“Cleanliness is a basic condition for Quality. The whole of enological science would be to no avail if the work itself were done in places that were dirty.”

– Emile Peynaud from Knowing and Making Wine
Is Cleaning and Sanitation That Important?

• The importance of cleanliness and sanitation within the winery cannot be overemphasized. Cleanliness and sanitation are of utmost importance in the production of consistently high quality wines.
Is Cleaning and Sanitation *That* Important?

- Many issues, which affect the final quality of wines, are not within the control of the winemaker. The most notable, and perhaps most important influence is that of the environment within the vineyard. Throughout the life of a wine, the winemaker can influence quality in many ways.
- The strongest (and most important) influence that the winemaker has regarding wine quality is through proper sanitation.
Is Cleaning and Sanitation That Important?

- A winery can establish good sanitation practices with relatively small input. This is especially true when compared to the bleak task of managing entrenched microbial populations throughout the cellar and wines produced under poor sanitation conditions.

- If performed regularly, a proper sanitation program will help prevent problematic microbial issues from ever getting a foothold.
How Important is Your Wine to YOU?

All Winemakers search for an “edge” over the competition...try Sanitation

Proper Sanitation:
• Improves Quality
• Improves Consistency
• Improves Product Safety
• Improves aging potential
• Improves retention of positive flavor attributes.

Proper Sanitation:
• Reduces Equipment Cost
• Reduces unsaleable Product
• Reduces chemical use in wine
• Reduces labor costs
• Reduces Worry and Stress
Need More Reasons for Cleaning and Sanitation?

• Poor sanitation practices WILL, sooner or later, ruin your wine.
• Bad wine WILL, sooner or later, ruin your reputation
• A bad reputation WILL, sooner or later, ruin your business.

• WHY RISK IT ????
An ounce of Prevention...

- *Simple steps taken now will prevent major problems later.*
• **Cleaning** is the mechanical and/or chemical removal of visible dirt, grime, stains, etc. from a surface, such as a wine hose, press, or cellar floor. Cleaning is performed many ways using any of the numerous tools available, including scrub brushes, rags, brooms, or circulating chemical and water solutions. Keeping your cellar and equipment clean is the necessary first step in creating a healthy environment for your wine. It is important to note that unless something has been cleaned, it **CANNOT** be sanitized.
• **Sanitation** refers to the process of significantly reducing (not eliminating) the number of live microorganisms from a surface or piece of equipment by using chemicals, heat, or filtration. Sanitation is **NOT** sterilization.
Definitions...

- **Sterilization** by definition is the removal/destruction of ALL living microorganisms. Sterilization practices are usually reserved for the bottling of microbially unstable wines in an attempt to produce a sterile final product.
Proper Cleaning and Sanitation Process

• Pre-Rinse (Removal of bulk, loose materials such as lees, grape skins, etc.)
• Application of Detergent (Manual scrubbing, CIP, soak)
• Post-Rinse
• Sanitization
• Rinse (potable water)
There are several correct ways to clean. Although some wineries may utilize fully automated cleaning systems, we will focus on two of the most common cleaning operations:

**Manual & Semi-Automatic Cleaning Operations**
Manual Operations....

• Utilize brushes, rags, etc., along with appropriate cleaning compounds/solutions, and a well-trained operator. Only surfaces, which may be effectively accessed by a cleaning devise (brush, scrub pad), should be cleaned in this fashion. In other words, *if you cannot reach it, or see it, you cannot clean the object effectively.*
Semi-Automatic Operations....

- Utilize a “circuit” or loop which is built with pumps, wine hoses and internally open vessels. The circuit has a few basic parts: a pump, a suction side hose run, an outlet side hose run, a circulating solution vessel (if the vessel to be cleaned cannot act as a holding reservoir for the circulating solution), and the vessel or piece of equipment to be cleaned. This setup is most effective when a CIP(clean in place) spray device is used within the vessel to be cleaned.
Manual & Semi-Automatic Cleaning Operations

• Both of these operations utilize the same cleaning and sanitizing solutions. In either case, an initial water rinse is performed to remove bulk matter (lees, soil, and debris). Once this is complete, a cleaning solution is circulated, or is used with scrubbing action (or both). Continue this operation until item is confirmed clean.
Manual & Semi-Automatic Cleaning Operations

- Rinse with clean water to remove soiled cleaning solution. Next, circulate/apply appropriate sanitizer. Most sanitizers require a final rinse whereas others do not. It is important to check manufacturer’s recommendations. Final Rinse with potable water.
Manual & Semi-Automatic Cleaning Operations

- The Automatic and Semi-Automatic cleaning operations may utilize stronger, hotter cleaning solutions than that used in Manual cleaning operations.
Manual & Semi-Automatic Cleaning Operations

• Greater cleaning efficacy is achieved through increased:
  • contact times (soak, gels, foam)
  • chemical concentration
  • mechanical action (scrubbing, high pressure spray)
  • temperatures.
Common Cleaning Agents For Wineries

- **Alkaline Based**: Good for Tartrate removal
  - **Strong Alkali**: Caustic soda (NaOH), - Antimicrobial at higher concentrations, caustic potash (KOH). These are used with heavy soil loads.
  - **Mild Alkali**: Sodium metasilicate, trisodium phosphate (TSP) and sodium carbonate (soda ash). These can only be used with lighter soil loads.
Common Cleaning Agents For Wineries

- **Acid Based:** Mostly used for scale/mineral deposit removal and prevention
  - Detergents for food plants are commonly based on phosphoric acid (citric)
  - Various organic and inorganic acids are also added to increase specific types of scale removal, to solubilize scale ingredients through chelation, to speed action and to passivate stainless steel.
Common Cleaning Agents For Wineries

- Low foam or high foam surfactants are added to “wet out” a surface for better penetration and to improve rinseability
Common Sanitizing Agents
For Wineries

- **Caustic Soda** - Common component of cleaner/detergents. Does have antimicrobial properties at higher levels, and may be viewed as a first step in sanitation. Must include a sanitation cycle as well.
Common Sanitizing Agents
For Wineries

• Caustic Soda

• Quats/QAC- Quaternary ammonium compounds function by damaging the cell membrane of microorganisms. It is the only sanitizer group that has true residual activity. The quats are generally effective at killing vegetative yeast and mold cells. They are less effective at killing bacterial endospores and fungal spores. Typical quat concentrations used for food contact surfaces are 200 - 400 ppm, with a follow-up rinse usually done prior to the next use of the equipment. Can be used to sanitize equipment prior to long periods when the equipment will not be used.
Common Sanitizing Agents
For Wineries

- Caustic Soda
- Quats/QAC
- Peracetic Acid Compounds - Aquious solution of acetic acid, hydrogen peroxide (H2O2), and stabilizer(s). The primary mode of action is oxidation. PAA disinfects by oxidizing of the outer cell membrane of vegetative & bacterial cells, endospores, yeast, and mold spores. Concentrations ranging from 85-300 ppm are used. The FDA has set a minimum of 85 ppm peracetic acid for food hard surface sanitation.
Common Sanitizing Agents For Wineries

- Caustic Soda
- Quats/QAC
- Peracetic Acid Compounds
Common Sanitizing Agents For Wineries

- Caustic Soda
- Quats/QAC
- Peracetic Acid Compounds
- Hydrogen Peroxide
- Ozone - Strong Oxidizer. Effective over very broad range of microbes. Leaves no chemical residue and has a half-life of ~20 minutes. Special equipment required as ozone cannot be stored and thus must be generated on-site.
Common Sanitizing Agents
For Wineries

- Caustic Soda
- Quats/QAC
- Peracetic Acid Compounds
- Hydrogen Peroxide
- Ozone
- Heat - Penetrates better than any other sanitizer. Hot water is preferable but steam is most common. Table shows set of guidelines generally regarded as safe for equipment sanitation. Begin timing when distal most (coolest) parts reach desired temperature.

<table>
<thead>
<tr>
<th>Temperature/time Guidelines for equipment sanitation</th>
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<tbody>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>200°F(93°C)</td>
</tr>
<tr>
<td>180°F(82°C)</td>
</tr>
<tr>
<td>160°F(71°C)</td>
</tr>
<tr>
<td>140°F(60°C)</td>
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</tbody>
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*Practical Winery & Vineyard  Nov/Dec 1989
Oxidation / Oxidizer?

- The mechanism of oxidation is the transfer of electrons, therefore the stronger the oxidizer, the faster electrons are transferred to the microorganism and the faster the microorganism is inactivated or killed.
Chlorinated cleaners and sanitizers were once very commonly used in wineries. Today we know of the dangers associated with their use. TCA (2,4,6-trichloroanisole) is a chief cause of cork taint, and is formed when naturally-occurring airborne fungi come in contact with chlorphenols (chlorinated phenols). One way chlorinated phenols can be formed is when hypochlorous acid or chlorine radicals (found in chlorinated cleaning and sanitizing agents), come in contact with untreated wood or wood products (pallets, corks, etc).
Why not use Chlorinated Products???

TCA can become **systemic** in a winery by accumulating in wooden structures (beams, barrels, etc), drain pipes, rubber hoses and exposed bentonite. Affected rubber hoses and bentonite then become a means of “inoculating” wine or water that contacts it.
Why not use Chlorinated Products???

TCA is perceptible in wine at extremely low levels (single digit PPT) and is persistent in affected wines.
Why not use Chlorinated Products???

In addition to chlorinated compounds, other halogen-based sanitizing agents (iodine, iodaphores) are being phased out of use in the winery for playing a possible role in Cork Taint.
The Most Effective Program:

There is no detergent or sanitizer that is *IDEAL* for every occasion or microbe. In order to achieve the highest level of cleanliness and sanitation, it is imperative to alternate cleaners and sanitizers within the winery cleaning schedule.
The Most Effective Program:

During a weekly cleaning/sanitizing program, it is advised to use a Caustic Detergent & Peracetic Acid Sanitizer cycle Monday through Thursday, and an Acid Based Detergent & Quaternary Sanitizer cycle Friday.
Don’t Guess!

- **Proper detergent and sanitizer strength:**
  - Test strips
  - Titrations
  - Temperature tape/crayons, quality thermometer when sanitizing with heat
  - **Follow manufacturers mixing recommendations, but confirm strength with above methods**
Don’t Guess!

- **Sanitization Efficacy:**
  - Do not rely on your senses to determine if item has been sanitized.
  - Microbiological Plating- Method gives Results in ~3-7 days. Human error, special training
  - Rapid Microbial Screening:
    - ATP Bioluminescence / AK technology-
    - Results are real time. Simple to use.
Make a Plan, and Stick to it!

- **Create Standard Operation Procedures (SOP’s)**
  - Have written procedures detailing when and how to clean and sanitize all equipment types used throughout the year. Employees need to receive regular training on procedures.
Make a Plan, and Stick to it!

• Assign a Cleaning and Sanitation Director
  • Whether it is you or an employee, make certain that someone is responsible for Sanitation quality, schedule, and efficacy (sanitation testing)
Make a Plan, and Stick to it!

- Maintain Cleaning/Sanitation Records
  - Basic means for tracking progress and efficacy of cleaning program.
Common Winery Cleaning & Sanitation Applications

- Cleaning of winery Premises
- Pumps and hoses / Fermentation and wine storage containers (tanks)
- Harvest Equipment
  - De-stemmer/Crusher, Inclines & sorting tables
  - Press
- Filters
- Fillers
- Barrels
- Utensils, fittings & other equipment
It’s the LAW...

The U.S. Department of Labor’s Occupational Safety & Health Administration (OSHA) outlines within its general Regulations (Standards – 29 CFR) Part 1910 (Occupational Safety and Health Standards) requirements of industry to protect their employees.

http://www.osha.gov
It’s the LAW...

As with all machinery and electrical devices, proper safety measures must be taken to ensure an accident-free workplace. Prior to servicing or cleaning any applicable device, it **MUST BE** de-energized, following proper lockout/tagout procedures *(29 CFR 1910.147)*. If entry is required, the unit and its atmosphere **MUST BE** confirmed safe as per OSHA guidelines *(29 CFR 1910.146)*.
Common Winery Cleaning & Sanitation Applications

• Cleaning of Winery Premises:

  Cellar floors and drains are the dirtiest areas in the winery. They require sanitation vigilance. Left improperly sanitized, floors and drains will harbor microbes, and can lead to outbreaks of infection in wines. It is imperative that the floors and walls within winery work areas are kept clutter-free and clean.
Common Winery Cleaning & Sanitation Applications

Once floors have been swept, they should be cleaned using appropriate cleaning agents, brushes, scrub pads or mops. Perform a post cleaning rinse. Floor drains/drain troughs should then be inspected, removing all debris and then too cleaned. Following a rinse, sanitizing solution should be applied to the floors and drains as per manufacturer recommendations.
Common Winery Cleaning & Sanitation Applications

After appropriate sanitizer contact time has been achieved, floors and walls should be rinsed and then dried using a floor squeegee. Puddles left after cleaning are not only dangerous slip hazards, but encourage microbial growth. **Always use proper safety procedures!**
Common Winery Cleaning & Sanitation Applications

- **Pumps and hoses / Fermentation and wine storage containers (tanks)**

  Pumps and hoses should be cleaned and sanitized on a regular basis. Left neglected, they have the potential to be the most unsanitary items in the cellar, as well as a very effective means of spreading contamination.
For greatest efficiency, the cleaning of pumps and hoses should be done in conjunction with the cleaning of a tank. Rinse with water the tank that will be cleaned, removing as much solids and debris as possible. Position the pump in front of the tank. Connect a short hose from the suction side of the pump to the bottom (lowest) valve on the tank.
It is advisable to place in-line a screen gasket (i.e. Newman™ screen gaskets, Tri-Clover™, Schlueter™ Tee-Line Strainer, Alfa Laval™ strainers) to prevent clogging of spray device. Now connect remaining hoses to be cleaned in-line (one hose connected to another, forming a continual, long hose). Once this is done, connect one side of this hose-run to the outlet side of the pump, and the other side of this hose-run to a CIP-type spray head (spray ball) positioned through a top opening in the tank. Special barrel and tank cleaning devices with rotating spray heads can increase water and time efficiency (see suppliers section).
Ensure that the spray device is sufficiently deep into the top of the tank as to eliminate any “spray shadow”. Note that devices are available that are placed in the base of the tank, attached to the outlet side of the pump. These devices spray up, from the bottom, i.e. Gamajet™. Once this line is set, and keeping track of volume, add hot water (~140°F) into the tank. Add a sufficient amount of water to prevent pump cavitation (when pump suction creates a vortex and thus sucks in air). Once a sufficient amount of water has been put into the tank, add the appropriate amount of cleaning agent to the known volume of water, as per manufacturer’s recommendation.
Pumps and hoses / Fermentation and wine storage containers (tanks)

It is important to test the solution strength with titration or chemical test kits. This ensures that enough chemical is used for the task as well as prevents waste from using too much chemical. Prepare tank and surrounding area so as to eliminate risk of injury by chemical spray (i.e. drape plastic sheet over tank door opening, place hazard cones around risk area). Be sure that the tank is vented prior to starting operation!
Pumps and hoses / Fermentation and wine storage containers (tanks)

Circulate cleaning solution through spray device until vessel, hoses and pump are clean. This can last 20 to 30 minutes. Confirm that all surfaces are clean through careful inspection. Additional run times may be required, and additional cleaning agents may need to be added (test chemical strength) to thoroughly clean items. Once confirmed clean, cleaning solution in the tank, pump and hoses may be properly disposed.
Fill vessel with approximately the same amount of water as before. Turn the pump on and circulate rinse water for 5 to 10 minutes. Empty system of this water. Add the same volume of water to the tank again. This time, add the appropriate amount of sanitizer to the water, and circulate for the recommended length of time as per manufacturer’s instructions. Properly dispose of this solution. Fill tank with enough water (potable) to circulate a final rinse. Drain water from the pump head. Store hoses off of the floor in a way that allows water to drain out. Always use proper safety procedures!
Common Winery Cleaning & Sanitation Applications

• **Harvest Equipment**
  
  • **De-stemmer/Crusher , Inclines & sorting tables**

  De-stemmer/Crushers as well as inclines & sorting tables must be cleaned manually. Some come with built in sprayers. These should only be used to aid in the removal of bulk matter, and not as the only means of cleaning. Open and disassemble the device in a safe manner, allowing as much of the interior to be accessed as possible. With water or high pressure sprayer remove debris and bulk material.
Harvest Equipment
De-stemmer/Crusher, Inclines & sorting tables

Prepare a cleaning solution in a bucket with a concentration suitable for a manual hand wash operation (see manufacturer’s recommendation). Clean equipment using brushes, cleaning pads, etc, with scrubbing action. When clean, rinse all surfaces with fresh water. Prepare sanitizer in a bucket as per manufacturer’s instruction. Apply sanitizer to all surfaces of equipment for appropriate amount of contact time (see manufacturer’s instructions). Consider using a hand pump style sprayer to apply sanitizer.
Once adequate contact time has been achieved, rinse with potable water. For longer storage times, use a QUAT sanitizer, and postpone final potable water rinse until item is to be used again. QUATs have residual antimicrobial properties. **Always use proper safety procedures!**
Common Winery Cleaning & Sanitation Applications

• Harvest Equipment
  • Press

There are many types of grape presses used by wineries. All require some degree of manual hand cleaning. Whether you are cleaning a basket press or a bladder tank press, partial or total entry into the devise may be required. **Always use proper safety procedures!**
Harvest Equipment
Press

Using brushes, scrapers etc., remove seeds, skins, and all other bulk materials from the inside (and outside) of press. Pay close attention to draining slits, axial feed valve, press door assemblies, and folds within press bladders as these oftentimes hide materials to be removed. It is imperative to check with your press manufacturer for recommendations regarding chemicals used to clean and sanitize. The use of other than recommended chemicals and procedures may void warrantee.
Currently, representatives from both Willmes and Europress (Euromachines) recommend using a mild, non-chlorinated, alkaline cleaner such as non-chlorinated TSP. Chlorinated products as well as Ozone will reduce service life of press bladder, and may void warrantee! A suggested rate of 2 pounds of TSP per 60 gallons of warm water (110-115°F) was given. Temperatures are never to exceed 180°F (Willmes).
Using this cleaning solution, in conjunction with appropriate safety procedures, hand scrub presses which do not allow for fluid circulation through an axial feed valve. For those presses with axial feed valves, a circulation loop is created. The drain pan is placed below the press. Using appropriately sized hoses, the inlet of a pump is connected to the outlet of the drain pan, and the outlet of the pump is connected to the axial feed of the press. The drain pan is filled with cleaning solution. The pump is turned on, and the press is made to rotate continually.
Harvest Equipment
Press

Ensure that there is an adequate amount of cleaning solution so as to prevent pump cavitation. Hand scrubbing may be required when using this procedure. Continue operation for approximately 20-30 minutes. Deactivate system and visually inspect all surfaces to determine if press is clean. Longer run times may be necessary. Once confirmed clean, cleaning solution may be properly disposed. **Always use proper safety procedures!**
Harvest Equipment
Press

With circulation loop still in place, fill drain pan with fresh water. Circulate for approximately 5 minutes. Discard this water, and refill pan with fresh water. Add citric acid to this water at a rate of 1 pound per 60 gallons of water (*Willmes*), and circulate for approximately 10 minutes. Properly dispose of this liquid. Refill pan again with fresh water, and circulate for approximately 5 minutes. When complete, drain entire system, and turn press with door down, leaving it open to dry. **Always use proper safety procedures!**
Recommendations regarding sanitation vary. No sanitation chemicals were recommended by Willmes™ or Europress™. Both however advised against the use of chlorinated products and ozone.

Heat sanitation is an option. Europress™ advises against the use of steam, and Willmes™ states that temperatures are never to exceed 180°F.

Ask your manufacturer for recommendations.
Common Winery Cleaning & Sanitation Applications

• Filters

Taking into consideration that the word filter encompasses a very broad range of equipment, it is important that you consult with your manufacturer for procedures specific to your device. Although procedures and techniques may differ from one manufacturer to the next, the purpose of this guide is to encourage proper cleaning and sanitation. The concept is the same regardless of the device:

Clean and sanitize all equipment on a regular basis using appropriate detergents and sanitizers.
Common Winery Cleaning & Sanitation Applications

• Filters—Plate and Frame, Lees Filter

Remove filter pads from plate and frame style filters or filter media from lees filters, and dispose of properly. With water or high pressure sprayer remove debris and bulk material from plates and entire system. Prepare a cleaning solution in a bucket with a concentration suitable for a manual hand wash operation (see manufacturer’s recommendation). Clean equipment using brushes, cleaning pads, etc, with scrubbing action. When clean, rinse all surfaces with fresh water.
Filters—Plate and Frame, Lees Filter

Prepare sanitizer in a bucket as per manufacturer’s instruction. Apply sanitizer to all surfaces of equipment for appropriate amount of contact time (see manufacturer’s instructions). Consider using a hand pump style sprayer to apply sanitizer. Once adequate contact time has been achieved, rinse with potable water.
For longer storage times, use a QUAT sanitizer, and postpone final potable water rinse until item is to be used again. QUATs have residual antimicrobial properties.

If applicable, larger volumes of solutions may be prepared and circulated utilizing an external or integrated pump.

- Difficult deposits or films may require soaking plates in cleaning solution.
Common Winery Cleaning & Sanitation Applications

- **Filters— Pressure Leaf Filter**

  The challenge with cleaning and sanitizing a *pressure leaf filter* is circulating cleaning and sanitizing solution through every passage of the device for an appropriate amount of time. Numerous filter design types exist. Every winery should design a custom SOP for their situation, accommodating their unique cleaning challenges.
Filters—Pressure Leaf Filter

Always use proper safety procedures! HIGH PRESSURE SYSTEM! After properly disposing of filter media, rinse entire system with fresh water. Initially rinse areas with a water hose spray, removing as much bulk matter as possible. Next, close filter chamber. Fill both the slurry vessel and filter chamber with water. Connect hoses forming a circuit between the product input valve and the filtered product output valve. This may be direct hose connection with some devices or into a secondary vessel.
The object now is to begin circulations through the device including every possible passage and valve in the unit. Many combination exist. It is advised that each winery creates a custom cleaning procedure which includes a step by step process for including every passage and valve within their unit. Circulate water between the slurry tank and the filter chamber incorporating all passages manifolded within that circuit. Circulate water between the inlet and outlet. Through entire process take care to include infrequently-used passages such as auxiliary, sample, bypass and vent valves.
Filters—Pressure Leaf Filter

Once thoroughly rinsed (more than one water rinse cycle may be required), drain entire system. Refill filter chamber and slurry vessel with fresh water and add appropriate amount of chemical cleaning agent for amount of water used. Circulate solution as before taking care to include and clean all passages. Once confirmed clean, properly dispose of solution and repeat process with fresh water.
Filters—Pressure Leaf Filter

After a thorough rinse cycle, drain system, and refill system with fresh water, adding appropriate amount of sanitizer for volume of water used. Circulate sanitizing solution in a manner as before. Follow sanitizer manufacturer’s contact time recommendations. Once this step is complete, dispose of solution properly and refill system with potable water. Circulate water throughout system, and then drain.
Common Winery Cleaning & Sanitation Applications

• Fillers

Bottle fillers generally consist of a filler bowl and filler spouts. Most filler bowls are easily accessed and can be hand cleaned with ease. Filler spouts can present a challenge as they contain areas out of site and difficult to reach. For thorough cleaning, their disassembly is required.
Fillers

Run clean water through the filler and set spouts to drain using “cups”, dummy bottles, or modified pieces of pipe. These are used to hold the spout valves open, allowing liquid to flow continually. Some fillers are modified with a “lift-open, turn-lock” system. Once rinse is complete, drain and begin disassembling the filler spouts. Using a cleaning solution and brushes, clean all parts of the spout. Scrub the inside of the filler bowl, making certain that the wine inlet, float valve and outlets to spouts are well cleaned. Internal bowl filling passages may require cleaning solution to be pumped through and allowed to soak.
Fillers

When system has been cleaned, thoroughly rinse with fresh water. Reassemble the system and sanitize. Hot water for the appropriate amount of time may be used (see chart on sanitizers page). The use of a sanitizing chemical may too be used. Be sure that the sanitizer has the appropriate amount of contact time as per manufacturer’s recommendation. This sanitation cycle should be followed by a potable water rinse.
Some wineries are using ozonated water for their sanitation cycle. It is important to note that ozonated water is a sanitizing agent, and does not replace a cleaning cycle. Also, ozone is not compatible with many gaskets and o-rings commonly used in fillers. Modifications may be necessary to allow for the use of ozonated water as a filler sanitizer.
Fillers

- A hot water or steam sanitation cycle is commonly performed just prior to a “sterile” bottling operation. The entire system must be brought to temperature. Any part of the system through which sterile filtered wine will pass (including the sterile filter housing and filter) must be brought to temperature, and for the appropriate amount of time (see chart on sanitizers page).
Fillers

• A hot water or steam sanitation cycle is commonly performed just prior to a “sterile” bottling operation. The entire system must be brought to temperature. Any part of the system through which sterile filtered wine will pass (including the sterile filter housing and filter) must be brought to temperature, and for the appropriate amount of time (see chart on sanitizers page).

• The heat sanitation cycle time does not start until the coolest part of the item being sanitized comes to temperature.
Common Winery Cleaning & Sanitation Applications

• **Barrels— Rack and Return Operations**

If a barrel that has been emptied is to be immediately refilled (racking operation), lees and sediments are removed from the barrel by turning it bung side down and rinsing with non-chlorinated water. Special barrel and tank cleaning nozzles with rotating spray heads can increase water and time efficiency (see suppliers section). Continue to rinse the barrel until exiting rinse water is clear and sediment-free. Confirm that the barrel is clean by visually inspecting the inside using a small flashlight.
Common Winery Cleaning & Sanitation Applications

• **Barrels—Storage**
  
  Barrels to be stored for an extended period of time must be properly maintained to ensure viability and health. Once the barrel has been cleaned, it is allowed to completely drain with bung hole down. When the inside of the barrel is dry, it is rotated bung side up. The inside of the barrel is then “sulfured”.
Common Winery Cleaning & Sanitation Applications

• **Barrels—Storage**

  - Sulfuring a barrel is done by either burning ~5 gm/ 60 gallon barrel of sulfur discs or wicks (*Barrel Builders Inc.*) within the barrel or through the addition of an equivalent amount of liquefied gas SO₂.
Common Winery Cleaning & Sanitation Applications

• Barrels– Storage

Once the barrel has been sulfured, it is tightly bunged and stored. The sulfuring process must be done monthly. Barrels should be stored in an environment of 70-85% humidity. If your cellar environment is of lower humidity levels, the water rinse and drain process may be included with the monthly sulfuring. This will help maintain the barrels structural integrity.
Although burning sulfur within barrels is an acceptable means of SO\textsubscript{2} addition for the purpose of barrel storage, it should be noted that unburned, elemental sulfur may be deposited. This deposit, if allowed to come in contact with wine later, may cause the formation of H\textsubscript{2}S.
Although burning sulfur within barrels is an acceptable means of SO₂ addition for the purpose of barrel storage, it should be noted that unburned, elemental sulfur may be deposited. This deposit, if allowed to come in contact with wine later, may cause the formation of H₂S.

Only 5 mg/L of elemental sulfur in the must is enough to produce H₂S concentrations which cannot be removed (VINTNER'S CORNER Vol.16, No. 3 May - June, 2001)

Bruce W. Zoecklein)
Be aware that sulfur advertised as “dripless” can drip!

When burning sulfur within a barrel, it is advised that dripless burning cups be used.
Common Winery Cleaning & Sanitation Applications

- Utensils, valves & other equipment
  - All other items not yet mentioned that come into contact with wine must also be cleaned and sanitized on a regular basis. Most of these operations are performed with small bucket volumes of cleaning and sanitizing solutions. Incorporate the same steps as are used with all other equipment: pre-rinse, detergent cleaning, post-rinse, sanitation cycle, final potable water rinse.
Common Winery Cleaning & Sanitation Applications

- Utensils, valves & other equipment
  - Valves, and particularly ball valves, need to be taken apart to be properly cleaned. Ball valves have a “side pocket” which cannot be accessed when the valve is intact. Ball valves, and multi-flow valves (three way valves) are well known for their ability to retain and transmit detrimental wine microbes.
Barrel and Tank Cleaning Devices

- Special barrel and tank cleaning nozzles with rotating spray heads can increase water and time efficiency. Some suppliers & styles include: Shae™ Barrel Washer (Key Industrial), Gammajet™ Barrel Blaster, LS Tank Washer™, Bitard Barrel Rinser, Schlueter™ Spray Balls and Toftejorg™ (Alfa Laval) tank cleaning devices to name a few.
Some suppliers of cleaning and sanitizing chemicals & equipment

- **Loeffler Chemical.**  [http://www.loefflerchemical.com/](http://www.loefflerchemical.com/)
- **Madison Chemicals**  [http://www.madchem.com/Food_Plant/Acid_Cleaners.htm](http://www.madchem.com/Food_Plant/Acid_Cleaners.htm)
- **Johnson Diversey**  [www.johnsondiversey.com](http://www.johnsondiversey.com)  (262)-631-4001
- **Brenntag**  (formerly *Great Western Chemical*)  (559)-485-4150
- **Key Industrial**  (General equipment and supplies for the wine industry)  (800)-852-5270
- **Ecolab**  (800)-352-5326
- **Barrel Builders Inc**  [www.barrelbuilders.com](http://www.barrelbuilders.com)
• This publication contains product type and procedural recommendations. Changes in regulations occur constantly and human errors are possible. Read the label before using any chemical, and contact equipment manufacturers for recommendations. The Texas A&M University System and its employees assume no responsibility for the effectiveness or results of any chemical usage. No endorsements of products are made or implied.