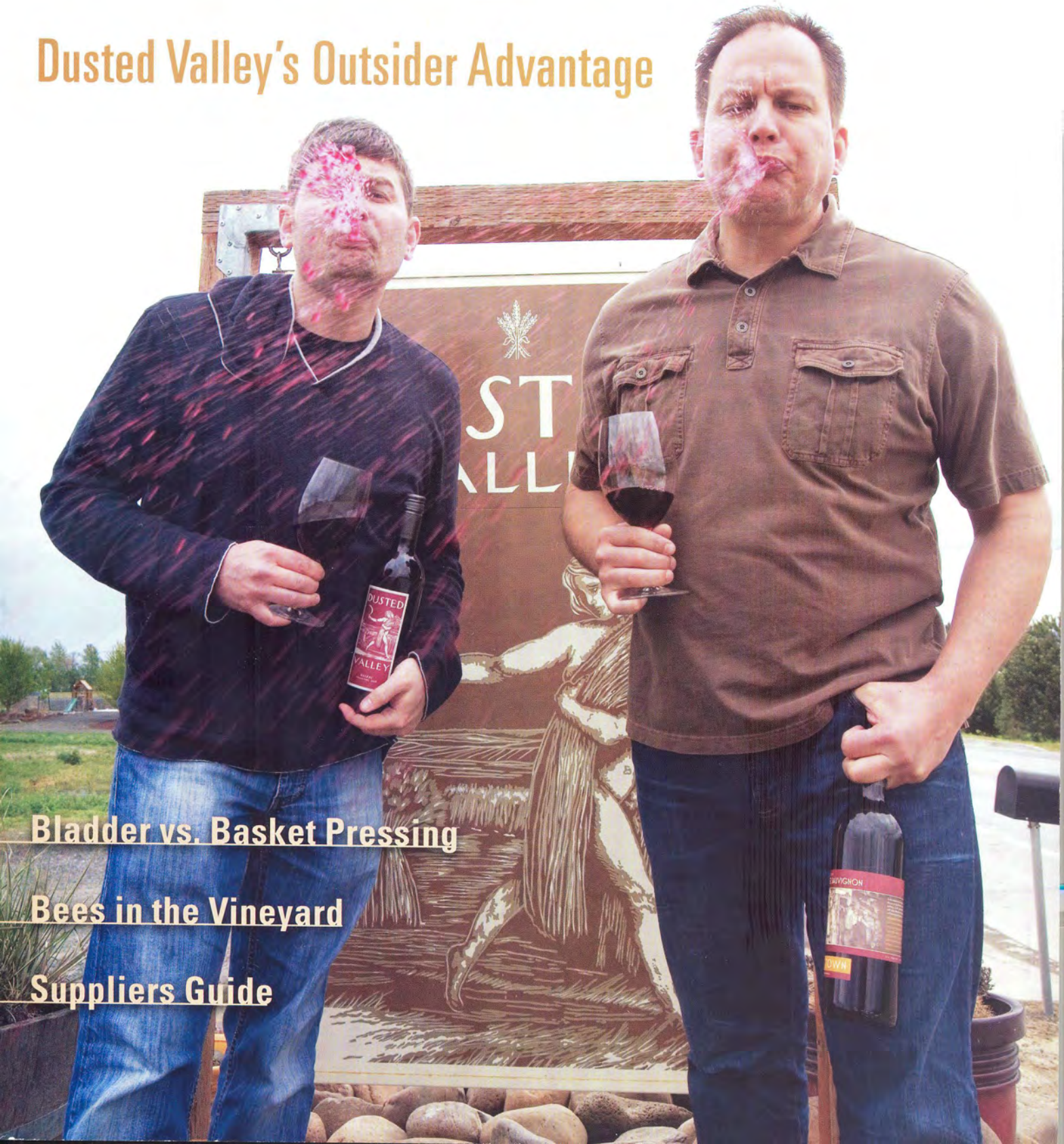
Vineyard & Winery Management

JULY - AUGUST 2011 WWW.VWM-ONLINE.COM NORTH AMERICA'S LEADING *INDEPENDENT* WINE TRADE PUBLICATION

Dusted Valley's Outsider Advantage



Bladder vs. Basket Pressing

Bees in the Vineyard

Suppliers Guide

The Della Toffola thermocompact heating tank *(left)* and conical flash vacuum chamber *(right)* are the major components of the flash detente system at Lodi Vintners. Photo: Ted Rieger

By Ted Rieger, senior feature editor

'Flash' Vinification Systems Enhance Quality

Technology can help improve color extraction, tannin and aroma

Technology designed to enhance color and phenolic extraction in red grapes prior to fermentation is now installed at two custom-crush facilities in California. This technology involves a two-step process in which destemmed and crushed grapes are heated in a thermal tank up to 185°F, then transferred to a cooler vacuum chamber tank where the grape skins crack or burst to release phenolic components such as anthocyanins, tannins and aroma components from grape-cell walls.

Rick Jones, a co-founder of Vinovation, now works as a winery technology consultant and was involved in placement of the two units in California. One was manufactured by Pera of Florensac, France, and installed at Monterey Wine Company in King City, Calif., in 2009. The other unit was manufactured by Della Toffola, headquartered in Treviso, Italy, and installed at Lodi Vintners in Lodi, Calif., during the 2010 crush.

Jones explained that each unit uses thermal vinification, or "thermovinification," a process category that has been used for several decades in European wineries, in which grapes and must are heated prior to fermentation and pressing. But these recently installed equipment systems – called "Flash Detente," "Thermoflash" or "ThermoCooler," depending on model and manufacturer – have a vacuum chamber added to the process for rapid cool-down of the heated must, which effectively causes the grape skin walls to burst and release tannins and anthocyanins.

Flash detente systems have been used since the1990s, and

AT A GLANCE

- Flash technology is a two-step process that first heats grape must in a thermal chamber, then quickly cools the must in a vacuum chamber to extract grape skin phenolics.
- Flash systems were originally designed to enhance tannin, color extraction and aroma in red grape varieties.
- Flash technology can assist in improving underripe and moldy grapes.
- Pyrazine and other unwanted aromas can be vaporized in the flash vacuum chamber and removed in flash water.

are installed at wineries in Europe, South Africa, South America, Australia, China and the United States. More than 60 Della Toffola systems are in use at wineries worldwide. These range in capacity from 1.5 tons per hour up to 60 tons per hour, but the more commonly used units range from 5 tons per hour to 30 tons per hour.

A Della Toffola Thermoflash demonstration unit with a capacity of 1 ton per hour was brought to California during the 2000 crush and trialed at several wineries, including Beringer Vineyards and Shafer Vineyards in Napa Valley, Bonny Doon Vineyard in Santa Cruz, and Fresno State Vineyards. *(See V&WM January/February 2001, "Thermoflash Tested During 2000 Crush in California.")*

Flash vinification can be used as an alternative to traditional extraction methods such as cold soaking and extended maceration, and can reduce the need for pumpovers and other cap-management practices during fermentation. Analyses of grape lots comparing normal vinification with flash vinification show that flash can provide better results in extraction levels of anthocyanins, tannins and color intensity in a shorter time period.

Della Toffola cites studies of extraction level increases of up to 50%.

Although the process can be used as a corrective action for problematic grapes that may be underripe, have mold, or be of lesser quality, winemakers experienced with the equipment view it as another tool for all quality levels of grapes that can provide options depending on winemaking goals for specific lots, for obtaining desired wine quality parameters, and for enhancing production efficiency.

Two buffer tanks are used for grape must that is fed at a consistent rate into the Della Toffola flash detente system at Lodi Vintners. Photo: Ted Rieger

LODI VINTNERS DELLA TOFFOLA SYSTEM

Lodi Vintners installed a Della Toffola flash detente system during the 2010 crush; it has a capacity of 30 tons an hour and cost approximately $1 million. System components were manufactured at Della Toffola facilities in Argentina and Italy. Lodi Vintners director of operations Tyson Rippey said up to 300 tons of grapes were processed in one day, and the unit processed a total of 4,000 tons in 2010. Actual daily processing varies, since the unit must be cleaned when switching between different varieties.

The system includes two buffer tanks, each with capacities of about 100 tons of fruit (two truck loads), which are filled with crushed and destemmed grapes. The buffer tanks have mixing systems to maintain the must at a uniform consistency for feeding into the heating unit. The must is pumped through a piping system and fed at a consistent rate at ambient temperature into the top of the heating "Thermocompact" tank. Free-run juice can be bled from the must solids into a storage tank for rosé production or to blend back later. The remaining must is moved in a circular motion by a central motor and shaft running through the center of the tank, with paddles and chutes that move the must gradually down through different tank levels.

The newly added must is immersed in a ring of hot must heated rapidly to a range of 160°F-185°F. The must ultimately falls to the lower section of the tank for maceration. At this stage the winemaker has the option to remove the must and go directly to press or a fermentation tank, or send it to the cooler vacuum tank for flash extraction.

The heated must that is moved and fed into the conical chamber cooler unit is pumped down to a hard vacuum between 30 and 50

Grape must rotates in the top of the Della Toffola thermocompact tank as it's fed into the lower heating chamber. Photo: Ted Rieger

mBar. This results in the evaporation of intracellular water that causes the surface of the grape skins to crack, and the water in the cell walls quickly vaporizes – the "flash" – and immediately is followed by relaxation, or "detente." Vapors given off as the crushed grapes expand are recovered in a condenser that is cooled by recirculating water. This must vapor condensate, or "flash water," can contain unwanted aromas.

The must leaves the flash tank at a temperature of about 85°F and can proceed directly to a tank for fermentation. Other options are to leave it on the skins for further maceration, go to press, or the client can truck the must to another facility for processing. This higher must temperature can provide a quick start to fermentation after inoculation. By reducing traditional maceration time and enabling a faster start of fermentation, flash systems provide a potential benefit to expedite tank turnover and provide more efficient process flow.

To operate the flash system, Lodi Vintners also installed a 7 million Btu propane-powered boiler system, dedicated to provide heating for the flash system, and a new cooling tower/condenser. The boiler will be switched to natural gas when piping is installed to tie into the local utility gas line.

In addition to enhancing extraction, the flash system can reduce negative characteristics. The high temperature acts as a sanitation measure to knock out Botrytis and molds that may be present, and inhibits damage from enzymes such as polyphenol oxidase and laccase.

"The 2010 growing season and harvest provided a perfect storm for testing a machine like this," Rippey said. "There was a lot of underripe fruit, so we ran the system for those that wanted a bump in Brix levels. After the late-season rains, rot was an issue, so it helped with that, and then we had fruit from coastal vineyards with pyrazine (vegetal aroma) issues, so some clients were only interested in pyrazine removal. The machine has a lot of multiple applications. It was a learning process for us, and we continually changed the way we operated the unit between the first day and the last day we used it. I followed up with the clients whose fruit we processed in the system in 2010, and everyone seems happy with the results."

Rippey said Lodi Vintners will add improvements for the 2011 crush, including an additional buffer tank to feed the system, so the facility can unload and hold more truck loads of grapes at the beginning of the process. Also planned is installation of a heat exchanger to further cool must coming out of

FOODGRADEGLYCOL.COM

From 1 gallon to 275 gallon totes.

We sell EXACT volumes!

Private Labeling on Any Container Size

FREE Shipping on all orders!

Call 800-658-7716 or

ORDER ONLINE: www.FoodGradeGlycol.com

Enter Promo Code "Propylene" for 5% off

Chemicals Direct ™

the flash vacuum tank and another holding tank for the flashed must. The cooling heat exchanger is for clients who want to truck the must to other facilities for fermentation. With must leaving the flash tank at temperatures of 85°F, there is risk of early fermentation starting in the tanker truck.

Rippey's company, The Vintners Group, also owns and operates Carneros Vintners custom-crush facility in Sonoma, and is leaning toward installing a Della Toffola flash system there for the 2011 harvest. Rippey said the Sonoma unit will likely have a smaller capacity, about 15 tons an hour, as North Coast clients generally process less fruit and smaller lots. Carneros Vintners ran some trial lots in 2010 with the smaller, 1-ton-per-hour older Della Toffola flash system that was the demo unit trialed in California in 2000.

MONTEREY WINE COMPANY PERA SYSTEM

The Pera flash detente system installed in 2009 at Monterey Wine Company has a capacity of 20 tons per hour and cost about $2 million. Winemaker Eric Laumann, who performed trials in 2000 with the Della Toffola demo flash unit while a winemaker at Bonny Doon, has used the Pera system for the past two crushes; 3,000 tons of grapes were processed in 2010.

Laumann noted that the loading and processing rate for the flash system is very important, and he found it easier to work with the commercial-scale unit he has now than with the small pilot unit he used in 2000. In the Pera 20-ton-per-hour unit, he said it is best not to operate with less than a 15-ton load. "The first grapes into the system and the last grapes do not get imploded in the vacuum chamber as well as those in middle of the process, so we like to run the system at an even rate for at least a half-hour," he said.

The system also has applications for white grapes. "We used it on whites for moldy grapes to denature laccase, and the vacuum chamber helped blow off some of the moldy character, so it provided an opportunity to salvage both white and red grapes that had mold in 2010," Laumann said. He plans to continue to experiment with white grapes to determine more potential uses, yet he observed that white lots run through the unit have been more difficult to clarify.

A conical flash vacuum chamber cools must quickly to release skin phenolics. Photo: Ted Rieger

Citing benefits of the flash unit with normal, healthy grape lots, he said, "We're getting increased mouthfeel, nice fruity wines, better aromatics, and we're seeing a color shift with much more purple tones."

Laumann said he believes the system can be used for all quality levels of grapes. "If you have great grapes, this allows you to have all the anthocyanins and tannins extracted early, which allows pressing earlier, and decreases the chances of extracting bitter phenolics, such as green seed tannins, that can be alcohol soluble during fermentation. We have some high-end clients that used it for everything they brought in."

Long-term color stability has been cited as a benefit of the technology. Although finished wines have not been aged long enough from Monterey Wine Company's production for conclusive results, Laumann said, "Our pinot noir processed in the flash unit was very purple in color compared with standard processing. We find that pinot noir color tends to bleach out with sulfur, but the flash-processed pinot has maintained its color even after sulfur was added."

The winery has done some lab analysis to compare the same vineyard lots processed by standard methods and by flash processing. For one zinfandel lot, tannins measured in the control batch had 329

Steam Cleaner
FOR Sterilizing Bottling Lines
Melting Tartrates
Cleaning Equipment
Electro Steam
www.cleanwinery.com e-mail info@arsenterprises.com
Available from ARS/Pressure Washer Company
Call (800) 735-9277

mg/L compared with 426 mg/L in the flash batch, and polymeric anthocyanins measured 20 mg/L in the control vs. 27 mg/L in the flash. Laumann said samples have been given to researchers at the UC Davis Department of Viticulture and Enology for study and analyses. Laumann summarized, "Over the next couple of years, we hope to be able to put into better context how valuable this tool is, and how widespread it can be used for all our clients, and for the industry in general."

FLASH WATER AROMA REMOVAL

Barry Gnekow has processed grapes in both flash units in his role as a consulting winemaker for Hahn Estates of Monterey County. He processed about 500 tons with the Pera unit at Monterey Wine Company in 2009. In 2010, Gnekow processed grapes with the Della Toffola unit at Lodi Vintners -- underripe pinot noir to overripe zinfandel and everything in between. He's also used flash processing on most major red Bordeaux and Rhone varieties grown in California. The cooler 2010 growing season in some locations inhibited ripening, and the process helped with Brix levels and aided with extraction from underripe lots.

Gnekow said the ability to remove excessive pyrazine aroma and character was a big factor in putting the Pera unit in Monterey County. The flash water can also collect raisin character from overripe fruit.

One of the most fascinating parts of the process, he said, was discovering the secondary benefit of how other off-aromas can be concentrated and removed in the flash water.

"The French talk about *terroir*. But after dealing with smoke taint in 2008, I believe in 'airoir,'" Gnekow said. "Whatever aromas or pollutants may be in the air can be absorbed into the grape skins." In 2010, he detected diesel and gasoline exhaust in flash water from vineyard lots where the grapes grew next to a busy highway. He also detected cow manure aroma in flash water from a vineyard next to a cattle ranch.

Gnekow collected samples of flash water with unwanted aromas during the 2010 crush and froze them in containers as library samples to educate clients and winemakers about the off-aromas that can be removed by flash detente.

"In France, the flash water is put back into the must, but they usually filter it first," Gnekow said. "Here we don't have to return it; it can go into the wastewater system." ■

Ted Rieger, *CSW, is a writer and photographer based in Sacramento, Calif., and has been a contributing editor for V&WM since 1990.*

Comments? Please e-mail us at feedback@vwm-online.com.