

Winemaking

From Vine to Bottle at Stone Hill Winery



Harvest

In Missouri grapes ripen from mid-August through mid-October depending on the variety. The vast majority of Stone Hill's grapes are machine harvested. The machine has several advantages over hand harvesting: 1) Machine harvesting can be done at night when the outside temperatures are lowest, thereby minimizing the extraction of phenolic compounds. Phenols can impart a bitter taste to delicate white and rosé wines and, therefore, need to be minimized; 2) Machine harvesting is much quicker than hand harvesting; therefore, it

can be accomplished when the grapes are at their optimum ripeness. One machine harvester can take the place of 50 hand pickers and can harvest up to 1.5 acres per hour; 3) In the advent of stormy weather, the machine harvester allows the winery to rapidly harvest before the onset of detrimental late-season bunch rots, which would reduce the quality of the grapes; 4) The fruit is very clean since the machine harvester has suction fans over the conveyors, which remove any leaves from the fruit.

Hand Sorting

A key part of Stone Hill's machine harvesting operation is hand sorting to guarantee maximum quality. As the grapes are discharged from the harvester into the transport bins, they first fall onto a table that fits over the top of the transport bin. Our crew carefully removes any MOG (Material Other than Grape), ensuring that only grapes are sent to the winery for crushing.



Hand Harvesting Grapes

Most of Stone Hill's Norton grapes are grown on a Y-shaped trellis called the Geneva Double Curtain. Unfortunately, due to the long cluster stem of the Norton grape, mechanical harvesters are not able to adequately harvest Norton grown on this trellis. Therefore, we employ the time-honored tradition of hand harvesting on these vineyards. All of our newer plantings of Norton are being established on a higher-density, single-curtain trellis that will allow for optimum sunlight exposure for maximum Norton quality while also allowing for mechanical harvesting.

continued...

Crushing

Once harvested, the bins of grapes are quickly transported to the main winery in Hermann. The 1-ton bins are dumped into a receiving hopper that conveys them to the destemmer/crusher. The destemmer/crusher gently removes the berries from the cluster stem and then slightly crushes the berry to allow for the easy extraction of the juice. From the crusher, the mix of juice, pulp and seeds, known as the “must,” is pumped through a must chiller to lower the temperature. Must destined for white or rosé wines will go directly to the presses. Reds will go directly to a fermentation tank to be fermented on the pigment containing grape skins. In either case we want the must temperature relatively cool at this stage of the process for optimum quality.



Red Wine Fermentation

At Stone Hill Winery we use different strains of yeast for the different wine types. Each yeast strain has been selected based upon its fermentation characteristics, which can affect the final wine flavor. The yeast is added to the red wine fermentor as it is being filled from the destemmer/crusher. All of our fermenting tanks have refrigeration to control the heat given off by the fermentation and to maintain the fermentation at the optimum temperature for the particular wine. Most of the reds are fermented in the range of 65-75 degrees Fahrenheit. Within a few hours of the onset of active fermentation, the carbon dioxide gas given off by the yeast will cause a cap of grape skins to rise to the top of the fermentor. Twice a day we pump some of the liquid from the bottom of the tank over the top of the cap to remix it and aid in the extraction of pigments and tannins from the grape skins. During this pump-over, the red wine may be splashed through the air

to aerate the yeast. Yeast requires a certain amount of oxygen for healthy growth and good fermentation odors. This is one of the few times that oxygen is beneficial to wine quality. After the skin fermentation, the wine is drained from the fermentation tank, and the remaining solids, called “pomace,” is pumped to the presses to extract the last of the wine.

Pressing

Stone Hill has three state-of-the-art presses to extract the juice. The presses were built in Germany by Willmes GmbH and are considered the finest made presses in the wine industry. The presses are a range of sizes to allow for optimum processing of varying lot sizes. The largest press holds up to 30 tons of grapes while the smallest only holds four tons.

The press is a large cylindrical container with a rubber membrane affixed to its interior walls. Periodically bisecting the press cylinder is a series of circular, perforated drain channels. Once the press cylinder is filled with the mix of grape



continued...

Pressing (from page 2)

skins, seeds and pulp, the rubber membranes are gently inflated with air pressure to slowly extract the juice out through the drain channels to a collection basin. After the pressure is maintained for a few minutes of juice draining, the press will deflate and rotate in order to redistribute the must and then begin the cycle all over. The whole process of pressing will take approximately two to three hours for each batch.

The real key to quality is to extract the juice very gently with minimum pressure. Rapid, high-pressure extraction of the juice would extract greater amounts of phenolic compounds from the grape skins resulting in harsh, bitter wine.



Juice Fractions

During the press cycle, the press will go through a series of gentle pressure increases. With white and rosé grape must, approximately 2/3 of the juice will be extracted with a 0-0.25 bar of pressure. This is the most delicate fraction and is referred to as the “free-run” juice. As the pressure begins to increase, the winemaker will draw samples and taste the juice. The juice will gradually change, and the winemaker will determine when to switch to the “press” juice. At Stone Hill we pump the free-run and press juices to different

tanks so that we can treat each in a manner that will maximize the overall wine potential.

Stainless Steel Tanks-A Modern Winemaking Marvel

From the time the juice is pressed until the wine is bottled, most of Stone Hill’s wines will be stored in modern, temperature-controlled, stainless steel tanks. Stainless steel tanks are inert and air tight; therefore, they impart no flavor to the wine and protect it from oxidation. At our main winery in Hermann, the stainless steel tanks range in size from 50 to 16,000 gallons, holding a combined total of 290,000 gallons. These tanks are used for the various stages of wine making: juice settling, fermentation, clarification, stabilization, blending, and final bottling preparations.

Once white or rosé juice is pressed, it is pumped into a refrigerated, stainless steel tank. Here it will be allowed to cold settle for 24-48 hours. During this period of cold settling, the small particles of grape pulp will settle to the bottom of the tank. When settling is complete, the cellar staff will pump the clear juice off the top of the grape sediment. The sediment on the bottom of the tank will then be filtered to recoup any remaining juice. A specially selected strain of yeast will then be added to begin fermentation. During fermentation, the yeast consume the grape sugars and convert it to ethanol. In the process, they give off carbon dioxide and heat. In order to maximize the development of the fruity aromas in the wine, the fermentation temperature must be maintained in the range of 50-65 degree Fahrenheit. Failure to control the fermentation temperature will result in stuck fermentations and the production of “off” aroma and flavor. Complete fermentation takes 10 – 16 days.



After fermentation is complete, the yeast will begin to settle to the bottom of the tank, and, if left in this condition, they begin to break down releasing off aromas. In order to avoid this, the wines are

continued... 3

Stainless Steel Tanks...(from page 3)

pumped through a centrifuge that rapidly removes the yeast, thereby preserving the fresh, fruity aroma and flavor. Centrifuging may also be done before the wine is fermented to dryness to remove the yeast and stop the fermentation while leaving behind the natural grape sugars. This technique is used to make several of our award-winning wines such as Vignoles and Steinberg White.

At this point, the wines may be blended, fined for clarity or stability, cold stabilized to remove the natural cream of tartar crystals, and/or filtered. The winemaker has the option to employ any or all of these steps prior to bottling.



Barrel Fermentation

Stone Hill Chardonnay is barrel fermented and “sur lee” aged. In this process, the Chardonnay juice begins fermentation in a stainless steel tank. Once a healthy fermentation has begun, the fermenting juice is transferred to 60-gallon, American and European oak barrels to continue the fermentation. When fermentation is complete, the wine is allowed to remain in contact with the yeast (the definition of “sur lee” aging). In order to prevent the “off” odors caused by yeast sediment on the bottom of a tank or barrel, the wine is stirred (batonnage) initially every four days and later every seven days, to keep the yeast in a suspended or oxidative state. The suspended yeast give off complex flavors and odors that interact with the oak extract from the barrel, resulting in a dry wine of incredible complexity. The wine will continue to be aged in this fashion for seven to eight months.

Barrel Aging

In Hermann, Stone Hill Winery’s oak cooperage consist of 250 60-gallon barrels for aging the Norton, Chardonnay and Port. At our Branson winery, another 160 60-gallon barrels are used for aging our Cream Sherry. Barrel aging allows the wine to extract oak flavors and tannins while allowing a minute amount of oxygen to enter the wine through the barrel staves. During the period of barrel aging, many complex chemical reactions are occurring in the wine. Typically, the simpler fruit aroma of the wine will be transformed into a much more complex aroma, tannins will soften, and flavors develop great complexity.

Stone Hill Winery uses American white oak (*Quercus alba*) and European oak (*Quercus robur*) barrels. The two different species of oak have slightly different flavor and aroma profiles. In addition, the techniques employed by the various coopers while building the barrel can have a profound effect on the taste the barrel will impart in the wine. We typically buy barrels from 4-5 different coopers to build flavor complexity in the Norton wine. The barrels are only used for three years for aging our Norton wine. One third of the barrels are new each year. After three years, the bulk of the oak flavor and odor has been extracted. The barrel will then be transferred to our Port or Sherry program where we want the slow oxidative aging the barrel offers but not the strong oak flavors of a newer barrel.



continued...



Bottling

Stone Hill Winery produces approximately 215,000 gallons of wine annually. The vast majority is bottled, cased and warehoused at our Hermann winery. In 2006 we installed a new state-of-the-art bottling line in Hermann. The line is fully automated and has a top speed of 120 bottles per minute.

Stone Hill Spumante Blush and Golden Spumante are bottled daily, on a one-man line, at our Branson winery. Our bottlers in Branson will be happy to show you the operation if you stop in for a tour.

Our Blanc de Blancs is fermented in the bottle, aged in tirage, riddled, disgorged and packaged at our New Florence winery.

Photos by George Denniston for Stone Hill Winery