Electrodialysis (ED) or STARS – Specific Tartrate Removal System

**ED/STARS and pH Shift:**
ED/STARS is the only technology that allows you to mimic or match your current cold stability regimen, in particular the pH shift, whilst provide you with increased tartrate stability. If you had a pH shift of 0.05 with your traditional cold stabilization program, ED/STARS can either match or further reduce this pH shift. ED/STARS allows you to stabilize based on conductivity or pH shift.

“Tartrate Stabilization A La Carte”

**ED/STARS and Sustainability:**
Traditional Cold Stabilization can take up to 27% of your winery’s total annual energy consumption. Tartrate stabilization via STARS replaces this traditional method, while reducing up to 95% of the energy consumed by Cold Stabilization. This decrease effectively reduces the energy used for stabilization from 27% to less than 2% of your winery’s annual energy budget.

ED/STARS, the “Flex Your Power” award winning tartrate stabilization technology, replaces energy and labor-intensive bulk refrigeration currently used to accomplish tartrate stability.

It is a must-have tool for sustainable, quality wine production.

**Water consumption:**
ED/STARS recycles its “waste water” (conductant) by using Reverse Osmosis technology to clean and re-use conductant several times over. This reduces water consumption to approximately 4% to 5% of wine volume treated and reduces the amount of chemicals used during processing.

Many wineries don’t know how much water they use when cold stabilizing. Mainly referring to cleaning tanks with high levels of tartrate build up. Very few wineries realize that their water-chilled cooling towers can use between 30% and 50% water of wine volume treated (Bulk Refrigeration).

In addition, AWRI has calculated that for each Liter of wine lost, 400 liters of irrigation water goes down the drain with it.

**STARS and STABILAB:**
ED/STARS is the only process for wine tartrate stabilization that predicts, stabilizes and verifies stability in a single pass. The unique combination of STABILAB and ED/STARS provides a guaranteed process that predicts the needed drop in conductivity for tartrate stability.

ED/STARS is an integrated approach for tartrate stabilization which does not rely on the Davis test or Freeze test to determine stability. Its integration of STABILAB and ED/STARS provides a unique, globally proven, complete and comprehensive approach to Tartrate Stabilization.
STARS and Organic Wine:
The use of ED/STARS, as well as any other technology, has to be approved by the CCOF on a case by case or winery by winery basis. The below is a copy from the CCOF to a winery that requested authorization to use ED/STARS as well as VA removal.

Thank you for the update to your organic system plan to include new filtration technologies — electro dialysis and Volatile Acidity Removal (ion exchange resin).

CCOF Certification Services has completed our review of your operation’s additional processing equipment. CCOF has determined that electro dialysis and ion exchange resins are in compliance with NOP regulations and pose no known risk to the organic integrity of certified product.

Currently, these technologies are loosely housed under the definition for “Food Contact Substances” by the FDA. These types of materials have been accepted by the NOP for use in organic production, but remain controversial (see NOP Policy Statement December 12, 2002). CCOF reserves the right to reverse this decision at any time. Should this decision be reversed, the NOP certification of wines processed with these technologies before the change in policy will not be affected.

At this time CCOF has not reviewed these technologies to international standards, as very little information exists about the use of these technologies in organic production outside of the United States. Please alert CCOF if wine undergoing treatment might be exported.

If you have any questions or need further clarification, please do not hesitate to contact me at ext 26. We appreciate your participation in the CCOF Organic Certification Program.

Safety, Cellar and Production Logistics & Costing of Cased Goods:

ED/STARS can provide up to 32,000 gallons of stable wine per 24 hours, eliminating the need for costly testing and prolonged cold storage due to instability (larger machines are available).

Quantifying cost benefits due to improved production logistics can be complex. While the conventional cold stabilization process regularly provides a challenge in predicting exactly when a wine is ready for bottling, ED/STARS’ production planning is easy, precise and predictable.

For wineries that have a “Wine- Just in Time” program, conversion of bulk wine into actual “taxable inventory” as soon as it is bottled, in addition to predictable, on-demand bottling is essential to keeping costs down and shelves stocked. ED/STARS can be an integral part of your Just-in-Time inventory management by providing dependable, predictable, swift stabilization time after time.

No potential injuries or wine losses due to falling ice.

Elimination of wine loss:
ED/STARS eliminates wine loss compared to traditional Cold Stabilization. Find below a calculation representing the elimination of wine loss and the savings it represents:

Assumption:
To simplify the model, we are choosing a 10,000 gallon tank and a wine cost per gallon of $7.50. Furthermore, we are assuming an $800.00 cost per ton of grapes.

- A 10,000 gallon tank cold stabilized by chilling, generates about 500 gallons (0.5% and up to 1%) of potassium bitartrate slurry. This slurry remains behind after cold stabilization and is considered a wine loss in most cases.
- 500 gallons of slurry at $7.50 per gallon represents a $3,750 savings in wine loss.
- Let’s assume you have 10 tanks, which would represent $37,500 in savings or 5,000 gallons in wine savings.
- Convert the saved wine into a reduction of purchased grapes, at the above assumed cost per ton and you could calculate a reduction of about 33 tons. In this case savings are less but still considerable ($26,400).

Please, feel free to do this exercise by replacing tank volume, price per gallon and grape cost with your own figures.

**Chilling and Heating of wine:**
When using the traditional method of cold stabilization, wineries often use a heat-exchanger to increase wine temperature prior to bottling. In addition to generating unnecessary “wear and tear” on the chiller by dropping tank temperatures to 27°/28° F, the routine of re-heating the wine to between 50° - 60° F after cold stability, contributes a significant amount to the winery’s operating cost.

Savings in the amount of $5,000 to $10,000 or 500 to 1,000 BTU’s per year depending on wine volume processed are common (natural gas or electrical re-heating). This does not include savings in boiler maintenance or the elimination of water for the purpose of heat-exchanging/re-heating wine.

One problem cold stabilization can create is that it chills other tanks in the cellar due to lowering of ambient cellar temperature. Certain chemical and microbiological processes require the wine to be 60F for long periods (Malolactic fermentation and MicroOx). During the cooler months it might be necessary to periodically heat these tanks in order for the processes to proceed.

Some “old” system allow water to pass along the sides of the wine tank, running thousands of gallons of hot water down the sides before sending it to wastewater runoff reservoirs. In addition, cleaning the tartrate crusted tanks with hot water further increases demand on the boiler. Elimination of such practices by using STARS, reduces the amount of water that has to be pumped, treated and disposed of and can lead to savings of over 1,000,000 gallons of potable water, depending on winery size.

If offices are in proximity of the chilled tanks or in the same cellar, ambient temperature of cellar causes increased costs associated with additional heating of offices and work areas.

**Juice & Wine Acidulation:**
ED/STARS owners can predict and manage pH drops without using Tartaric Acid.

Most wineries add Tartaric Acid to juice or wine to manage wine pH. With STARS, you can adjust pH levels, if needed, while stabilizing the wines. There is no or little need to add any Tartaric Acid to your wines or juices, thus, reducing or eliminating the need to acidulate. This can provide the winery with significant savings due to the reduction or elimination of Tartaric Acid.
In addition, ED/STARS doesn’t need any Cream of Tartar to achieve Tartrate Stability. ED/STARS provides complete elimination of Cream of Tartar and by doing so, eliminating any release of “slurry” material into the winery waste water system.

**Flavor and Aromas:**
When cold stabilizing wine via cold stabilization or bulk refrigeration, oxygen pick-up is a common and known side effect. The knowledge of wine volume shrinkage while reducing wine temperature is well established and can have a negative, oxidative character which usually shows up 6 months after bottling.

ED/STARS prevents any oxygen pick-up during stabilization. It eliminates volume-shrinkage by stabilizing wine at cellar temperature. At the same time, wine is covered continuously with a blanket of inert gas, preventing any oxidation during processing.

If you tartrate stabilize your red wines, ED/STARS will prevent color precipitation and provide superior quality and structure. As ED/STARS removes predominantly Potassium, Calcium and Bitartrates, a slight pH shift can be expected. A welcomed effect for winemakers who pick mature and ripe fruit.

Several wineries have conducted extensive chemical and sensory testing from side-by-side trials, using a mobile unit from Winesecrets before investing in ED/STARS.

Analytic differences were small, including a slight .1-.2 drop in pH. This turned out to be the wine chemistry marker for a slight but noticeable difference noted in blind sensory tests—a bit more perceived acidity, a brighter taste and mouthfeel, which the testers preferred, even though the titratable acidity itself hardly changed.

All ED/STARS customers have considerably reduced or eliminated the addition of Tartaric Acid during the vinification process to adjust wine pH and instead are taking advantage of the slight .1-.2 drop in pH to balance their wines.

**Labor Savings:**
Labor savings can be attributed to elimination of tank staging for batch process cold stability, adding seed crystals, filtering out tartrates, cleaning the tartrate crusted tanks and heat exchanging to warm the super chilled wine.

Health and risk improvement can be considered by eliminating the addition of 25lbs Cream of Tartar bags and removing potassium bitartrate slurry.

If larger volumes are stabilized via ED/STARS, labor savings can be increased.

ED/STARS can improve the bottling process and logistics by approximately 20 percent or more, depending on winery size, resulting in fewer label misplacements. Fewer shifts are needed to produce the same amount of wine, resulting in further labor savings. In addition, less reworking of labels reduces waste, saves labor, overtime and materials.

**PG&E, Industry web-link**
http://www.fypower.org/feature/awards/6th/profile.html?company=fetzer
http://www.winebusiness.com/wbm/?go=getArticle&dataId=59205

http://www.fypower.org/bpg/case_study.html?b=food_and_bev&c=Fetzer_Vineyard

Other:
http://www.energy.ca.gov/research/iaw/descriptions/500_02_001.html

http://findarticles.com/p/articles/mi_m3488/is_10_90/ai_n39356739/?tag=content;col1


http://www.northbaybiz.com/General_Articles/General_Articles/A_Taste_for_Technology.php

http://www.practicalwinery.com/sepOCT08/page1.htm