both top and bottom tank samples should be taken and evaluated.

Methods:
Toasted Oak – These products should be secured in the tank for fermentation. Numerous methods are available for all three StaVin products. The most popular is the Fan System. Installation involves welding C rings at 3 to 4 foot spacings around the circumference of the tank. They should be placed *a minimum of 4 feet above the bottom of tank* to allow better mixing of the lees. The rings themselves may be enough to hold the toasted oak for smaller fermentors. For larger fermentors a stainless steel chain is run through the C-rings and the Stave Fans, bags of Beans or Segments are attached to the chain.

Stirring the Tank - This is by far the most important procedure when white wines are fermented and aged on toasted oak and yeast lees. We recommend stirring at least once per week. The winemaker, however, should determine if this is often enough or too often for their tanks. Australian winemakers have been known to mix once per day! There are at least four "mixing" systems that appear to satisfy the winemakers using them. (This is not to say that there are not more system in use!)

1. The Snake System – This employs a piece of reinforced food grade tygon tubing, usually ¾" to 1" OD, attached to a barbed fitting at the bottom of the tank. Wine being pumped through the tube will whip the snake into the lees skin, breaking it up. More complete circulation occurs by pumping through the bottom valve and rack valve as the snake disturbs the lees. The cleanest way to use the snake is to add a 2" tri-clover fitting both outside and inside the tank. Then a 2" tri-clover with barbed fitting (with the hose attached) is installed on fitting inside the tank.

(See pictures below). The tube appears to function well at 2/3's to 1 tank diameter in length. To keep the snake on the bottom, so that it whips properly along the bottom and not vertically in the tank, weight should be placed along the tubing. The best weights appear to be fermentation bungs slid along the tubing. This is enough weight and also protects the tank from abrasion. The system should be tested by filling the tank to the rack door with water. Then the flow rates needed to get the proper snaking action from the tube may be determined (these may be modified using the outside valve).

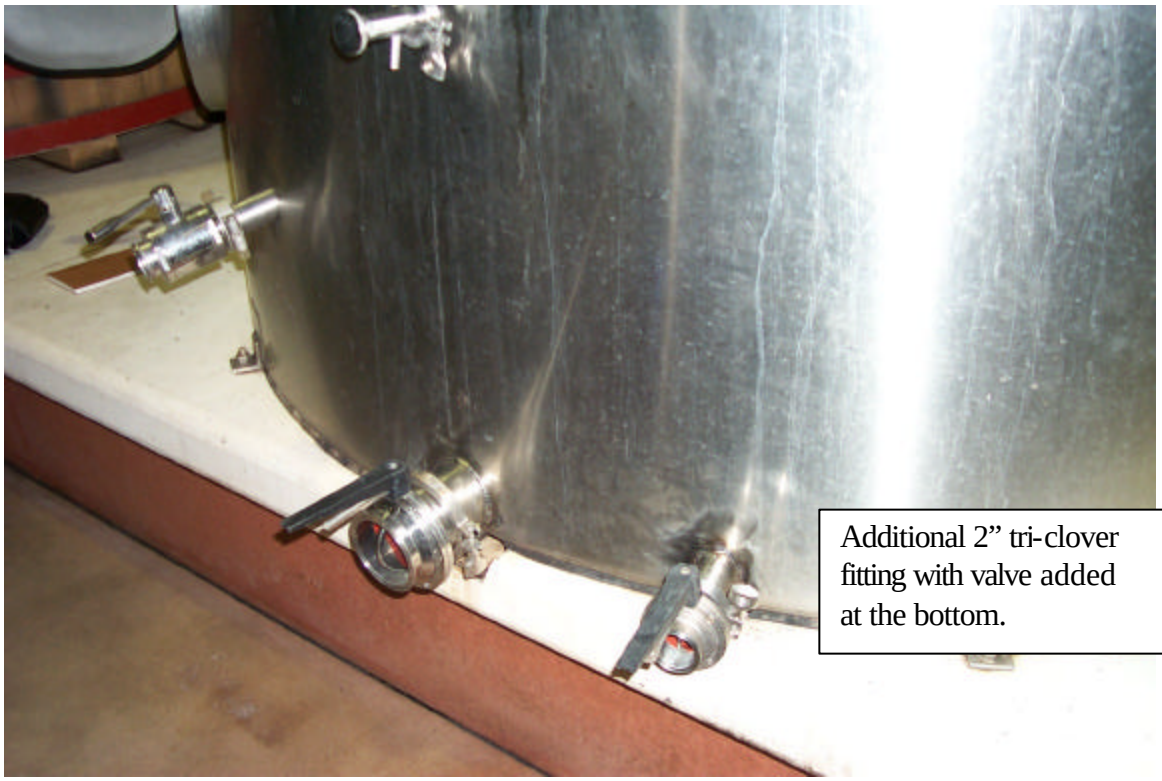
2. Rotating Rack Valve – Some winemakers have found that pumping wine back though a rotating racking valve can do a reasonable job of mixing a tank with lees. Rotating the valve from side to side may create enough agitation to break up the lees that may have skinned over. Though it has not been tried, the attachment of a tube to the end of this rotating rack pipe may induce additional turbulence to help mix the lees.

3. Submersible Pumps – Some Australians use a combination of two pumps to help mix tank lees. These are food grade SS pumps lowered through the top of the tank. One pump is upright. The other is laid on its' side and moved around as much as the connections allow, to aid in mixing.

4. Active Tanks – A number of Australian wineries have motors mounted on the outside of their tank so that the shaft is oriented at about a 30? angle downward and inward. Propellers mounted on the shaft inside the tank do a nice job of circulating a tank.

Some winemakers have tried to use Guth mixers, but have not been satisfied with results. The lees tend to accumulate on the sides and skin over hard. Also, the toasted oak must be attached very securely or the mixer could be damaged if any oak comes free.

Micro-Oxygenation - After primary fermentation has finished, the program may include some level of micro-oxygenation for approximately the first three months. We have calculated that up to 0.5 ppM of O_2 is added when stirring lees in barrels. During fermentation and MLF, O_2 may be added to help the wines finish. While stirring should be started at the end of primary and continued through MLF, oxygenation should start post MLF unless help is needed to finish MLF. Once the wine has had SO_2 adjusted, oxygen should be added only after stirring the tank and at the winemakers' discretion. It is important that the lees be stirred first! Unlike in red wine fermentation, we depend on the particulates (yeast and grape solids) to consume the oxygen in white fermentation. This aids the timely death of yeast in semi-oxidative conditions, minimizing the potential for H_2S and encouraging the autolysis of the yeast. The usual addition would be up to 0.5 ppM over a 24 hour period, after stirring. For further information please contact StaVin Inc.



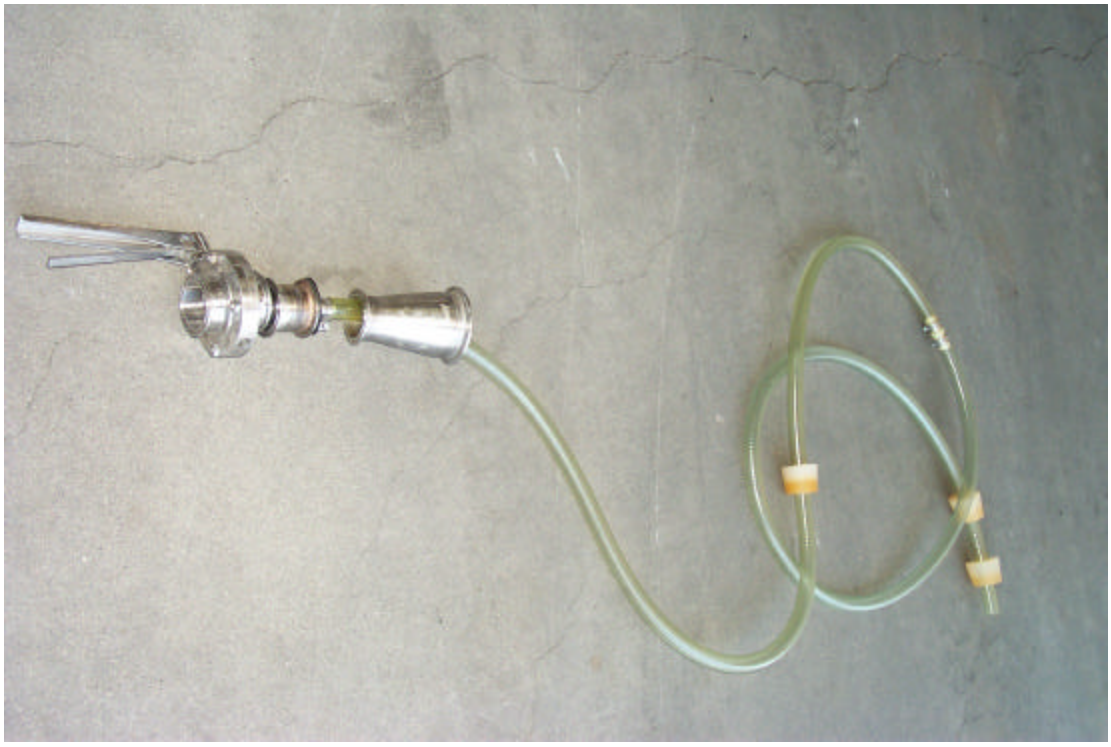
Additional 2” tri-clover fitting with valve added at the bottom.

Fermentation bungs are slid onto the tygon tubing to add weight and keep the “snake” on the tank floor.

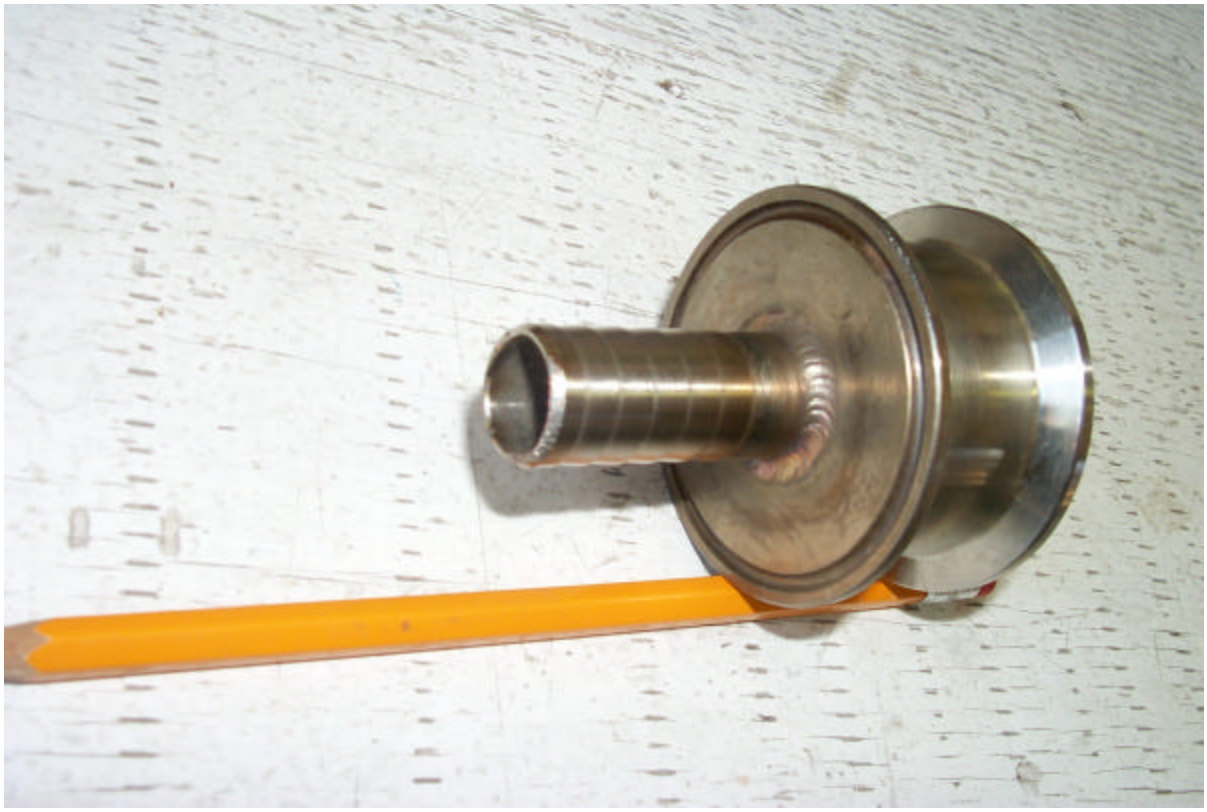
Snake system incorporating existing valves – (2 valve tank) - Must use bottom valve to allow the snake to be as close to the tank floor as possible. The system slides into the existing bottom valve before filling tank.

2” to 3” adapter for bottom tank fitting

Complete system - Use reinforced tygon tubing at least the diameter of the tank, Bungs are used for weigh to keep the tubing on the bottom



Reverse tri-clover adapter to allow connection of tubing to tank fitting and valve




Back side of adapter