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Product Review: Optical Grape Sorters for 2019 Harvest

Andy Starr



FRUIT SORTING HAS BEEN around as long as winemaking. Until recently, it was done by a crew of humans using their eyes to sort clusters or berries moving along a conveyor belt. It's slow, expensive, tedious work that doesn't remove all of the undesired fruit, often discarding good grapes attached to partially damaged clusters. As it is usually done only when the value from sorted grapes exceeds the cost of sorting (roughly \$200 per ton or \$3.00 per case), a winery will only hand-sort to produce its best reserve wines or to salvage problem lots.

In addition, labor shortages have made staffing during the busy harvest season impossible at times, eliminating hand sorting as an option. You'll just hope for the best from the grower, knowing full well that hope is not a strategy.

For those who focus on tradition or "that's the way they do it in France" (sometimes they'll say Italy, but it's usually France), be aware that labor shortages are an even bigger issue in Europe, with mechanization of sorting and other processes now commonplace. So if you automate your sorting, you can honestly say "it's the new tradition" or "it's what the French do," sparing yourself any potential "innovation shaming" from your peers.

Andy Starr is an entrepreneur, marketing and strategy consultant, and winemaker with over 30 years experience in new technology and new market development, and in building organizations. His company, StarrGreen LLC (www.starrgreen.com) assists clients in the wine, beverage alcohol, and greentech industries. Best known as the Founder of Neocork Technologies, the synthetic cork pioneer, Andy built the company from an unfunded business plan through R&D, manufacturing and marketing, ultimately shipping Neocorks to 19 countries. He has six years of winemaking experience, highlighted by two years as the award-winning head winemaker for Yarden, Israel's first super-premium winery.

Product Review: Optical Grape Sorters for 2019 Harvest



TOP: The Pellenc Vision 2 uses an intensely bright light to determine a grape's color, shape and size. (SCOTT SUMMERS)

BOTTOM: An easy-to-use touchscreen dashboard allows winemakers to set rejection parameters for each lot. (PELLENC)

Automated optical sorters can process up to 10 to 12 tons per hour, depending on the model and incoming grape quality, driving sorting costs down to as little as \$20 per ton or \$0.30 per case. At that cost, a winery could sort most or all of its fruit, increasing the quality of every wine it makes.

All optical grape sorters reviewed in this article use a similar approach, using cameras to analyze each item (grape, leaf, insect, etc.) passing through a conveyor belt. The sorter's central processing unit (CPU) makes an evaluation of each item based on the winemaker's desired parameters, e.g., color range, raisins, material other than grapes (MOG), and then directs a brush or arm to keep or reject that item. No machine is perfect. You will lose some "good" fruit with the bad and retain some "rejects" with the good fruit, but the loss rates are quite low.

In assessing an optical sorter, you are likely to look at speed, programmability, ease of use and cleaning, but it's critical to know what happens prior to the sorting step. Are you getting primarily machine- or hand-harvested fruit? Does your destemmer do a good job of removing MOG and raisins? If not, the sorter has to run more slowly to achieve the desired sort level.

Six sorting machines are reviewed, of which I observed three during the 2018 harvest: **Pellenc Vision 2**, **Bucher Vaslin Delta Vistalys** and **CITF's Alien**.

Vision 2

PELLENC USA

John Felice, sales representative for Pellenc USA, explained that their Pellenc Vision 2 optical sorter uses intensely bright light to "see into the grape" and make more specific color, shape, size and "raisin" decisions. The Vision 2 evaluates, decides good or bad and, if needed, gives an instruction to 96 individual air nozzles to turn on and remove the item. It operates at a rate of up to 2,000 items per second, or up to 10 tons per hour. All daily data, such as rejected material rates, average berry size, etc., are logged on screen.



When integrated with additional Pellenc receiving equipment, the Vision 2 optical sorter can control a sequenced/timed start-and-stop of up to six other crush-pad machines.

Krupp Brothers Winery, an ultra-premium red producer in Napa, recently installed entirely new crushpad equipment and tanks in an existing winery, including the Pellenc Vision 2 sorter, as part of a complete Pellenc grape receiving system. Associate winemaker **Desiree O'Donovan** uses it to remove raisins, insects and other MOG. O'Donovan is impressed with Pellenc's precision, noting that it "won't blow off the wrong grape." She runs it at 5 tons per hour, the same speed as their destemmer/mechanical sorter, giving Krupp sorted fruit in the same time as unsorted, without needing any extra staff. O'Donovan added that it made sense to her to have an all Pellenc line. Their Pellenc Selectiv' Process Winery M (M means 'medium sized') destemmer/mechanical sorter does an excellent job of retaining most raisins on the cluster, making the optical sorter run more efficiently to remove the remaining ones.

Product Review: Optical Grape Sorters for 2019 Harvest

Italics Winegrowers in Napa also has a Pellenc Vision 2 optical sorter. For much of his career, owner **Ken Martin** used optical sorting for his premium ruby red grapefruit and other citrus in Texas, so he welcomed optical sorting for grapes. Martin likes the Pellenc sorter's ability to "get deep into the parameters" of color, raisins and split berries. He likes the sorted fruit quality he is getting, noting that the Pellenc Vision 2 "doesn't take lunch breaks."

Martin estimated that hand sorting would cost him \$33,600 annually (\$20 per labor hour multiplied by 10 people for eight hours a day with 21 harvest days) or roughly \$200 per ton, giving the sorter about a five-year payback for a machine he expects to own for at least 15 years. Even more important, Martin explained that labor shortages are making hand sorting much less

of an option. The Pellenc is relatively easy to clean as part of a 45-minute crushpad process. Italics also has a Pellenc destemmer/mechanical sorter and receiving line.

Martin gave an example of how a custom crush client used the optical sorter to save a small mildew-infected lot of Pinot Noir that would have been rejected. They brought in the grapes, set the optical sorter to keep only good berries, and it kicked out about 20 percent of the lot. So, 80 percent was saved and turned into top quality Pinot Noir, helping both the winemaker and the grower. This capability would be a significant benefit for wineries in rainy climates.

Both Martin at Italics and O'Donovan at Krupp praised Pellenc for their service and training, noting that they even have a spare machine available if needed.

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Delta Vistalys HD

BUCHER VASLIN

Bucher Vaslin has been making and improving optical grape sorters since 2010. What started as the **Delta Vistalys R2** has become the **Delta Vistalys HD** (high definition) in 2019. The Vistalys HD has the same body and footprint as the R2 but with significant changes in software and peripherals that now look at actual colors instead of a pixelated representation, so 10 billion pixels are now 32,000 colors. Also new for 2019 is a user-friendly 15-inch touchscreen. **Mea Leeman**, director of sales and marketing for Bucher Vaslin North America, notes that Bucher continuously provides upgrades to their optical sorters in the field, having provided 24 software updates over 11 years, and are now adding touchscreens and an internal viewing camera to them.

The Vistalys HD was extensively tested in 2018, with reduced waste showing up in the good berries and fewer good berries in the waste. Leeman explained that the biggest improvements are a "self-learning process that learns and stores color preferences while the machine is running," so no stopping to recalibrate is necessary. Improved data collection and feedback now tell the user if rejection is by color or shape, where previously one had to manually inspect for shape (raisins or cracked berries) or color. Leeman states that the Vistalys HD can run up to 10 tons per hour for hand-picked fruit and up to 12 tons per hour for mechanically harvested.

Additional updates include Wi-Fi connectivity that allows simplified,



Home site in St. Helena, California. (This state-of-the-art facility is worthy of its own story as walking through the sprawling industrial winery site and then entering the glowing interior are reminiscent of opening the door to Narnia.) Roblee explained that Bucher Vaslin’s high definition camera works well in finding raisins and undesired colors, while Jain loved the sorter’s versatility, explaining that “you can program anything you want on it.” Roblee experiences anywhere from 0.5 to 10 percent scrap, depending on fruit quality and winemaker criteria and has the ability to put those rejected berries into lower-value wines.

I also observed Bucher’s Vistalys R2 model sorting Cabernet Franc at **St. Supery** in Rutherford, California, where the entire red wine production is from estate grapes, sorted either optically or by hand. Winemaker **Brooke Shenk** explained that in 2019, Bucher will upgrade their 2013 vintage machine to HD level. Shenk was very happy with the Vistalys’ ability to keep only the most pristine berries, kicking out raisins and color variances. She explained that St. Supery can process 3 to 4 tons per hour through the sorter, and it meets their high quality standards.

Bucher’s Leeman emphasized that their team sees themselves as knowledge consultants where “our job as supplier is to know the best way to optimize equipment and transfer the knowledge to our customers.” They are doubling the size of their Santa Rosa service site in 2019 for more user-friendly training programs and to increase spare parts inventory. Bucher commits to having spare parts for 20 years for all their equipment.

yet detailed, data collection of the machine’s process history right down to a date and time stamp for every button pushed, plus an interior camera to allow the user to see the output in real time.

Jim Roblee is the winemaker and **Rebecca Jain** is the enologist for **Trinchero Family Estate’s** “small-lot winery within a winery” at the **Sutter**



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WineGrapeTEK

WECO

WECO (Woodside Electronics Corporation) has been building optical sorters for 35 years. **Bryan Chambers**, winegrape manager, explains that they started with tomatoes, then moved on to walnuts and blueberries, and finally to grape sorters starting in 2010. Chambers explained that “WECO has a laser focus on optical sorting” across a wide range of fruits and nuts with more than 2,000 sorters in use worldwide.

The WECO WineGrapeTEK sorter is equipped with four proprietary cameras. The cameras are closer to the fruit and the light source which, in turn, provide brighter lighting and a more accurate sort. WECO designs and manufactures its camera/illuminator systems in-house to be optimized for high speed sorting and greater flexibility in choosing desired color. WECO’s sorters are “full spectrum,” operating over the entire visible and infra-red spectrum. Chambers noted that WECO often installs units at other than “ultra-premium” wineries, such as those in challenging climates where rain-damaged lots can now be salvaged.

WECO’s sorter is touchscreen programmed, with memory settings for different varieties or vineyard blocks. “You can set it to ‘Zinfandel’ and then fine-tune afterward,” Chambers explained. WECO provides training and a 24/7 service program where their vehicles are stocked with spare parts. The machine typically takes 30 minutes to clean and can process about 6 tons per hour.

An advertisement for Spokane Industries. The background shows several large, cylindrical stainless steel tanks in an industrial setting. A person is visible on a staircase to the left. In the foreground, there are several smaller stainless steel components, possibly lids or parts of tanks. The Spokane Industries logo, featuring the letters 'SI' in a stylized font, is prominently displayed in the center. Below the logo, the text reads "SPOKANE INDUSTRIES" and "Over 40 Years of Service!". At the top right, it says "Custom Engineered Stainless Steel Tanks". The main slogan, "When Quality Matters, Call On Us!", is written in a large, bold, red font with a white outline. At the bottom left, there is a "MADE IN USA" logo. The bottom right features the tagline "Quality • Excellence • Service • Support".

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GrapeSort

ARMBRUSTER

Armbruster, based in Germany, has been building integrated crushpad equipment dedicated to the wine industry since 1938 and is distributed exclusively by **Scott Laboratories** in North America. Their GrapeSort optical sorter was introduced in 2013. **Dillon Coughtry**, Scott Labs' equipment sales specialist, explained that "the GrapeSort has a high resolution four-channel camera with near infrared (NIR) and red, blue, green (RBG) at 7,500 images per second that provide extremely accurate imaging of each grape." The GrapeSort runs optimally at 3 to 5 tons per hour or up to 8 tons per hour with very clean fruit.

The GrapeSort is optimized when run in line with Armbruster's double roller destemmer, which removes MOG very well, allowing the GrapeSort to focus on sorting individual berries. Armbruster crushpads can be set up with a centralized panel that controls the entire receiving line. It is designed for easy cleaning with the ability to completely remove the belt from the frame in a matter of minutes.

"Scott Labs is deeply focused on training," Coughtry said. "While the user may need only one hour to learn the basics, Scott's service technicians will spend additional time with the customer during harvest to optimize the sorter to their facility. This service is included with the machine."



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Vitisort

KEY TECHNOLOGY

Vitisort is manufactured by Key Technology, an optical sorting specialist in Walla Walla, Washington. **Marco Azzaretti**, their product manager for **Advanced Inspection Systems**, explains that Key has been building optical sorters for the food and agriculture industries for 30-plus years, with more than 5,000 machines in use from frozen french fry potato inspection to nuts, sliced apples, salad greens and winegrapes. Key manufactures in Europe and the USA.

Key launched Vitisort in 2014, the product of two years of ground-up design and development to handle winegrape-specific needs, while drawing on Key's sorting experience for many applications. The result is a reliable machine with an intuitive user experience that is compatible with all major destemmer brands. There are now 30 to 40 Vitisort machines in operation, including **Canoe Ridge** in Washington and **Chappellet** in Napa Valley.

Vitisort first puts the grapes through a vibratory sorter, which then feeds the optical sorter. Azzaretti explained that "our philosophy is to remove whatever you can mechanically to maximize efficiency of the optical sorter. You really want to have the optical sorter focused on the hard part—color, shot berries, raisins and whatever MOG remains."

Azzaretti pointed out that the Vitisort allows for a predictable MOG level as "you may not want 100 percent MOG-free grapes." Their system also allows for juice recovery during the mechanical separation process.



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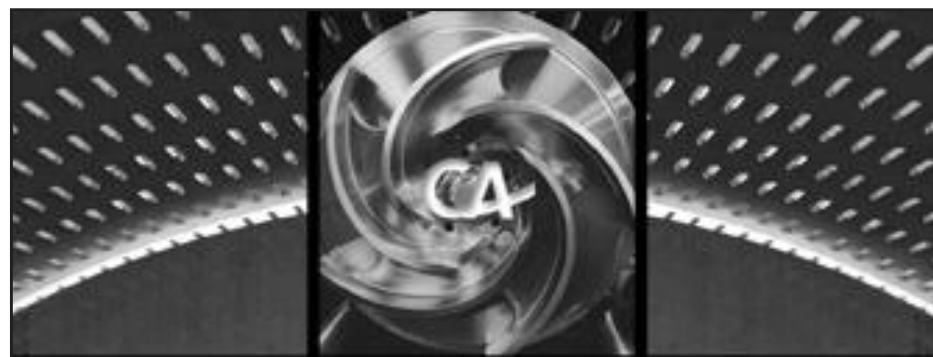
CITF GROUP

CITF Group produced a next-generation prototype Alien M18 optical sorter that uses robotic arms to vacuum up MOG, raisins and other waste, which received a Silver Award for Innovation at the **Vinitech Exhibition** in Bordeaux. In 2018, **Alpha Omega** was the first American winery to use the Alien M18. Winemaker **Jean Hoefliger** strives for perfection in red wines that retail for \$100 to \$650 per bottle, so he wanted the Alien as a secondary optical sorter, after a Pellenc Vision 2 performed the primary sort. It's essentially an optical sorter for sorting sorted grapes. Think of it in the way you might choose to use 400 grit sandpaper after using 220 grit. I personally observed the Alien's two robotic arms that removed every last bit of undesired material at 4 to 5 tons per hour. Each arm measurably can remove 200 pieces per minute for a total of 400 pieces per minute. "If you want perfection, you still need Alien or people," said Hoefliger. Bucher Vaslin is the exclusive dealer for CITF's Alien in North America.



Talk to Your Neighbors

In summary, winegrape optical sorting technology has improved significantly since its introduction 11 years ago. The machines have become more accurate, cost-effective and much more user-friendly while, at the same time, finding hand sorting staff is much more difficult. Optical sorters are a big investment, but you may not have to own one to get the benefits: Talk to a winery friend who owns one—they may have excess capacity to destem and sort your fruit on a per-ton basis. [WBM](#)



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