Acknowledgements

Chamisal Vineyard’s assistant winemaker played a large role in the composition of the Chamisal Vineyards Harvest Intern Training Manual. Throughout my employment at Chamisal Vineyards I have learned an enormous amount about the wine industry and winemaking in general. Working with Michael Bruzus on this manual was a great experience. He is a fantastic teacher and very patient supervisor. Although Mr. Bruzus recently resigned from his position at Chamisal, he will always be a part of the Chamisal Vineyards wine cellar family.
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Chapter One

Introduction to Project

Chamisal Vineyards is a smaller scale winery in Edna Valley, San Luis Obispo County, on the central coast of California. This company is in need of a new training manual that’s main focus is preparing harvest interns for their job as quickly as possible. Up until now, Chamisal’s assistant winemaker has been in charge of training interns. His training included the use of smaller, less organized, inefficient packets of information about the winery. The goal is to compose a new, all-in-one, training guide for interns to take with them after their initial training week so they can overview any information that may have been unclear. This manual is also meant to ensure the legal safety of Chamisal Vineyards. Overall, the system of training interns needs updating.

Statement of the Problem

The problem that needs addressing is Chamisal Vineyard’s lack a beneficial training manual for harvest interns. The interns have an immense amount of training to get through during their initial training week. It can be somewhat difficult to retain the information when it comes time to put it into use. Not having an employee manual can sometimes cause interns to do the wrong thing in tight situations, which occur often in wine cellars. These mistakes could possibly cause the company to loose gallons upon gallons of wine, which leads to exponential amounts of profit loss being blamed on
seasonal interns. These problems and situations that arise could have been avoided had the interns been trained more effectively.

**Importance of the Project**

The importance of proper training for cellar workers is. With Chamisal Vineyards increasing production exponentially every year,, and with them having so few college educated employees, they are in need of an affective training tool. Chamisal’s assistant winemaker and winemaker have very busy lives and have little time to focus on training employees. Therefore, writing a manual for seasonal workers is the last thing on their minds. They should be able to focus their energy on producing exquisite, fine wine instead of having to worry about reeducating their employees on things they have already been trained on during their first week of work.

**Purpose(s) of the Project**

The purpose of this project is to enhance and ensure the safety, proper education, and learning experience of all seasonal interns at Chamisal Vineyards. The overall goal of an internship is, after all, for the educational experience of the student. The manual would help ensure that the interns learn and can go back and review anything they want to remember if they were to take another position in a winery again after graduation. Many interns at Chamisal are Cal Poly students and although they physically work
for their internship credits, they should be getting the optimal mental learning experience as well.

**Objectives of the Project**

The objectives of this manual are to make life easier for Chamisal Vineyards’ winemaker and assistant wine maker when it comes to educating the interns each year on cellar procedures. The current assistant wine maker, Mike Bruzus is currently the person heading this task.

**Summary**

This manual will require much work and research. In the end it will be well worth the effort and be a beneficial senior project to Chamisal Vineyards. The future interns will have a valuable tool for them to refer back to instead of having to take attention away from management. In addition, it will help ensure the safety of the company as well as the interns themselves.
Chapter Two

Review of Literature

An employee-training manual is an essential part of any business. It is particularly important, however, for businesses dealing with high risk and low experience interns. Such a manual should include safety training, legal issues, and any other information needed to properly prepare employees for the job. It is important to remember, training employees is not a one time occurrence. It is important to follow up on training throughout employment.

Writing an Employee Training Manual

The AgSafe program is designed to help human resource departments take proper documentation of work related accidents, covers proper ways to update a company’s employee manual, promotes proper follow up on training on a weekly basis, and discusses how to better communicate safety from lowest to highest employee rank. “Agsafe is a network of farmers, producers and processors helping other farmers, producers and processors keep the dedicated men and women of the Ag industry safe and healthy” (agsafe.org). The purpose of the organization is to cut down on accidents in the agricultural industry through educating both employee and employer on how to effectively remain safety conscious on the job every day. Most large agricultural companies have what is referred to as an “IPP” or “Injury and Illness Prevention Program” that is written up by their human resources
department. According to AgSafe, this IPP should be updated and improved upon on a regular basis (at least once per year). AgSafe standards were kept in mind when writing the manual for Chamisal. The training manual will be written similarly to an Injury and Illness Prevention Plan.

**Parts of a Training Manual**

In order to compose a training manual it is important to first figure out the necessary components of a successful training document. According to Fox Rothschild LLP, a “law firm built to serve business leaders”, some of the top things to include in an employee handbook are:

1. Policies- be sure they are pertinent to the state and county regulations; updating policies on a yearly basis is very important to the legality of the document and safety of the company
2. Disclaimers
3. Code of Conduct
   a. Dress code
   b. Absentee Policy, Tardy Policy
   c. Drug & Alcohol Policy
4. Discrimination and Anti-Harassment Policies and Reporting Mechanisms; be certain interns know regulations and specifics
5. Computer/Internet/Device Usage Policies: 2012 harvest interns were not taught a policy on use of cellular phones on the job.
Another article titled “Employee Handbooks: 7 Tips to Getting Yours Done” by JD Supra. In this article, posed these key points to writing a manual:

1. “Don’t create specific expectations in the minds of employees by making promises you may not be able to keep”
2. Include Equal Employment Opportunity & Anti-Harassment Policies
3. Include Family and Medical Leave Act Information
4. Include a Social Media Policy: this is one policy to put into the handbook as it is more recent to today’s age
5. Require Receipt and Acknowledgement: Putting a signature space for our assistant wine maker as well as myself, and the interns to ensure they have read the handbook and understand it is an essential part of the manual
6. “Having an employee handbook also may get offer legal protection if an employee later files an employment claim against the business…”

These two articles, as well as the AgSafe seminar have presented a through understanding of what needs to go into an employee manual. With this research, as well as input from Chamisal management, a properly composed handbook is obtainable.

OSHA Regulations
Forklift Operator Regulations

“As an employer it is your responsibility to train and authorize your employees to operate your equipment, as required by Cal OSHA Title 8, Section 3664, Federal OSHA 1910.178 and ANSI B56.9” (Greylift).

Forklift accidents are an extremely common occurrence in the agriculture industry. It is essential to train all new employees thoroughly on proper operation of this useful but possibly dangerous piece of equipment. If proper training is not conducted, the company could be at serious legal risk if a serious accident were to occur. According to CAL OSHA, “The standard requires operator training and licensing as well as periodic evaluations of operator performance” (Greylift). This means checking up on interns and other employees in addition to the initial forklift certification class. Most company’s forklift training programs range from $100-$300 per company training session depending on the number of employees partaking in the program. Companies such as Honda, Caterpillar, Greylift and other forklift manufacturers commonly have training programs available upon purchase of a forklift.

In addition to training employees how to safely operate a forklift, there are also additional posters, pamphlets, DVDs, etc. to ensure the company has done everything it can to avoid an accident.
This helps keep the company out of lawsuits and legal problems in addition to maintaining a safe working environment.

**Basic Equipment Safety**

In addition to forklifts, there are many other powerful pieces of equipment present in the cellar during harvest time. Some of these potentially dangerous machines include: centrifugal pumps, scissor lifts, grape processing equipment (de-stemmer), grape presses, steam generators, and pressure washers.

Interns will also be required to learn safety around ladders, caution when walking on slippery floors and catwalks, wearing proper safety equipment, and wearing proper safety clothing to avoid accidents on the job.

**Chemical Safety and Confined Spaces**

Chamisal requires all employees to use extreme caution when digging out tanks and presses of partially fermented grapes because of the potentially unsafe amount of carbon dioxide that can be produced from such a process. CAL OSHA states under §1926.21 Safety training and education:

“All employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. The employer shall comply with any
specific regulations that apply to work in dangerous or potentially dangerous areas.” (CAL OSHA)

To reinforce this legal matter, Chamisal Vineyards requires that employees fill out a confined spaces release form every time any employee enters a confined space, which usually occurs multiple times a week.

Cleaning Chemicals Commonly Used in the Wine Industry

Cleanskin

Cleanskin is a cleaning agent used in the wine industry for sanitation and to remove tartrate buildup after primary fermentation.

“A work-safe CIP alkaline detergent powder used in solution with hot or cold water on wine contact stainless steel and associated surfaces to clean and remove wine tartar, colour, protein and most organic soil in one process. Also used for multi-purpose cleaning.

Cleanskin is a cream-white, free-flowing, homogeneous blend of particulate solids of mid-range pH sodium carbonate, peroxy-carbonate, proprietary alkyl-magnesium surfactant, chelating, water conditioning, and anticorrosion materials. Cleanskin removes wine tartar, wine-colour film, protein and
organic soil and is a multipurpose cleaner of winery stainless steel and associated surfaces whilst in aqueous solution.”

(EnolTech)

**Sulfur Citric**

Sulfur Citric is often used for cleaning bungs when topping off barrels as well as cleaning the outside of oak barrels and stainless steel fermentation tanks. Employees should wear rubber gloves as well as safety glasses when mixing and applying any sulfur citric solution.

“The acid content of a Sulphur-Citric sanitising solution also serves to neutralise surfaces previously cleaned with caustic solution... An effective sanitising solution can be made by dissolving 17 grams of PMB (3 level teaspoons) in 1 litre of water. This is best made by dissolving the measured dose of PMB powder in 500 millilitres of warm water, and then add cool water to make 1 litre of sanitising solution. To make Sulphur-Citric solution add 17 g (3 teaspoons) of Citric Acid to the PMB solution” (Eltham & District Winemakers Guild)

**Ozone**

Ozone is the most commonly used cleaning solution in the Chamisal winery. It is the most efficient way of sanitizing stainless steel, barrels, processing equipment, hoses for transporting wine, clamps, valves,
pumps, as well as other equipment. Ozone is used so widely in wine production because of its short half life, after being applied, it sanitizes quickly, then after about 20 minutes it turns to water and is completely food safe.

“In the natural world, ozone (O₃) is created when oxygen molecules are subjected to ultraviolet (UV) rays from the sun or by an electric charge from lightning. Some oxygen (O₂) molecules are split into single oxygen atoms, which then combine with other O₂ molecules to form ozone...Ozone reacts very quickly. It is 100-times stronger than chlorine but has a relatively short half-life” (Water Purification)

Summary

The training manual will include training tools presented on the CAL OSHA website as well as those already written by past management employees. The remaining essential information will be added to ensure all subjects are thoroughly covered in this quick reference manual.
CHAPTER 3

Materials and Methods

Materials for this manual included past training materials used, a computer and word processing program, and information from various different sources on training employees. The methods for this document started with initial research on wine cellar regulations followed by input and approval of the cellar management team. Meeting with cellar management consisted of meeting with the winemaker, assistant winemaker, and cellar master, all of whom had input on the composition of the manual.

Meeting With Management

Meeting with the wine cellar management team at Chamisal Vineyards was the first and most important step of writing this manual. If the manual were not written in a way that the management could effectively use it, then the manual would serve little purpose. Through face to face meetings as well as email conversations the proper information was agreed upon and the content desired for the manual was confirmed. Meetings with the assistant winemaker were most helpful and productive as this position is generally responsible for training new employees. The assistant winemaker was helpful and provided ample amounts of insight as to what was expected of the manual.
Collecting Past Intern Training Materials

Past training data was then collected from the assistant winemaker. These documents include the Chamisal Vineyards Operations Manual as well as sheets on safety. These are essential to training interns for day to day tasks as well as to keep the cellar a safe place for students to work. Often times the employee can be entirely responsible for causing an accident and the lawsuit ends up coming after the company. All of the papers in the handbook are to be signed upon finishing being read to ensure the safety of Chamisal Vineyards. More specific diagrams on how to set up pumpovers, transferring wine from tank to tank, and setting up processing equipment will also be added. These diagrams should be included because the most often mistakes made by interns are made when setting up equipment and visual aids may reinforce the learning process.

Manual Details

The Intern Manual for Chamisal Vineyards will be edited to look professional. When a student takes on an internship at Chamisal they will get the experience of a full time job. There will be very few pictures (only those essential to training), the text and layout will be clear and concise. The font will be size 12 in Calibri font. The manual will be sectioned out with easy to reference titles. The titles are an important factor to the handbook
because it is meant to be, a quick reference for the interns. A table of contents will also be included in the handbook for even more efficient information lookup. The actual printing of hardcopies of the manual will remain up to the management position responsible for training the harvest interns.

Composing the Manual

After collecting all of the necessary data necessary to the manual, the next step was to compose and format the manual itself. This task required meeting with the assistant winemaker and receiving his approval of its layout and format. Much of the content was written within the last year, but some of the information was taken from various past training documents written by the assistant winemaker.

Manual Outline

The following is the outline for the training manual. The outline was designed with efficiency of reference in mind. The titles are organized to ensure the reader can find the information they are looking for quickly and easily.

Title Page

I. Introduction to Chamisal Vineyards
II. Work orders
   a. Work order vocabulary
III. General pump use
   a. Selecting and Operating Different Pumps
   b. General Pump Notes and Reminders
IV. Selecting and setting up a tank
a. Cleaning Tanks and Fittings
b. Thermostat Use

V. Gas Use
a. Gassing Tanks

VI. Wine movement
a. Tank to Tank 
b. Tank to Barrel 
c. Barrel to Tank

VII. Daily Harvest Season Tasks
a. Pumpovers 
b. Wine Additions 
c. Cleaning Barrels 
d. Topping Barrels 
e. Moving and Stacking Barrels 
f. Red Grape Processing 
g. White Grape Processing 
h. Digging Out Tanks and Presses

VIII. Cellar safety
a. Personal Protection Equipment 
b. Proper Cellar Attire 
c. Scissor Lift Safety 
d. Forklift Safety 
e. Alcohol Consumption 
f. Lockout-Tagout 
g. Pressure Washer Safety 
h. Ozone Safety 
i. Steam Generator Safety 
j. Ladder Safety 
k. Confined Spaces

IX. Organization
a. Stainless Steel Fittings 
b. Cleanliness

Summary
Meeting with the management, collecting data from past years, and organizing the layout of the manual were all major parts of composing the training manual. If any of these procedures were to have been absent in the
process of writing the manual, it would not have become a reality. Using the management’s expectations and suggestions was an essential part of composing the manual and ensured that it be a proper fit for the company’s needs.
Chapter Four

Results and Discussion

The result of this project is the Harvest Intern Training Manual itself. This chapter of the project includes a finished copy of the manual itself as well as additional information explaining the manual’s layout and format.

The Harvest Intern Training Manual

The following is a copy of the actual Intern Training Manual:
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III. General pump use ......................................................................................................... 7  
   a. Selecting and Operating Different Pumps
   b. General Pump Notes and Reminders
IV. Selecting and setting up a tank ....................................................................................... 11  
   a. Cleaning Tanks and Fittings
   b. Thermostat Use
V. Gas Use .......................................................................................................................... 17  
   a. Gassing Tanks
VI. Wine movement ............................................................................................................. 20  
   a. Tank to Tank
   b. Tank to Barrel
   c. Barrel to Tank
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   e. Moving and Stacking Barrels
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   c. Scissor Lift Safety
   d. Forklift Safety
   e. Alcohol Consumption
   f. Lockout-Tagout
   g. Pressure Washer Safety
   h. Ozone Safety
   i. Steam Generator Safety
   j. Ladder Safety
   k. Confined Spaces
IX. Organization .................................................................................................................. 47  
   a. Stainless Steel Fittings
   b. Cleanliness
INTRODUCTION TO CHAMISAL VINEYARDS

Hello and Welcome to the Chamisal Vineyards Cellar family! The next few months will most likely be like nothing you have ever experienced before. It will be full of long days, hard work, learning experiences, victories, failure, with some fun thrown in along the way. Prepare yourself to experience fatigue, get your clothes wet and dirty, and earn yourself valuable work experience; not to mention your hands will be calloused and stained purple until January. Remember to get ample sleep at night in preparation for the next 8-12 hour work day. We are happy to have you here, but be prepared to earn your keep!

This manual is a quick reference guide for you to use throughout harvest. It is important to pay close attention throughout your initial training week. If you have forgotten anything from your initial training week that you would like to read up on check this manual first and if you still have any questions ask a seasoned cellar employee, the winemaker, or assistant winemaker. It is important to be aware of everything that is going on around you during harvest season to ensure that all harvest procedures are executed efficiently and in great detail.
# I. WORK ORDERS

Chamisal Vineyards uses written work orders to track all major winemaking operations. They are an essential document for ensuring that the correct job is performed in the correct manner. They are also vital for maintaining accurate records of wine additions and blends.

<table>
<thead>
<tr>
<th>CHAMISAL VINEYARDS</th>
<th>Work Order #</th>
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<tbody>
<tr>
<td>Vintage:</td>
<td></td>
</tr>
<tr>
<td>Type:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Pull sample for lab: (Y/N)</td>
<td></td>
</tr>
<tr>
<td>Title of Job:</td>
<td></td>
</tr>
<tr>
<td>Work Authorized By:</td>
<td></td>
</tr>
<tr>
<td>Work Done By:</td>
<td></td>
</tr>
<tr>
<td>From Vessel:</td>
<td>To Vessel:</td>
</tr>
<tr>
<td>Thermostat temp:</td>
<td></td>
</tr>
<tr>
<td>Sanitation:</td>
<td></td>
</tr>
<tr>
<td>Pump(s):</td>
<td></td>
</tr>
<tr>
<td>Additional Equipment: (Y/N)</td>
<td></td>
</tr>
<tr>
<td>Hose(s):</td>
<td></td>
</tr>
</tbody>
</table>
| Cleaning solution(s): | Clean/Filter/ 
|                     | Ozone            |
| Tank(s):           |              |
| *Allow 3 minutes for tank to dry, then close tank and add gas*
| Duration:          |              |

<table>
<thead>
<tr>
<th>Addition</th>
<th>Rate</th>
<th>Amount for this lot:</th>
<th>Lot Code</th>
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<th>Movement:</th>
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<td>From Tank:</td>
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<table>
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<tr>
<th>Lees:</th>
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<tr>
<td>Save: (Y/N) to: Keeps barrel add to wine.</td>
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<table>
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<th>Notes:</th>
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<table>
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<th>Barrel List:</th>
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</table>
A. WORK ORDER VOCABULARY:

Work order number: Use 5-digit date. Example: For February 15, 2011 use 021611. Follow date with a decimal number. First work order of that date would be 021611.1, second would be 021611.2 and so on.

Vintage: Specifies vintage of wine to be worked on.

Type: Specifies type of wine to be worked on; i.e. Pinot Noir, Chardonnay, Syrah. Maybe general or specific, i.e. Califa Chardonnay or CM 352 depending on the specificity of the operation.

Pull sample for lab (Y/N): Pull sample for lab analysis and have requested analysis run PRIOR to beginning operation as lab results may influence parts of the operation.

Title of Operation: Describes the type of the operation; i.e. Rack Califa Chardonnay blend to tank or Barrell down PN 115.

Work authorized by: Person writing work order should initial this

Work done by: Fill in with initials of workers performing task

Date completed: Fill in at task completion—confirms that work was completed as well as when it was completed.

Lab approval: Depending on lab results, task may require modification or additions which would be indicated here.

Description of operation: Describes the operation in detail.

Sanitation Section: Describes the equipment required for the operation and the sanitation method required to clean it before use:

Pumps: Recommended pump for this operation will be circled. If this pump is not available, check with supervisor. See Section 3.2 for more information on correct selection and use of pumps.

Hoses: Recommended hoses for this operation will be specified. If suitable hoses of this size are not available, check with supervisor.

Tank(s): Specifies the tanks that will be used and will require cleaning for this operation. See Section 3.3 for correct setup of tanks.
Additional accessories: Details any other specific fittings, like Rackiteer, that may be required for this operation.

Cleaning solution: Specifies the type of cleaning process we will use on the specified tanks, pump, hoses and additional equipment. See Section 3.4 for correct cleaning procedures.

Additions: Possibly the most important part of the work order. Notes type of addition, rate of addition, amount added to the lot and the lot code. Allows us to track additions by lot.

Movement: Describes the movement of wine during the operation. Where possible, volumes should be measured before and after the operation to determine if any losses or gains were sustained. Measurements will always be measured after a movement. It is the responsibility of the cellar staff to make sure this gets done before the work order is submitted to the lab. If there is a discrepancy with the gallons in excess of 5% or 60 gallons - whichever is greater, the lab should find the source of the discrepancy. If all sources for error have been exhausted, then the lab will immediately notify a winemaker of the discrepancy.

Lees: Specifies whether to save or dump the lees and what vessel to collect it in.

Barrel list: Will list the specified lots and barrel numbers relating to any operation involving barrel. Example: Racking barrels to a blend. The lab should double check that the specified barrels entered the tank.

The information from these written work orders will then be entered into the Winemaker's Database software by the Lab.

*** Important that ALL work orders get returned to lab at end of day! ***
II. GENERAL PUMP USE

Pumps use a number of different mechanisms to move liquid. Each pump has a suction (inlet) and a delivery (outlet) port. One common feature of all pumps is that they PUSH liquid more effectively than pulling liquid. Always set up the pump with a SHORT INLET HOSE and a LONG OUTLET HOSE to minimize the amount of “pulling” that the pump has to do.

Electric pumps will easily blow lines and fittings if turned on with a valve closed! Please check and recheck your valve positions before turning on pumps!

Never leave a pump running unattended as this may lead to sucking air, overfilling a vessel or other problems.

Take all precautions to avoid pumping air or running a pump dry. This will not only oxidize the wine but can damage the pump. Keep a close eye on liquid levels in the vessel you are emptying and filling.

A. SELECTING AND OPERATING DIFFERENT PUMPS

We utilize a number of different types and sizes of pumps in the winery. All have appropriate and inappropriate uses:

Wakeshaw 130: The Wakeshaw is our most versatile pump. It is a positive displacement pump which means that it can push air and self prime. It has 3” inlets and outlets which allow pumping of must. These can be reduced to 2” or 1 ½” for wine or juice movements. It can be run in forward or reverse and has a frequency drive and remote control for adjustment of speed. This pump can be used for any operation in the winery but is best suited for barrel filling and filtration. It is not ideal for large volume transfers. Flow rate of 0-150 gpm.

Plug pump into 208V outlet. Attach appropriately sized hoses; 3” for must pumping, 2” for pump-overs or tank to tank transfers, 1.5” for barrel filling or filtration. Ensure that the pump is setup with a SHORT inlet hose and a LONG outlet hose. Ensure that the hoses you select have adequate length for the operation. The pump has a number of controls on the control panel.

STOP Press this button to immediately stop the pump at any time
START Press this button to start the pump. This button must always be pressed after plugging a pump in. IMPORTANT: Before pressing the start button, ensure the remote control is turned to 0. Otherwise pump may start at full speed.
LOCAL/OFF/REMOTE Pump should be set to LOCAL for normal operation. Set to REMOTE if you wish the pump to be controlled by an external sensor such as a float sensor, pressure switch or electrovalve on a bottling line.

FORWARD/REVERSE Switches direction that the pump runs in.

SPEED/PRESSURE Set to SPEED for normal operation. In SPEED mode, the remote control adjusts the speed of the pump. Only use PRESSURE mode if pump is being controlled by a pressure switch. In PRESSURE mode, the remote control adjusts the pressure that the pump will run to.

RESET Resets the pump electronics. If the pump overloads or does not work, after checking all other possible causes for pump failure, press the RESET button.

The pump control panel also has a LED screen displaying pump speed.

- Clean and sanitize pump and hoses (see Section 3.4 for procedures).
- Ensure that remote control is set to 0 before starting pump.
- Ensure correct valves are open.
- Start pump slowly using the remote control. In the first part of a transfer, too much speed can cause excessive turbulence. Appropriate pump speed will depend on the type of operation and the size of the lines being used. In general:

  | Filtration using 1.5" hoses: | 2-3 on remote, 8-15 on screen (do not exceed 2.0bar on the filter) |
  | Barrel filling using 1.5" hoses: | 3-3.5 on remote, 12-15 on screen |
  | Tank to tank transfers using 2" hoses: | 5-10 on remote, 25-50 on screen |
  | Pump-overs using 2" hoses: | 5-7 on remote, 25-40 on screen |

Centrifugal Pump: Centrifugal pumps are not positive displacement. They will only pump liquid and require priming, so they are more difficult to set up than positive displacement pumps. They also allow wine to flow through them when not in use, so for many operations, a backflow preventer must be used. However, they are extremely efficient pumps and can move a large volume of juice or wine very quickly. This pump is best used for large volume transfers such as tank to tank transfers, or for cleaning tanks using the tank washer. Flow rate of 0-140 gpm.

Plug pump into 208V outlet. To start the pump, make sure the surface of the liquid being pumped through the pump is higher than the top of the head of the centrifugal pump. This allows gravity to prime the pump for you. Our Centrifugal pump only uses 2" transfer lines. DO NOT use this pump for must pump overs or filtration. Ensure that the pump is setup with a SHORT inlet hose and a LONG outlet hose. Ensure that the hoses you select have adequate length for the operation. The pump has a number of controls on the control panel:
STOP       Press this button to immediately stop the pump at any time
START      Press this button to start the pump. This button must always be pressed after plugging a pump in. IMPORTANT: Before pressing the start button, ensure the remote control is turned to 0. Otherwise pump may start at full speed.
LOCAL/ OFF/ REMOTE    Pump should be set to LOCAL for normal operation. Set to REMOTE if you wish the pump to be controlled by an external sensor such as a float sensor, pressure switch or solenoid on a bottling line.
RESET      Resets the pump electronics. If the pump overloads or does not work, after checking all other possible causes for pump failure, press the RESET button.
The pump control panel also has a LED screen displaying pump speed.

- A centrifugal pump is not a positive displacement pump. It will only pump liquids. All air must be bled from the lines before this type of pump will work. A port is located on the top of the pump head to allow air to be bled out.
- A Centrifugal Pump is intended to be used with sanitation solutions or wine only. Never use this pump with must.
- Clean and sanitize pump and hoses (see Section 3.4 for procedures).
- Ensure that remote control is set to 0 before starting pump.
- Ensure correct valves are open and backflow preventer is fitted if necessary. A centrifugal pump contains no check valves. Without a backflow preventer, as soon as the pump is turned off, liquid will begin to flow back through the pump. Fitting of the backflow preventer is critical for all tank to tank transfers or when pumping out a press pan or pump.
- Start pump slowly using the remote control. In the first part of a transfer, too much speed can cause excessive turbulence. Appropriate pump speed will depend on the type of operation and the size of the lines being used:

| Cleaning tanks using 1.5” or 2” hoses | 7-10 on remote, 70-100 on screen |
| Tank to tank transfers using 2” hoses: | 5-10 on remote, 50-100 on screen |
| Wine Pump-overs using 2” hoses:      | 5-10 on remote, 50-100 on screen |

**Air diaphragm Pumps:** Air diaphragm pumps use compressed air to move a flexible rubber diaphragm which pushes liquid through the pump. Because of this flexible diaphragm, there are no sharp metal edges to shear skins and seeds making this a very gentle pump. It is also a positive displacement pump and does not require a backflow preventer. There are check valves inside the pump which prevent backflow. We have three air diaphragm pumps; 2 x 2” and a 3”. The Yamada 2” air diaphragm pump is capable of flow rates of up to 140 gpm and is good for barrel filling, pumping out press pans and draining fermenters. It does not handle solids effectively so should not be used for red pump-overs. The Wilden 2” pump is a special high-pressure pump used specifically for the Lees
filter. It is capable of 80 gpm and up to 150 psi of pressure. The 3” air diaphragm pump is perfect for red pump-overs as the larger inlet and outlet allow skins to pass through easily. It has a flow rate of up to 200 gpm.

- Plug pump into compressed air outlet. Ensure air valve at pump is turned off and all air fittings are tight and properly connected. A loose air fitting can cause severe injury or damage.
- Clean and sanitize pump and hoses (see Section 3.4 for procedures).
- Pump speed is controlled by adjusting the air pressure via the regulator. Each air pump has an air regulator located on the pump to allow pump speed to be controlled. Ensure air pressure is turned to the lowest setting before opening air valve. Air valve should be opened all the way. Do not use the valve to control pump speed, use the air regulator.
- Start pump slowly, and adjust speed by turning the regulator dial.
- One feature of an air pump is that as they are controlled by pressure and not by an electric motor, you can shut a valve on the outlet side of the pump if necessary. This will cause pump to run until pressure in the outlet line equals the air pressure inside the pump. At this point the pump will stop running. Caution must be taken however, as this will cause high pressure to build up in the outlet line and could blow the line. It is better to turn the pump off at the air valve.

B. GENERAL PUMP NOTES AND REMINDERS
1. If you are not sure which pump to use for an operation, ASK someone! It is critical to use the correct pump for the job and certain pumps may only be used for certain tanks.
2. If a pump seems to be broken or not on key, it is important to inform the winemaker or assistant winemaker. If a problem with a pump is not taken care of right away it could lead to serious damage to the pump or injury to the pump operator.
3. Be sure to follow the “LOCKOUT TAGOUT” procedure as listed in the Safety section of this manual.
III. SELECTING AND SETTING UP A TANK

A tank should always be selected so that it is as full as possible. This will reduce the headspace and potential oxidation and spoilage of the wine.

To reduce the risk of accidental fitting removal, all of the fittings should be attached to the tank using 3/8” bolts with washers rather than wingnuts. The exception is the racking arm, which needs a wingnut for adjustment.

Tanks should be fitted for racking arms whenever possible.

Make sure both top and bottom man-doors are closed and secured. If available, use a proper gas vent rather than a rag on the tank top.

The thermostat should be switched on and set to an appropriate temperature. For wine storage, this will typically be at 10-12°C, but for wines still fermenting it could be as high as 15°C. If you are unsure about how a thermostat works, consult a winemaker. Do not make changes to settings unless you are positive you know what you are doing.

Always check the back of the tank to make sure the PVC valves on the supply and return lines are open.

You know when a thermostat is working when you see the “relay” light on the thermostat display turn on. Additionally, you should hear the glycol solenoid click on. If one of these things does not happen, notify a winemaker immediately.

A. Cleaning Tanks and Fittings

Before starting any cleaning activity, plan your work. Think about what equipment you will need for the tasks ahead and where possible, clean and sanitize it all at once.

Cleaning can be broken down into two separate parts:

CLEANING: The removal of physical dirt, stains and soil such as tartrates, which may contaminate the wine or provide a substrate for microbial growth.

SANITATION: Follows cleaning. The use of antimicrobial agents to kill any organisms, particularly yeasts and bacteria, that may infect the wine.

STANDARD METHOD:
1) Check interior of tank visually for tartrates and other soiling. Some soiling may require additional cleaning or scrubbing. Remove all fittings from the tank including all valves, gaskets
and the sample valve. Place these in a slotted bucket or basket, then put that into the sump to soak and allow movement of cleaning fluid within the parts and fittings. Removal of tank fittings from the tank will allow cleaning agents into areas that otherwise may harbor microbes. Check tank thermostat (either turn off thermostat or check that 'relay' light is off). Place caps over tank fittings to prevent cleaning fluids spraying out.

2) Fill sump with 40 gallons of HOT water (hot water will increase the oxidative activity of cleaners such as Sodium Percarbonate-Proxy). Add 2 cups of Sodium Percarbonate (Proxy) to the water.
3) Place the Scanjet 15 tank washer in the center of the tank, connecting a 2" line to it through the tank's bottom valve. Close the tank door and make final connections to pump using 2" lines (short suction line, long delivery line for maximum efficiency). Use Centrifugal pump if possible for all tank cleaning.
4) To avoid "hammering" the scanjet tank washer, turn on the pump slowly to push air out of the lines. When you hear cleaning fluid splashing out of the scanjet, you may now increase the speed of the pump to an appropriate speed setting. On the Centrifugal pump, 80%. Run circulation for 20-30 minutes.
5) Never assume the scanjet is working properly. Pay attention to these cues:
   a. Even though the pump is running, do you see cleaning solution coming out of the tank?
   b. Can you hear the cleaning solution striking the side of the tank?
   c. Can you hear the scanjet oscillating inside the tank? Can you hear the flow of water strike the sides, floor and ceiling of the tank?
   d. If you notice that one of these things is not happening: stop the pump, diagnose the problem and start again. If the problem persists, consult a winemaker.
6) Turn pump off and visually check tank interior with a flashlight for remaining dirt, paying particular attention to areas at the bottom of the jackets and around the man door. If tank is visually clean, proceed to Step 7, otherwise repeat 4.
7) To save water: If the cleaning solution in the sump looks visibly clean, transfer it to a 35 gallon white bucket. The cleaning solution can be re-used over and over again until the cleaning solution turns brown, black or brackish
   a. If the cleaning solution looks gross, dump it out.
8) Remove sump from under tank. Rinse cleaning solution from lines using cleanwater. Look, feel and smell outlet hose to verify all cleaning solution has been flushed out. Rinse out tank with hand gun to remove cleaning residues.
9) Refill stainless sump with 30 gallons of HOT water. Add ½ scoop KMBS and 1 scoop Citric acid to water. Circulate Sulfur/Citric mix through tank for 15-20 minutes.
10) Remove sump from under tank. To save water: If the cleaning solution in the sump looks visibly clean, transfer it to a separate 35 gallon white bucket than the proxy. The cleaning solution can be re-used over and over again until the cleaning solution turns brown, black or brackish
   a. If the cleaning solution looks gross, dump it out.
11) Rinse cleaning solution from lines using clean water. Look, feel, and smell outlet hoses to verify all cleaning solution has been flushed out. Rinse out tank with hand gun to remove cleaning residues.
12) Check fittings and valves for soiling. There should be no visual residues on the stainless fittings. If there are, scrub them off with proxy and sulfur/citric. Reattach fittings to tank. Turn on thermostat.

**OZONE METHOD:**
1) Check interior of tank visually for trtarates and other soiling. Some soiling may require additional cleaning or scrubbing. Remove all fittings from the tank including all valves, gaskets and the sample valve. Place these in a bucket or basket, then put that into the tank to soak and allow movement of cleaning fluid within the parts and fittings. Removal of tank fittings from the tank will allow cleaning agents into areas that otherwise may harbor microbes. Check tank thermostat is off (either turn off thermostat or check that ‘relay’ light is off). Place caps over tank fittings to prevent cleaning fluids spraying out.
2) Fill sump with 40 gallons of HOT water. Add 1 cup of CleanStrip to the water.
3) Place the Scanjet 15 tankwasher in the center of the tank, connecting a 2” line to it through the tank’s bottom valve. Close the tank door and make final connections to the pumpusing 2” lines (short suction line, long delivery line for maximum efficiency). Use Centrifugal pump if possible for all tank cleaning.
4) To avoid “hammering” the scanjet tank washer, turn on the pump slowly to push air out of the lines through the ScanJet. When you hear cleaning fluid splashing out of the scanjet, you may now increase the speed of the pump to an appropriate speed setting. On the Centrifugal pump, 80%. Run for 20-30 minutes.
5) Never assume the scanjet is working properly. Pay attention to these cues:
   a. Even though the pump is running, do you see clearing solution coming out of the tank?
   b. Can you hear the cleaning solution striking the side of the tank?
   c. Can you hear the scanjet oscillating inside the tank? Can you hear the flow of water strike the sides, floor and ceiling of the tank?
   d. If you notice that one of these things is not happening: stop the pump, diagnose the problem and start again. If the problem persists, consult a winemaker.
6) Turn pump off and visually check tank interior with a flashlight for remaining dirt, paying particular attention to areas at the bottom of the jackets and around the man door. If tank is visually clean, proceed to step 7, otherwise repeat 4
7) Remove ScanJet tankwasher from tank and pull the sump with cleanstrip away from the bottom of the tank. Connect Ozone line to a Sprayball and hang inside tank approximately 1/4 of the way down from the top. Turn on water and ozone generator. Open bottom manifold to confirm that all areas of the tank are being blanket ed by spray. If not, adjust the height of the spray ball. Close up tank and turn on Ozone generator. Ozone for 10 minutes. Remember to Ozone
all fittings as well, by filling a bucket with ozoned water draining from the tank and submerging fittings.

8) Ensure that the ozone generator is creating >1.0 ppm of ozone. If it is not generating a high enough concentration of ozone, consult a winemaker immediately.

9) If refilling tank immediately, turn Ozone generator off and run regular water for 5 minutes. Otherwise, tank is complete.

9) Check fittings and valves for soiling. There should be no visual residues on the stainless fittings. If there are, scrub them off with clean skin then rinse with ozone water. Reattach fittings to tank. Turn on thermostat.

**QUICK METHOD**

Sometimes, (for example, during Harvest and during rack and returns), a full cleaning is not required. During these operations, a sanitation cycle may be all that is needed. When equipment or tanks have been used for red and are going to be used for white, always perform a full cleaning. If in ANY doubt, perform a full cleaning cycle as outlined above.

**INTERN NOTE**: Sanitation for ALL fittings, tanks, hoses, etc. must be done immediately before using on any assigned task. It is also essential to remember that if a line is used for a red and then needs to be used for white, it is extremely important to clean and sanitize in between. The same goes for switching from a fermenting tank to a tank that has not begun fermentation. The pumpover sheet is numbered a particular way for a reason. KEEP TO THE ORDER ASSIGNED.

**B. THERMOSTAT USE**

Thermostats are a simple, but critically important part of any winemaking operation. If they are faulty in any way, do not attempt to diagnose or fix the problem yourself. Find a winemaker and ask them to diagnose the problem. Any employee that attempts to change the internal settings of the thermostats without permission from a winemaker will face severe disciplinary action.

**TANKS AND FERMENTERS:**

**Superstats Tank Thermostats**

Superstat thermostats, manufactured by RTI, are used for the temperature control of the majority of tanks.

The power button is on the left hand side of the thermostat. Pressing this should cause the screen to illuminate. If it does not illuminate, the thermostat may not have power. Please refer to a supervisor. If tank is empty or is about to be cleaned, turn power to thermostat off to prevent unnecessary flow of glycol to the tank.
The display features two numbers: The larger top number displays the current temperature being measured inside the tank. The smaller number on the bottom displays the set temperature (the temperature that the thermostat will turn on at).

The set temperature can be adjusted using the arrow buttons on the right hand side of the Superstat. Superstats can be set in Heat or Cool mode. As most winery operations deal only with cooling, this is the default mode and is indicated by a green LED in the bottom right hand corner of the screen. If heating is required on the tank, after connecting the portable glycol heater, hold the mode button down until the green mode LED turns red. This indicates the thermostat is in heat mode and will correctly control the flow of glycol to heat the tank.

The P (program) button on the right hand side of the thermostat is used to access additional parameters such as resolution, C or F measurement, calibration and differential. Please refer to the Superstat instruction manual for further information on adjusting these parameters.

Tanknet

Tanknet, manufactured by Accelon, is a newer style of thermostat that we are using to replace the Superstat.

Tanknet has no power button, once connected it is always on. The number displayed on the screen indicates the current temperature. In order to view the set temperature, press the SET button until the SET icon in the lower left side of the screen flashes and a temperature is displayed. This is the set temperature.

To switch cooling on, press the SET key until OFF flashes on the screen. Press the \( \text{AV} \) arrow keys until a COOL icon is illuminated in the top left corner of the screen. This indicates the thermostat is in cool mode. To change this to heat mode, press the SET key until the COOL icon flashes and then press the AV arrow keys until this is replaced with a HEAT icon. If the tank is empty or prior to cleaning, press the SET key until the COOL or HEAT icon is flashing and then press the AV arrow keys until OFF flashes on the screen indicating themostat is off.

To adjust the set temperature, press the SET button until the SET icon in the lower left side of the screen flashes and a temperature is displayed. Adjust this set temperature using the arrows.

Continuing to press the SET button will cycle through a number of other adjustable parameters. See the Tanknet instruction manual for further information. Unless you know exactly what you are doing, do not change any additional settings in the thermostat.

Once you are finished adjusting the Tanknet, it will revert back to displaying current temperature after several seconds - you do not need press any buttons to exit. It is automatic.

THERMOSTATS ON ROOMS:
Temperature and Humidity control are critical in barrel rooms. Superstats are used to control temperature in all five barrel rooms and humidity in rooms 1-4.

Operation is the same as the Superstats used for temperature control on the tanks. However, the display will continuously cycle through two numbers: **temperature** and **humidity**. As with the tank Superstats, the large number on the top of the screen is the current value and the smaller number at the bottom of the screen is the set value. Pressing the arrow keys on the right hand side of the Superstat will adjust the set value of the parameter that is currently displaying; if the Superstat is showing the humidity, the arrows will adjust the humidity set-point. If the Superstat is currently showing temperature, the arrows will adjust the temperature set-point.

Our barrel and case good storage rooms have a Superstat for temperature and humidity control as well as switches to turn temperature, humidity, exhaust fans and carbon dioxide monitoring on or off.

The **COIL** switch controls the cooling for the room. In the **HAND** mode, cooling will run continuously, regardless of Superstat setting. In the **AUTO** mode, cooling is controlled by the Superstat.

The **HUMIDITY** switch controls the humidification sprayers in the room. In the **HAND** mode, humidification will run continuously. In **AUTO** mode, humidification will be controlled by the Superstat. In addition, there is a timer inside the control box which adjusts the on and off cycles of the misters, so even in the **HAND** mode, the misters will not run continuously.

The **EXHAUST FAN** switch controls the operation of the exhaust fans which each room is equipped with. In **AUTO** mode this fan will be controlled either by Nightair which will cool the room using cool air from outside, or the CO2 monitor which will activate exhaust fan if it detects CO2 build-up.

The carbon dioxide sensor switch controls the carbon dioxide sensor in each room.

For normal operation, the **COIL**, **HUMIDITY**, and **EXHAUST FAN** switches should be in **AUTO**. The carbon dioxide sensor should be **ON**. Exception to this is Room 1, where case goods are being stored. In this room, humidity should be **OFF** as excess humidity will cause cardboard to become moldy.

If an operation calls for a barrel room to be entered frequently over a short period which necessitates leaving the roll-up door open, turn the cooling and humidity off. If the door is left open, running these will waste energy. However, once operation is complete and roll-up door is closed, ensure cooling and humidity are switched back to **AUTO**.

**INTERN NOTE:** You as an intern are not usually expected to change any of the thermostat settings in any of the rooms and generally not on any of the tanks unless told otherwise. However, if you do see something that seems out of place or if the jackets on any tanks seem to be out of order, it is very important to inform the winemaker or assistant winemaker immediately.
IV. GAS USE

All compressed gases are potentially dangerous, some more so than others. Gas bottles can explode or otherwise cause injury if they fall over or strike an object. Cylinders must always be secured, either in a special gas cart for transportation, or secured with TWO chains in storage areas. When not in use, fit protective caps to top of cylinder. This will prevent damage to valve if cylinder falls over. Empty cylinders should be marked by putting a metal ring over the top. Try and put empty cylinders to one side of the storage area so full cylinders can still be accessed. With the exception of diphosphate Carbon dioxide which has a special snowcone applicator, all compressed gases require the use of a regulator or flowmeter.

A regulator will deliver a measured PRESSURE of gas. A flowmeter will deliver a measured FLOWRATE of gas. Flowmeters have a gauge that displays flow in liters per minute (LPM) or gallons per hour (GPH). Regulators display pressure in PSI or BAR. **Flowmeters should only be used for gassing tanks and sparging, never for racking barrels or pushing lines through.** Because they deliver a flow rather than a pressure, they can easily create excessive pressures and cause lines and tanks to blow. Once you are finished using a gas **MAKE SURE THE MASTER VALVE ON THE CYLINDER TOP IS TURNED OFF!** Regulators leak and waste gas, so turning off gas at the regulator is insufficient. Always turn off at cylinder.

Argon: A heavy, inert gas, used to blanket tanks to prevent oxidation and to sparge out other gases. Because of its expense, always use with a timer/alarm so you do not forget to turn it off after gassing a tank.

**PROS:** Because it is a noble gas, it does not readily dissolve into the wine, so is good for treatment of finished wines.

**CONS:** Very expensive, ten times the cost of Carbon dioxide, so use with care.

**CAN CAUSE ASPHYXIATION! Use with care.** Although argon is non-toxic, it does not satisfy the body's need for oxygen and is thus an asphyxiant. Argon is 25% more dense than air and is considered highly dangerous in closed areas. It is also difficult to detect because it is colorless, odorless, and tasteless. In confined spaces, it is known to result in death due to asphyxiation.

Nitrogen: A light, inert gas. Because it is slightly lighter than air it cannot be effectively used for blanketing tanks. It can be used to rack wine from barrel and to push through lines.

**PROS:** Very cheap. Relatively insoluble.

**CONS:** Lighter than air, so not effective for blanketing. Can damage wines if used for excessive sparging.

Carbon dioxide (CO₂): Generally used as a solid, dry ice or as a liquid (dip tube) that sprays out as a solid. CO₂ is most frequently used during harvest to blanket tanks of grapes, or pressed juice. The only time it is used in the presence of finished wine is to protect wines while racking into barrels. It is very important to understand this distinction.
PROS: Cheap, very dense and good for blanketing tanks and fermenters to prevent oxidation. Dry ice is endothermic so can be used to cool.

CONS: Carbon dioxide is very soluble in wine, so can cause wines to become sour if too much CO₂ is used.

CAN CAUSE ASPHYXIATION! Use with care.

DRY ICE IS VERY COLD. WEAR THERMAL GLOVES AND FACE PROTECTION WHEN USING.

Sulfur dioxide (SO₂): Used for gassing empty barrels to prevent microbial growth. Sulfur dioxide is very dangerous. It is both flammable and extremely toxic. Exposure to this gas should be limited as even low doses can cause permanent lung damage or death.

RESPIRATORS AND GOGGLES MUST BE WORN WHEN USING SULFUR DIOXIDE

A. GASSING TANKS

For wines undergoing fermentation (primary or malolactic), we protect the wines by gassing with di-uble CO₂ until it’s white gas is seen exiting top of tank. Take care to keep your face well away from the tank as even one deep breath of Carbon dioxide can cause you to collapse from lack of oxygen.

Wear OXYGEN SENSOR close to face when using to ensure sufficient oxygen when gassing. If the low oxygen alarm sounds, exit to fresh air outside immediately.

For wines that are done with fermentation, gas with ARGON. This is to prevent buildup of elevated dissolved CO₂. Argon is heavier than oxygen. When applied correctly, it displaces oxygen and provides an anaerobic buffer between the wine and breathable atmosphere.

To lay down a proper layer of Argon Gas, gas must completely blanket the wine. This means applying it slowly at the bottom of the tank or at the surface of the wine so it forms a nice layer rather than a turbulent mix with air. We do this using the flow meter rather than a regulator (works on gas flow rather than pressure), with a long slow addition of gas as close to the bottom of the tank or surface of the wine as possible. The end of the gas line should be just above the surface of the wine for less mixing with air.

Our tanks vary from 15-60 gallons per inch, and to be safe, we want a 12” thick layer of gas, so 180-700 gallons of gas. The flowmeter works in Liters per minute so 4 Liters per minute = 1 gallon per minute. Wear OXYGEN SENSOR close to face when using to ensure sufficient oxygen when gassing. If the low oxygen alarm sounds, exit to fresh air outside immediately.

<table>
<thead>
<tr>
<th>Tank</th>
<th>Gassing time (At 20 LPM)</th>
</tr>
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<tbody>
<tr>
<td>FS 1-4</td>
<td>60 minutes</td>
</tr>
</tbody>
</table>
### SPARGING

Excessive dissolved Carbon dioxide causes a wine to taste fizzy and in most wine styles, this is unacceptable. Excess Carbon dioxide can be Sparged out of a wine by forcing tiny bubbles of an inert gas such as Argon through the wine. These tiny bubbles will knock the Carbon dioxide out of solution. Dissolved oxygen which can cause oxidation or microbial spoilage can be removed in the same way. A sparging stone is used which is a piece of sintered stainless steel with many tiny holes in it which creates a mass of tiny bubbles.

Solubility of gases in solution is dependent on temperature. The lower the temperature of the wine the more difficult the dissolved gases will be to remove. For good removal, the wine should be at 15-18°C. The most effective way to sparge wine is to put the sparging stone inline and pass the wine across it during a racking, filtration or pumpover. Sparging is best when it has the maximum amount of vertical feet of wine to pass through. The best success will be achieved if the sparging stone is placed in line where the line enters the bottom valve of the tank. That way as the wine flows across it, the bubbles will be drawn into the tank and rise through the tank knocking gas out of solution on the way.

During Sparging operations dissolved CO₂ and dissolved oxygen should be checked regularly using a carbon dioxide and dissolved oxygen meter. Please see Laboratory Procedures section for details.

**INTERN NOTE:** Gassing tanks is a task that you as an intern will be responsible for on a daily basis. Tanks should be gassed *after each and every pumpover* immediately before the cover is placed over the top of the tank.
Because of the precision required when filling barrels, always use the Wakeshaw pump and 1.5" lines for barrel filling operations. During harvest, if the Wakeshaw pumps are being used, the 2" air diaphragm pump can be used.

1. Layout the correct empty barrels according to the work order provided. Double check that the numbers on the barrels correspond to the numbers on the work order. The winemaker will typically advise on what barrels (new, used etc) to use including their barrel number. Never put white wine in a red barrel! Make sure barrels are rotated upright, hoops are centered front and back on racks and bung hole is vertical at 0°. Repositioning barrels once full is difficult, so ensure that they are placed correctly before filling.

2. Using methods described in the cleaning section, clean and sanitise the required equipment and hoses. Barrels do not require the same sanitization as the stainless fittings. All fittings such as hoses and the pump will only be adequately cleaned when the cleaning solution is pumped through it. Submerging the equipment is insufficient. Ensure that you have enough line to reach all the barrels. Always rack to barrel through the racking arm of a tank or from over the top with Porta Tanks.

3. Make sure you have sufficient clean bungs for the barrels. Barrels should have bungs put in them immediately after filling. Also, make sure you have a cleaning solution for cleaning any spills—typically sulfur/tartaric, as well as a wax pencil and eraser for labeling barrels, a rag for cleaning barrel tags and a flashlight for checking barrels. Make sure all barrels have a plastic barrel tag before beginning.

4. Check the tank you are pumping out of is vented!

5. Gas barrel with carbon dioxide.

6. Start the pump slowly. Once you have sufficient wine in the barrel to prevent turbulence (about 10 gallons), turn the pump speed up to 12-15 on the Wakeshaw speed dial at 2.5-3.

7. If racking through the racking arm, loosen racking arm wing nut carefully. Using a flashlight, slowly rotate the racking arm down while checking the sight glass for solids. Stop movement of racking arm once solids are seen and tighten wing nut. If racking over the top of a port a tank, slowly lower the line into the tank while checking the line for solids with the flashlight. Stop lowering the hose into the tank when solids are seen passing through the hose.
8) Use flashlight or finger to monitor barrel filling. Stop pump before barrel overflows. It is better to have the barrel \( \frac{1}{2} \) inch empty than to overfill it.

9) Place clean bung tightly in barrel. Clean around bunghole and any spilled wine on barrel.

10) Referring to your work order, accurately label barrel with Varietal, Lot ID and date filled.

11) Regularly check tank levels to monitor progress. Once pump starts sucking air, turn pump speed down to pump the last wine out. Turn pump off before sucking air.

12) If we are left with a partial barrel, that barrel **MUST BE CLEARLY LABELED WITH A LARGE AND KEPT SEPARATE OUT IN THE CELLAR so it can be topped later. Failure to do this will result in a written warning.**

13) Using a flashlight, check tank through top manhole to determine how much clean wine and lees is in tank. We may decide to rack the lees to another tank or barrels for further settling.

14) **DID YOU LABEL THE BARRELS AND ANY PARTIAL BARRELS?**

**C. BARREL TO TANK**

Unless otherwise specified, barrels will be racked using the Rackitze racking wand. Be aware that the lees level in barrels varies dramatically and as such, the level of the Rackitze should be adjusted for every barrel.

1) Using methods described in the Cleaning section, clean and sanitize the required equipment and hoses. All fittings such as hoses and the Rackitze will only be adequately cleaned when the cleaning solution is pumped through the wand. Submerging the equipment is insufficient. Take the time to visually inspect the interior of the Rackitze to ensure it is clean.

2) Before beginning, ensure tank is correctly setup, with bolted clamps, door tight, racking arm if necessary, Gas tank with appropriate gas. Check with winemaker as to whether any additions are required.

3) If this is a first racking (wine is on gross lees), ensure lees cup is fitted to Rackitze for a cleaner rack. If unsure, check with winemaker.

4) Racking will always be performed with NITROGEN. Regulator should be set for 12-15 PSI and regularly checked. Use the two stage regulator if possible as it provides more accurate pressures. **NEVER USE THE GAS FLOW METER.**

5) Insert Rackitze into barrel until tip is 4-6 inches off the bottom of the barrel. With the cam fitting UP (open), rotate the fitting until the rackitze fits the bung tightly. Close the cam fitting (lever down) but do not force it down. Loosen the fitting if necessary.

6) Open gas valve partially then open the wine valve. Opening the gas valve first allows gas pressure to build inside the barrel and prevents backflow from stirring the lees.

7) Using a flashlight on the sight glass, slowly adjust the height of the Rackitze wand down until you see lees ghosting (small amounts of light lees), then lift it back up a \( \frac{1}{4} \) inch. Once this is adjusted, open your gas valve fully.
8) Once barrel is empty, close your gas valve and then your wine valve. Vent excess gas from the rackiteer carefully and bleed line to remove excess gas in the line. Bleed excess gas back out of wine line.

9) Referring to the Work Order, label the new tank with the Varietal, LOT ID and date filled.
VI. DAILY HARVEST SEASON TASKS

A. PUMP OVERS

STANDARD PUMP OVERS

Pump over is a technique where a pump is used to mix a tank or fermenter. Pumpovers are performed at the beginning and end of every day during the harvest season. After the grapes are processed and poured into the open top fermenters the first pump over must be performed that same day to ensure the juice is uniform throughout the tank. In addition to uniformity, pumpovers are performed in order to submerge the skins so that CO2 is pushed to the surface and released.

When performing a pump over it is important to remember that oxygen is the enemy, unless told otherwise. For this task the [Air Diaphragm Pumps](#) are generally the most fitting when pumping over open top tanks. If one of these is not available at the time, it is suitable to use the [Wakeshaw 130](#) if and only if the tank being pumped over HAS A BUILT IN SCREEN. If the Wakeshaw 130 is used for a tank without a screen, there is almost a certainty of malfunction and can lead to costly repairs due to skins getting caught in the pump. When using the Wakeshaw for pumpovers, it is important to keep it at an extremely low speed! If the pump is turned too high, there is a very likely chance that it will implode the screen inside of the tank, causing more costly damages.

INTERN NOTE: Knowing how to accurately perform a pump over is an essential part of an intern’s responsibility. Pumpovers are generally performed once or twice daily per tank and take between 10-90 minutes each. Report to the wine maker at the beginning of each day for a list of tanks requiring pumpovers for that morning.

PUMPING OVER AND MAKING ADDITIONS VIA VENTURI

If you have a large volume of nutrients to add to a tank (over 5 gallons), it is safer and easier to add it to the tank via pump over and venturi. Disclaimer: 6% Sulfurous acid is never to be added via this method. 6% Sulfurous acid should always be added slowly over a moving body of wine. A venturi is a tool that causes suction due to the difference in relative pressure from a small opening in a pipe with a moving body of water. Basically, it allows you to suck nutrients into the pump during a pumpover. When the venturi is positioned in front of the pump, by slightly closing the inlet valve and opening the valve at the top of the venturi, it causes the suction to come from the hose attached to the venturi. See picture below:
When using the venturi, it is critically important to make sure it is flushed with wine before using it to suck in the nutrients. The reason for this is to prevent a slug of oxygen from oxidizing finished wines or excessive foaming fermenting wines. In order to achieve this, once the pump and hoses are setup for a pump over, open all the valves and allow gravity to push the wine through the pump and venturi setup. Close the valve at the top of the venturi and begin the pump over. Once the tank has started rolling from the pump over (usually about 5 minutes), begin sucking in the nutrients: Slightly close the 2" butterfly valve at the front of the venturi while simultaneously opening the 1.5" butterfly valve at the top of the venturi. You know the venturi is working when you see the volume of nutrients in the bucket slowly diminish. Never completely close the 2" valve at the front of the venturi. The idea of the venturi is to mix and pump over; if you add all the nutrients at once, the nutrients will not be completely homogenized into the wine.

PUSHER LINES

Pushing lines refers to methods to evacuate the wine in the hoses to the tank. NEVER just use the pump to push wine into the tank- this will push air into the tank as well and oxidize the wine. There are two methods to push wine into the tank:

Nitrogen: Pushing lines with gas pressure is often referred to as “walking” the line. Walking the line involves lifting a section of the hose, starting at the inlet end, causing the wine in the line to flow away from the section you are lifting. By slowing walking down the line and keeping a section of hose raised,
you can push all the liquid out of the line. However, this will not work if you are working against a large amount of pressure such as wine in a tank, we need positive pressure to assist us. Connect a gas fitting to the inlet end of your hoses. Connect a nitrogen tank to this fitting. Using positive gas pressure typically 8-12 psi, walk the line to the tank. If you have a pump inline, “jogging” (the pump moving at a slow speed) the pump will help. Once all the wine is in the tank, close the tank valve, turn off gas (and pump) and carefully vent hoses (they will have significant pressure built up in them).

**Water**: Evacuating a line with water has the added benefit of rinsing your lines at the same time as it pushes the wine into the tank. Also, because we are pushing with a liquid and not a gas, you are not required to walk the line. Attach a water hose connection to the inlet end of your wine hose setup. Ensure that there is a sight glass on the outlet end of the hose so you can see when water gets to the outlet. Turn on the cold water and closely monitor the sight glass on the outlet end. Once you see wine color begin to lighten, close outlet valve and tank valve and immediately turn off water. Disconnect outlet hose from tank and position over drain. Carefully open valve to release excess water pressure. BE CAREFUL! There will be a lot of excess water pressure! Leave valve open and turn water back on if you wish to rinse the lines.

**INTERN NOTE**: As a general rule of thumb, we almost always push the wine with “air” first when finishing a pump over or any other kind of wine movement. Pushing with “air” consists of shutting the main valve on the pump, letting suction build (having a bucket underneath for spillage, which is always a smart idea), then walking the wine through the hose until your fellow intern or cellar worker gives you a signal that there is no longer wine coming out. After pushing with “air” water is then used to flush the rest of the wine out of the lines using the procedure mentioned above.

**B. WINE ADDITIONS**

**YEAST INOCULATION INSTRUCTIONS**

*Note: These instructions are for all brands of yeast **EXCEPT** Anchor Yeasts*

**Materials List:**

- A large white bucket (calculate the size required by performing your calculations first)
- c if the inoculation requires more than one bucket, put it on a pallet.
- c If possible, screw your bucket onto casters
- 2 pitchers or several red cups for weighing yeasts, GoFerm, etc.
- **Yeast**
- **GoFerm**
- Hot water (from winery hose taps is fine)
- A Thermometer (the Infrarad Thermometer works, but make sure it is pointing at liquid, not bubbles)
- A purple cloth
- Stainless Reducer and elbow for valve of your inoculation tank

1. Weigh out the total amount of yeast to use (as requested by the work order) and set aside
2. Calculate the amount of GoFerm to use by multiplying the grams of yeast from step 1 by 1.25:
   \[ \text{GoFerm} = (\text{grams yeast} \times 1.25) \]

3. To calculate the amount of water to use in your slurry, take your GoFerm, then multiply by .0053:
   \[ \text{Water} = (\text{GoFerm} \times 0.0053) \]

4. Using a Thermometer, bring your amount of clean Water to +2° C

5. Slowly add the GoFerm to the bucket of 42° C water making sure it is completely dissolved with no clumps
   a. To make this job easier, use the power drill and stirring rod

6. Once the temperature reaches 38° C, slowly add the total amount of yeast from the work order.
   a. Remember, these are a colony of living organisms. They can detect your emotions. For a happy inoculation, think happy thoughts and add the yeast as gently as possible: Poopy emotions make poopy wines.

7. Wait 20 minutes for the yeast orgy to commence. This time would be a good idea to clean up the mess you made from measuring out all your ingredients

8. Bring your bucket to the tank you will be inoculating
   a. Put a reducer and elbow on the bottom valve (do not use bottom valve for white wines – use racking valve) to direct the juice into your yeast bucket

9. Drop the temperature in the yeast bucket 10° C every ten minutes by adding cold juice from the tank.

10. Once the bucket in the tank has come within 10 degrees of the tank, wait another ten minutes, then dump it into the tank, or suck it into the tank via the suction manifold on the centrifugal pump.

If you don’t think you can add it to the tank by yourself, use these 10 minutes to find someone who can help you.

**COMMON HARVEST SEASON ADDITIONS**
- GoFerm
- Diammonium Phosphate (DAP)
- Citric Acid
- Tartaric Acid
- Tannins
  - FT Rouge (red grapes)
  - FT White (white grapes)
- Enzymes
  - ColorPro
  - Cinn Free
- Liquid Sulfur
ADDITION SAFETY REMINDERS
1. Always wear dust mask and glasses when measuring and putting additions into a tank.
2. When adding liquid sulfur ALWAYS wear a respirator. If you start to feel lightheaded or dizzy, get a breath of fresh air immediately and inform a fellow employee or winemaker.
3. If burning of the eyes or skin occurs at any time, INFORM THE WINEMAKER OR ASSISTANT WINEMAKER IMMEDIATELY!
4. If any nutrient is running low (especially sulfur) be sure to inform the winemaker or assistant winemaker as quickly as possible!
5. Always label your nutrients! The label should include the nutrient name, amount of nutrient, and which tank it is to be added to.
6. The nutrient table should always be equipped with the following:
   a. Scissors
   b. Marker
   c. Calculator
   d. Tape
7. Always clean and put back any equipment used for making or measuring additions.
8. If there is any question about how much or which addition to add to a tank, ASK THE WINEMAKER OR ASSISTANT WINEMAKER! It is important that the correct nutrients and additions make it into the correct tanks.

C. CLEANING BARRELS
1) Lift empty barrels onto barrel cleaning rollers on crushpad. Rollers should be positioned over the drain.
2) If requested, drain lees into to bucket and collect in a labeled lees barrel.
3) Insert Accustat high-pressure barrel washer into barrel bung hole.
4) Turn on hot water and pressure wash inside of barrel for two minutes. Use a lab timer to ensure accurate timing.
5) Clean outside of barrel. For red barrels, use proxy followed by a sulfur-citric rinse and then hose down with clean water. For white barrels use sulfur-citric only.
6) Clean barrel rack thoroughly with sulfur-citric.
7) Remove barrels from rollers and rotate bung hole to an upwards position.
8) Insert steam wand lightly (so there is room for some pressure to escape). Turn on steam generator and leave in barrel for two minutes. Remember to use heat resistant gloves when operating steam generator! Turn off steam and remove wands.
9) Place bung in bung hole and let sit for Two minutes. This lets the steam sit in the barrel and penetrate the cracks that may hold harmful bacteria and old wine residue.
10) Remove the bung and rotate bung hole 180 degrees to let drain.
11) Ozone each barrel for one minute using barrel spray ball (NEVER run ozone through the pressure washer!).
12) Turn Ozone off.
13) Rotate barrel 180 degrees again and fill with ozone for about 30 seconds.
14) Replace bung.
15) Barrels will then be inspected later that day or the following day to ensure they are of reusable quality.

Cleaning barrels is a very important process for harvest interns. It is important to always take safety precautions. All employees involved in barrel cleaning should be wearing safety glasses, protective gloves, and earplugs.

D. TOPPING BARRELS

Our barrel rooms are laid out in such a way that every barrel can be accessed by the special Stokes ladder. It will fit down the barrel rows. Climbing barrels is considered unsafe and should be avoided. Please wear a headlamp when topping. The light source will make accurate topping much easier and will leave your hands free.

1) When topping from the topping barrel, do not use more than 10-12 PSI gas pressure. This is sufficient. There should be just enough gas to keep wine flowing.
2) Top barrel to inner rim of bunghole. DO NOT OVERFILL and fill into the bunghole as this may cause barrel to overflow with temperature changes. When filling, do not allow any part of topping wand to contact wine (DO NOT STICK THE SPOUT INTO THE WINE!). Leave the bung upside down over the bunghole to indicate the barrel has been topped.
3) Clean the bung, thoroughly around the bunghole and the inside of the bunghole with a strong solution of KMBS and tartaric in hot water (no citric!). Citric can be metabolized into acetic acid by bacteria. Rinse the rag between each barrel. Clean any other drips, wine stains or mold visible on the barrels.
4) Reinsert the clean bung tightly.
5) MOLD IS YOUR ENEMY! If you see it, do something about it, or else it will spread!

E. MOVING AND STACKING BARRELS

Moving barrels, whether full or empty, is one of the most difficult tasks to perform on a forklift. Do not attempt until you are a proficient forklift operator. Always drive carefully and slowly and don't allow the barrel stack to block your view. NEVER APPLY THE BRAKES SUDDENLY! YOU WILL STOP BUT THE BARRELS WON'T! Keep barrels at a travel height (6”) until you need to lift them higher. Beware, wet racks slide easily, keep them tilted back towards the forklift.

Before moving barrels, ensure that the barrels are properly centered on the racks and that bung holes are in the appropriate position. Uncentered barrels could cause a barrel stack to collapse.
Full barrels can be transported in racks two high. Carefully drive forks into holes in the rack, driving forward until approximately 4” are left between the barrels and the forklift mast. **If you drive forward until the barrels hit the mast, your forks will extend beyond the barrels a significant distance and could damage objects or other barrels.** Keep barrels at travel height (6”) until you are ready to lift and stack. When stacking, drive forward until the edge of the rack closest to you is about 2” in from the edge of the barrel. The tilt control is useful for small front-back adjustments here. This should roughly center the rack. Sideshift until rack is centered above the lower barrels and slowly lower the rack, making sure that it fits snugly. If in doubt, put forklift in neutral, engage park brake, exit forklift and check barrels from the side to ensure that they are level.

Pick up two high barrel stack and carefully drive it to the destination. If the stack is blocking your view, drive in reverse. Marks have been placed on the floor of the barrel rooms to assist in accurate, efficient placement of barrel stacks. The front corners of the barrel racks should line up with the marks. **Before placing racks in the marks, ensure you have 4” of space between the barrels and the forklift mast, otherwise your forks will hit the barrel stack behind and could cause damage or stack collapse!** Stack full barrels four barrels high, ensuring stacks are straight and vertical.

**F. RED GRAPE PROCESSING**

Equipment needed for Processing Red Grapes:

- Forklift with “bin dumper” attachment
- Two SANITIZED white picking bins
- Proper set up open top fermenter (with all fittings, sealed, closed and SANITIZED)
- 2 SANITIZED white rakes
- SANITIZED hopper
- SANITIZED destemmer
- Pallet jack
- Two-Three cellar employees
- Any additions assigned on work order (measured out and ready to add)

**ESTATE GRAPE RECEIVAL**

Picking at Chamisal is performed by a contract picking crew paid by the ton (occasionally by the hour).

The winemaker will determine blocks to be picked and advise the vineyard management to arrange picking crews.

Picking will generally begin at 3am under lights. The advantage of night picking is that the fruit arrives at the winery at low temperatures, slowing oxidation and microbial activity. It also allows fruit processing to occur more efficiently.
Pickers will dump picking bins onto the stainless sorting tables which are placed across the tops of the macrobins. Two winery or vineyard staff will sort all fruit into macrobins. Any fruit that is compromised by bird or bee damage, is underripe, or has fungal diseases should be discarded. Sometimes an affected part of a cluster can be cut out and discarded. In worse situations, the entire cluster may need to be discarded.

Once the bins are full, the fruit will be delivered by tractor to the winery. The bins are slid off the tilt trailers onto the crushoad and empty bins put on trailers for continuation of picking. Winery staff will be required to help expedite the loading and unloading of bins and this activity takes priority over other winery activities.

The fruit must be weighed by the Weighmaster before it is put inside the winery or processed.

If grapes are not to be processed immediately, they should be placed in a cold room until they are processed.

**Contract Grape Receipt**
Contract fruit will typically be delivered by truck in macrobins. Each macrobin holds approximately 1000 pounds of grapes, but may contain more if grapes were machine harvested.

Regardless of who is unloading contract fruit, the grapes must be weighed immediately by a certified weighmaster. Two or three bins can be weighed simultaneously. Tare weights for macrobins should also be recorded. Weighmasters must follow guidelines set by the California Agricultural Department of Weights and Measures.

After weighing, fruit can be processed or put into cold storage.

**Set Up of Equipment**
The processing of Red Grapes requires three people:

1. **Forklift Driver**: Dumps full bins of grapes into hopper. Dumps full bins of destemmed berries into appropriate fermenter.
2. **Destemmer #1**: Makes additions to destemmed fruit (sulfur dioxide, tannins), assists in rotating out bins of destemmed fruit as they get full. Rakes stems into trash bin.
3. **Destemmer #2**: Cleans empty grape bins, assists in rotating out bins of destemmed fruit as they get full.

**Hopper**
Grapes are dumped using the bin dumper on the forklift into the elevated Grape receival hopper. This feeds the grapes into the destemmer using an auger. The outlet chute of the hopper must be accurately positioned over the destemmer. Be sure to lock the wheels of the hopper into place to prevent it from moving when grapes are dumped in.
The speed of the hopper is adjustable using the dial on the variable frequency drive on the front of the hopper. The speed should be enough to create a constant feed of grapes into the destemmer. Faster speeds can clog the destemmer and will reduce the quality of berries coming out. The following are recommendations:

Estate grapes: 20-25 on the dial
Non-Estate: 30-40 on the dial

Speeds in excess of 40 will run the risk of clogging the destemmer.

Always ensure that the hopper has sufficient grapes in it. An empty hopper may mean 2-3 minutes before grapes are feeding the destemmer again.

If the hopper stops operating, press the RESET button on the control pad.

If processing more than one lot, run the grapes completely out of the hopper before beginning the next lot.

DESTEMMER

The destemmer is a fairly simple piece of machinery. Whole clusters feed in one end. These are beaten by paddles causing loose berries to fall through a rotating screen. Berries come out the bottom and stems come out the end. Berries are collected in clean and sanitized macro bins, two on hand so they can be rotated out without stopping the processing. Stems are collected in old macro bins that cannot be used for grapes anymore (“trash bins”).

The speed of the destemmer can be adjusted to ensure that it gently and effectively removing the stems. This task will be performed on a lot by lot basis by the Winemaker or Assistant Winemaker.

IF THE DESTEMMER EVER STOPS RUNNING WHILE PROCESSING GRAPES, IMMEDIATELY STOP THE HOPPER! OTHERWISE THE HOPPER WILL CONTINUE TO RUN AND CREATE A BIGGER CLOG.

Generally the destemmer will be run without a crusher to maximize the number of whole berries. Crushing wheels can be added at the direction of the winemaker if crushing is desired.

G. WHITE GRAPE PROCESSING

Because Chamisal Vineyards has been equipped with new machinery for processing white grapes, interns will be trained by the assistant winemaker of the procedure for processing white grapes.

*This section of the manual will be updated post 2013 harvest.

H. DIGGING OUT TANKS AND PRESSES
DIGGING OUT OPEN TOP TANKS

- 2 SANITIZED white picking bins
- 2 cellar employees
- 1 SANITIZED rake
- 1 SANITIZED shovel
- Ventilation fan
- Forklift with bin dumper
- Tank for pressed wine
- Pump (usually air diaphragm)
- 2 lines (pump to sump & Pump to tank)
- Sight glass fitting
- Tri-clover clamps and gaskets
- At least 4 butterfly valves
- Gas Monitor

1. Be sure that all equipment being used has been sanitized. including your boots!
2. Set up the press, sump, and PT (or cistern tank) being pressed into. Be sure all lines and tanks have been sanitized.
3. Be sure fan and hose are set up properly to ensure safe ventilation.
4. Have one employee entank and begin to shovel quality grape skins into white bin. The second employee will assist employee in tank by raking skins into bin.
5. When bin is full, the employee on the ground will replace the full bin with the second empty one, dump the full bin into press, and return to help employee in tank. It is important to keep up consistent conversation with the employee in the tank as the levels of CO2 may be high. Be sure to ask questions to ensure they are feeling healthy and well as they dig out the tank.
6. When all of the quality grape skins are removed from the tank, the press can then be closed and turned on for pressing. Be sure to keep an eye on the sump to ensure it does not overflow. When the sump reaches a level of fluid where the pump will not take in any air, feel free to turn on the pump. Do not leave the pump running unattended! Although it may seem as though the juice is coming out at a constant rate, it will slow as the press finishes.
7. After press is running without fear of the sump overflowing, both employees can then return to clean out the open top tank. This can be an extremely messy process and it is important to do a thorough job at cleaning any mess leftover. The lees left in the bottom of the tank can be put into a trash bin until no more lees can be dug out of the tank. The remaining lees and skins can be hosed down.

DIGGING OUT & CLEANING RED AND WHITE PRESS

- Digging out a press requires at least two employees, preferably 3 or more.
- When cleaning out the red press it is important to remember that the levels of CO2 may be high and it is important to inform a fellow employee if you become light headed or dizzy while inside the press.
- It is important to clean the press thoroughly! This usually takes between 30-45 minutes to do the job correctly.
Intern Training Manual

- You are finished cleaning when:
  - all grapes and grape residue is free from press
  - Floors have been hosed down and are free from grapes or grape residue
  - Drains have been emptied into trash bins
  - Picking bins are cleaned, dry and put away
  - Forklift has been rinsed off and forks are clean
- Make sure the press is approved by a supervisor before leaving for the day or switching to another task!
VII. SAFETY

A. PERSONAL PROTECTION EQUIPMENT
All cellar employees are equipped with their own Personal Protection Equipment, often referred to as PPE. This equipment should be used often and kept organized throughout the harvest season. Employees are required to return all PPE to their personal labeled box at the end of each day.

Each employee’s PPE box should contain:

- 1 flashlight
- 1 set of safety glasses
- 1 personal respirator
- 1 dust mask
- Set of ear plugs (more are available upon request)
- Two sets of gloves
- Employees will be provided with gloves
- Employees that wear respirators must have clean shaven face, or else gases can leak into the respirator

If you believe that you are missing or would like to request further personal protection equipment be sure to ask the winemaker or assistant winemaker. It is extremely important to Chemial Vineyards that employees feel safe in the work environment at all times!

B. PROPER CELLAR ATTIRE
Having the proper cellar attire is very important during harvest. Having the proper clothes and safety equipment ensures a safe work environment for yourself and for your fellow co-workers. When preparing yourself for a day of work keep be sure to follow the following dress code:

1. Wear long pants and rubber boots to protect yourself from slipping and falling on the consistently slippery cellar floor.
2. No overly baggy clothing; overly baggy clothing has a chance of getting caught in machinery and may result in injury.
3. Hair must be kept neat and pulled back if necessary. When working around heavy equipment this is an important to keep hair pulled back or cut short to avoid getting caught in machinery and leading to severe injury.
4. Keep fingernails clean and free from nail polish.
5. No jewelry!
6. Remember to wear your PPE when needed!!!

C. SCISSOR LIFT SAFETY
Source: https://www.osha.gov/SLTC/scaffolding/hazard_alert.html

HAZARDS

Organizations that have workers, including students who are employees, who use scissor lifts to film events and functions, must address the hazards associated with this equipment. These hazards can include:

- The lift failing over or a worker slipping off the platform if the lift is:
  - used during bad weather or high winds
  - positioned on soft or uneven ground, or on weak utility covers (e.g., underground sprinkler valve boxes)
  - overloaded with heavy objects
  - used with guardrails removed
  - driven over uneven, unstable ground, or surface in poor condition, with the lift in an elevated position, or
  - used with brakes that are not properly set.
- A worker being electrocuted if the lift makes contact with electrical lines.

HOW TO REDUCE HAZARDS

- Establish and follow safe work practices that include, but are not limited to:
  - Inspecting controls and components before use
  - Selecting work locations with firm and level surfaces away from hazards that can cause the lift to be unstable (e.g., drop-offs or holes, slopes, bumps or ground obstructions, or debris)
  - Selecting work locations that are clear of electrical power sources (e.g., power lines, transformers) - by at least 10 feet - and other overhead hazards (e.g., other utilities, branches, overhangs, etc.)
  - Operating lifts only during weather conditions that are safe for use (e.g., not in high winds, rain, snow, sleet, etc.)
  - Moving the lift to/from a work location safely, with the lift lowered, unless following safe practices allowed by the manufacturer
  - Setting the brakes and stabilizing the lift before raising it
  - Ensuring that the lift is not overloaded
  - Working safely from the lift (e.g., do not remove guardrails or stand on them for extra height)
  - Reporting problems and malfunctions
- Train workers on, and make sure workers follow, established safe work practices and manufacturers’ recommendations for operating scissor lifts safely
- Allow only trained workers to use scissor lifts, and make sure those workers show they can use a scissor lift properly
- Make sure that the scissor lift has a guardrail system that protects workers from falling, and
- Test, inspect, and maintain scissor lifts according to the manufacturer’s recommendations

D. FORKLIFT SAFETY

The scissor lift and forklift are two essential pieces of equipment to the wine making process. It is important that these vehicles are operated safely and kept in top condition throughout the year, especially during the harvest season. Interns will be thoroughly trained how to safely operate and maintain both of these important vehicles.
As a daily morning task, cellar employees are required to fill out a daily maintenance sheet on all forklifts as well as scissor lift equipment.

During your initial training week you will be trained to safely operate a forklift. It is important to remember everything you have learned and practice safety precautions each and every time you get in a forklift.

REMEMBER:

1. **ALWAYS** wear a seatbelt, even if it is just moving a very short distance.
2. **Honk** the horn when going around corners.
3. Stay at a safe, controlled speed.
4. **Never** have someone stand on the forks!
5. **Lower** forks and turn off before exiting forklift.
6. **Be** aware of your surroundings.
7. **Don't** get in a hurry! Work at your own comfortable speed to ensure safety.
8. **Do not** make any sudden stops when carrying a load.
9. **Keep** forks close to ground when in motion.
10. **Be** aware of your center of gravity, weight of load, driving comfort level.
11. **Be** aware of uneven and wet surfaces.
12. Overall use your Common Sense and stay safe!

**E. ALCOHOLIC CONSUMPTION**

Although wine is an alcoholic beverage in itself and alcoholic beverages are constantly present in the cellar, it is important to remember that the consumption of any alcoholic beverage is prohibited during working hours. Mixing alcoholic consumption with heavy equipment operation can lead to problems including but not limited to:

- **Damaging** tanks, barrels, pumps, etc.
- Can cause severe endangerment or injury to fellow employees
- Can cause severe damage to equipment
- Can cause severe damage to yourself!

Therefore it is important to remember that alcohol consumption is strictly prohibited in the work environment and will result in disciplinary action by the winemaker or assistant winemaker.

**F. LOCKOUT-TAGOUT**

Anyone who operates, cleans, services, adjusts, and repairs machinery or equipment should be aware of the hazards associated with that machinery. Any powered machinery or electrical equipment that can move in a way that would put people in danger is a hazard that can be prevented by following
locking or tagging procedures. Failure to lockout or tag power sources on equipment can result in electrocutions, amputations, and other serious-sometimes fatal-accidents.

What are the most common causes of these accidents?

- The machine or piece of equipment was not completely shut off before a maintenance or repair operation. Not only must the machine be turned off but also the power source that goes to it.
- The machine was turned on accidentally, either out of carelessness or because the person who turned it on didn’t realize that another worker was there and could get hurt.
- The machine wasn’t working correctly but wasn’t fixed, turned off, locked or tagged, and someone who didn’t know about the problem used it.
- Moving equipment wasn’t blocked.
- Safety procedures were inadequate or hadn’t been properly explained.

Remember the dangers and be on your guard around any machinery and moving equipment. Even if you don’t operate the machinery, you could get caught in it and injured if it isn’t properly disconnected. So what can you do to prevent accidental injury from moving machinery?

- Identify all jobs and equipment that require lockout of power sources
- Post warning signs wherever possible to indicate that lockout is required
- Develop written procedures explaining how lockout is to be done
- Train all personnel in the lockout procedures for their particular job and offer periodic refresher training
- Allow no deviation from the written policies and procedures
- Use engineering and administrative controls as much as possible to eliminate the need for lockout
- Perform regular maintenance to prevent malfunctioning equipment

Be aware of your personal safety and the safety of others when working with or around moving equipment and machinery. Always follow proper lockout and tagout procedures, even for a quick or minor repair!

G. PRESSURE WASHER SAFETY

A pressure washer is a power tool that sprays water at high pressures to clean large, sturdy surfaces such as buildings, farm equipment, and roads.

RISKS

- The strong spray from a pressure washer can cause serious wounds that might first appear minor. Wounds that appear minor can cause a person to delay treatment, increasing risk for infection, disability or amputation.
The fast, strong spray can throw objects that strike and injure others who are close by.

- Electric shock can occur if the pressure washer is not used properly and if safety instructions are not followed.
- Using small, gasoline powered engines can cause carbon monoxide poisoning. Workers should not use any equipment powered by gasoline engines inside buildings or other partially enclosed spaces unless the gasoline engine can be placed outdoors and away from air intakes.

**REQUIRED PROTECTIVE EQUIPMENT:**
- Hearing Protection
- Safety Glasses
- Thermal Gloves (When using Hot Water)
- Gloves
- Insulated Boots (Rubber Boots)

**PRECAUTIONS:**
- Always use hearing protection when using the pressure washer. The pressure washer runs at a minimum of 90 Decibels.
- Use insulated gloves when using hot water.
- Never run a pressure washer without water.
- Make sure you are on a stable surface and using both hands when using the spray wand. The recoil and torque forces can knock you off a ladder.
- Never point a pressure washer at yourself, others or animals.
- Never attempt to push or move objects with spray from the washer.
- Never use a gasoline powered washer in an enclosed space.
- Always test the ground/fault circuit interrupter (circuit breaker or outlet) before using a pressure washer.
- Always plug a properly grounded pressure washer into a properly grounded receptacle.
- If an extension cord must be used, keep the pressure washer’s power cord connection out of any standing water, and use a heavy duty extension cord with components rated for use in wet locations. Keep both the power cord and extension cord connections as far away as possible from the item being washed and away from any water runoff.
- Wear rubber soled shoes that provide some insulation when using the pressure washer.
- Never cut or splice the pressure washer’s power cord or extension cords.
- Never remove the grounding prong from the pressure washer’s power cord plug or the extension cord.
- Never let a child near the pressure washer. No child should use the pressure washer.

**IF YOU ARE HURT BY A PRESSURE WASHER:**
- Call 911 if emergency help is needed.
- Take care of any wounds:
  - Before treating the wound, wash your hands with soap and clean water
  - Remove any object that is in the way of caring for the wound
  - Put pressure on the wound with a clean cloth to stop bleeding.
- After bleeding has stopped, pour bottled or clean running water over the wound.
- Gently clean around the wound with soap and clean water.
- Pat dry and use an adhesive bandage or dry clean cloth to cover the wound.
- Leave unclean wounds open.

- Persons who have high pressure spray wounds are urged to get medical attention as soon as possible. A medical professional might X-Ray the injured area, provide a tetanus shot and antibiotics, or make a referral to a specialist.

**H. OZONE SAFETY**

At Chamizal Vineyards, we have begun using ozone for sanitation purposes. Its use has been generally accepted and documented to be effective for barrel cleaning and sanitation, tank cleaning and sanitation, clean-in-place systems, and for general surface sanitation.

Ozone, or O₃, is generated in nature as a bluish or colorless gas characterized by the clean fresh smell in the air following a thunderstorm. When oxygen (O₂) and electricity interact, ozone is created, and this is why we smell ozone around copy machines, electric motors, or during arc welding.

Natural levels range from 0.01 ppm to 0.15 ppm and can reach higher concentrations in urban areas. Ozone is an unstable gas and readily reacts with organic substances. It sanitizes by interacting with microbial membranes and denaturing metabolic enzymes.

Ozone will also attack microbial biofilms and degrade them much as it would any other polysaccharide. Upon release of its oxidizing potential, ozone reverts back to oxygen from which it was generated. Application of ozone does not leave a chemical residual, and under ambient conditions, it has a half-life of 10 to 20 minutes. Thus, ozone must be electrically generated on-demand and cannot be stored for later use.

**USING OZONE SAFELY**

Ozone is a toxic gas and must be monitored in the workplace when in use. However, in almost 100 years of industrial use, there has never been a human death attributed to overexposure to ozone. The Occupational Safety and Health Administration (OSHA) has set limits for ozone exposure in the workplace. These limits are for continuous eight-hour exposure of no more than 0.1 ppm, and a short-term exposure limit (STEL) of 15 minutes at 0.3 ppm, not to be exceeded more than twice per eight-hour work day.

A manual containing all the relevant safety information for working with ozone generating systems is essential; it should also contain operating instructions for the winery’s generating system. Workplace monitoring for ozone off-gas must be performed, and records must be maintained to assure OSHA compliance.

When ozone is generated, it is important that the concentration and flow rates be verified, and these should be checked periodically by a technician on some regular schedule or interval (e.g.,
monthly). All ozone generated should be accounted for by checking for leaks in the system and by proper destruction of any excess ozone.

It is not enough to just purchase an ozone generator. Your winery must also have maintenance, verification of performance, monitoring, and, especially in the case of mobile ozone units, an in-place systems approach that ensures the safe use of ozone in the workplace. Properly used, these ozone sanitizing systems are much safer than chemical (chlorine and caustics) or heat-based sanitizing systems.

OXIDATION OF EQUIPMENT AND FACILITIES
One concern is that use of ozone will oxidize equipment and facilities, and this can happen if the materials are incompatible with ozone. Most materials used in food processing are compatible. Stainless steel (e.g., 316L) is corroded less by ozone than by chlorine, and common plastics used in food processing are generally resistant including ECTFE (Halar®), PTFE (Teflon®), PVDF (Kynar®), PVC (rigid, schedule 80 or 40), and silicone tubing and gaskets. Natural rubber will readily degrade; however FPM (Viton®) and Teflon gaskets are very stable.

I. STEAM GENERATOR SAFETY

At Chimisal Vineyards, we will frequently use a steam generator to sanitize barrels before filling them with wine. Steam generators are extremely effective at sanitizing and nearly sterilizing the inside of a barrel with very little water usage. However, because of the nature of steam, if you are not aware of the safety issues associated with the steam generator, you could cause very serious bodily harm.

A steam generator takes cold water and, via an internal boiler, heats up the water until it turns to steam (above 212 degrees Fahrenheit). Steam is extremely hot and all safety precautions should be followed carefully.

ANY TIME YOU USE THE STEAM GENERATOR YOU WILL NEED THE FOLLOWING PERSONAL PROTECTIVE EQUIPMENT (PPE):
- Eye Protection / Goggles
- Thermal Gloves with Insulation
- Rubber Boots that cover up to the shins
- YOUR BRAIN – think carefully about everything you’re doing

STEAM GENERATOR SET UP:
1) Ensure that the pressure gauge is reading 0. If it is not, slowly and carefully release the pressure via the (yellow) steam valve.
2) Open the (yellow) steam valve and (red) blow-down valve to empty the steam generator of sediment and impurities that have collected since its last use.
3) Connect the steam generator to a hose via the cam-loc fitting at the front of the Steam Generator. Open the cold water valve at the wall mixing station. Keep the water turned on the entire time you are using the steam generator.
a) NOTE: Water will not enter the steam generator until the steam generator’s switch is turned on.

4) Open both (yellow) Steam line valves.
   a) This allows the boiler to be filled without producing back pressure

5) Close the (red) Blowdown Valve

6) Plug in and fasten the 3-phase Steam Generator plug to the 480 volt, 60 Amp. Leviton Power switch, located behind the 2 presses.
   a) Ensure that the Power switch on the steam generator is off, then throw the power switch on the Leviton.

7) On the Steam Generator: ensure that the Blowdown Switch is flipped to DISABLE, then Turn the Power switch to the “ON” position.

J. LADDER SAFETY

Many work site injuries are caused by accidents involving ladders that are not placed or used safely. Following these safety guidelines can help prevent ladder accidents.

Before using any ladder, check its condition. Make sure there are no broken, cracked, or missing rails and that rungs are not slippery from grease or oil. Check for damage or corrosion on metal ladders. If a ladder is in poor condition, don’t use it. Report the problem so it can be tagged and repaired. A competent person should periodically inspect all ladders and remove damaged ladders from use until they are repaired.

When choosing and using a ladder, keep the following in mind:

- Choose the appropriate type and size ladder for the job, including correct fittings and safety feet.
- Near electrical conductors or equipment, use only ladders with non-conductive side rails.
- Set the ladder on solid footing against a solid support.
- Place the base of a straight ladder out away from the wall or edge of the upper level about one foot for every four feet of vertical height.
- Be sure straight ladders are long enough so that the side rails extend above the top support point by at least 36 inches.
- Single cleat job-made ladders should be 15 to 20 inches wide with ladder cleats uniformly spaced 12 inches apart.
- Never try to increase the height of a ladder by standing it on other objects, such boxes or barrels, or by splicing two ladders together.
- Portable ladders should be tied, blocked, or otherwise secured against movement.
- Keep ladders away from doorways or walkways, unless they can be protected by barriers.
- Keep the area around the top and base of the ladder clear. Don’t run hoses, extension cords, or ropes on a ladder; these may create obstructions.
- To avoid slipping on a ladder, check your shoes for oil, grease, or mud and wipe it off before climbing.
- Climb the ladder carefully, facing it and using both hands. Use a tool belt or hand line to carry materials.
Most ladders are designed to hold only one person at a time. Two persons may cause the ladder to fail or be thrown off balance.
Do not lean out to the side when you’re on a ladder. If something is out of reach, get down and move the ladder.
Ladders should never be used sideways as platforms, runways or scaffolds.

Choosing and using ladders wisely is a step in the right direction.

**OSHA LADDER SAFETY**

Source: [https://www.osha.gov/Publications/portable_ladder_qc.html](https://www.osha.gov/Publications/portable_ladder_qc.html)

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.
- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface. Unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (see diagram).
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder’s load rating and of the weight it is supporting, including the weight of any tools or equipment.

**K. CONFINED SPACES**
The following sheet should be filled out thoroughly EACH AND EVERY TIME an employee enters a tank where fermentation has occurred. When digging out tanks it is essential to make sure the environment is safe to enter and there is ALWAYS a fellow employee with the person inside the tank. It is also important to always use the portable fan and hose to assure CO2 levels are at a safe level.

### Environmental Health & Safety
**Chamisal Vineyards – Confined Space Entry Permit**

<table>
<thead>
<tr>
<th>Permit No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Scheduled Start</th>
<th>Scheduled Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>Date</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description of Work to be Performed</th>
<th>Location of Confined Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean a Tank</td>
<td>Tank Room</td>
</tr>
<tr>
<td>Tank #:</td>
<td>Outside Crush Pad</td>
</tr>
<tr>
<td>Dig a Tank</td>
<td></td>
</tr>
<tr>
<td>Press #:</td>
<td></td>
</tr>
<tr>
<td>Clean a Press</td>
<td></td>
</tr>
<tr>
<td>Other (describe):</td>
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</table>

<table>
<thead>
<tr>
<th>Types of Hazards</th>
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</thead>
<tbody>
<tr>
<td>Oxygen Deficient Atmosphere (&lt; 19.5%)</td>
</tr>
<tr>
<td>Entrainment</td>
</tr>
<tr>
<td>Oxygen Enriched Atmosphere (&gt; 23.5%)</td>
</tr>
<tr>
<td>Engulfment</td>
</tr>
<tr>
<td>Energized Electrical Equipment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-line respirator</td>
</tr>
<tr>
<td>Full Body Harness</td>
</tr>
<tr>
<td>Powerful Outside Ventilation</td>
</tr>
<tr>
<td>Self Contained Breathing Apparatus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air Monitoring Results Prior to Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor Model</td>
</tr>
<tr>
<td>Calibration Performed?</td>
</tr>
<tr>
<td>Initials:</td>
</tr>
<tr>
<td>Alarm Conditions?</td>
</tr>
<tr>
<td>If (Y), specify:</td>
</tr>
</tbody>
</table>

**At Entry:**

*ENTER CONFINED SPACE ONLY WHEN MONITOR ALARM STOPS*
Oxygen ________%  LEL ________%  CO ________%  H₂S ________%

Monitoring Performed by ___________________________ Date: ________ Time: ________

Continuous Air Monitoring Results

<table>
<thead>
<tr>
<th>Start: _____</th>
<th>Acceptable limits: (19.5-23.5%)</th>
<th>(10%)</th>
<th>(25 PPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time: _____</td>
<td>Oxygen ________%  LEL ________%  CO ________%  H₂S ________%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time: _____</td>
<td>Oxygen ________%  LEL ________%  CO ________%  H₂S ________%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time: _____</td>
<td>Oxygen ________%  LEL ________%  CO ________%  H₂S ________%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time: _____</td>
<td>Oxygen ________%  LEL ________%  CO ________%  H₂S ________%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time: _____</td>
<td>Oxygen ________%  LEL ________%  CO ________%  H₂S ________%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Authorization

We have reviewed the work authorized by this permit and the information contained herein. Written instructions and safety procedures have been received and understood. Entry cannot be approved if any answers are marked “no”. This permit is not valid unless all appropriate items are completed. This permit is to be kept at the job site. Return site copy to supervisor.

Entrant’s Name: ___________________________  Signature: ___________________________
Date: ________

Attendant’s Name: ___________________________  Signature: ___________________________
Date: ________

Supervisor’s Name: ___________________________  Signature: ___________________________
Date: ________

2013 Confined Space Permit Sign-in Sheet

<table>
<thead>
<tr>
<th>Permit Number</th>
<th>Entrant Initials</th>
<th>Attendant Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-063</td>
<td></td>
<td></td>
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<tr>
<td>10-064</td>
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<tr>
<td>10-065</td>
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<tr>
<td>10-066</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is extremely important that these sheets get filled out ALL THE WAY every time a tank is entered! In addition to disciplinary action, employees who do not adhere to this rule will not be eligible to receive rewards for digging out tanks.
VIII. ORGANIZATION

A. STAINLESS STEEL

Every stainless steel clamp, reducer, valve, fitting, etc. has its own specific place where it belongs. Keeping all stainless parts organized and in the proper place keeps the cellar running smoothly and efficiently, especially during harvest months. It is important to put fittings back in their proper place immediately after you are done using them!

If a clamp has a wing nut, or nut and washer on it, keep them together! Do not remove a wing nut and replace with a nut and washer or vice versa. There is no need to mix them up.

Make sure all stainless steel fittings are COMPLETELY CLEAN before returning them to the correct rack. This means no sign of grape residue, dirt, etc. whatsoever.

FITTINGS THAT BELONG ON THE WALL RACK

- Any valve 3” or larger
- Any clamp with a nut and washer
- 2” Ball Valves
- Permanent tank fixtures (should either be on the wall rack or inside tank after cleaning for quick accessibility)

FITTINGS THAT BELONG ON THE MOBILE CART

- Clamps with wing nuts
  - Clamps should be organized by size
- Any valve 2” and under
- All gaskets
- Wax pencils
- Reducers of all sizes
- Misc. other stainless often used during harvest

B. CLEANLINESS

Cleanliness, organization, and cellar sanitation are two extremely important responsibilities that all cellar employees possess. It is your responsibility to be sure of the following list of precautions on a daily basis:

1. Keep in mind that EVERYTHING has a right place and should be returned to that place after use.
2. Clean everything thoroughly! Leave stainless steel, pumps, hoses, etc as clean if not cleaner than you found them.
3. All water hoses, wine transfer hoses, and steam hoses must be clean, rolled up, and put away at the end of every day!
4. Drains and floor must be COMPLETELY free from any grape skins at the end of the day. This means going through and pulling EVERY DRAIN as the LAST task for the end of the day.
5. Be sure to work from top to bottom when cleaning. Start by spraying down the catwalks and outside of tanks, then move to floors as a final task.
6. Place permanent fixtures inside tank after cleaning out any tank. Generally, they will be used for that same tank throughout harvest season.
7. If you see any clamps, hoses, rakes, etc., living around unattended, be sure they are all the way clean and put them away. Even if you did not use them it is your responsibility to keep the cellar clean and organized! It is a TEAM EFFORT!
8. Cleanliness and organization is an extremely important part of maintaining a safe cellar environment. When equipment is left on the floor it can lead to injuries.
Discussion

The manual just presented should be updated yearly with input from the winemaker or assistant winemaker. It will be used as much or as little as the training instructor wishes. However, it is advised that each intern receive a hard copy previous to beginning full time cellar work.
Chapter Five

Summary, Recommendations, and Conclusions

Summary

The completed manual will be used as a training aid for Chamisal Vineyards 2013 Interns as well as interns in years to follow. The manual will be updated as needed with the growth and improvement of the Chamisal Vineyards wine cellar. It will be a key resource for interns to better understand their job in cellar setting during harvest time.

Recommendations

It is recommended that the manual be kept up to speed with the cellar and all of its improvements throughout the years to come. Upkeep of this manual should be performed by the assistant winemaker or winemaker. If either winemaker or assistant winemaker are unable to do so, they may hand this duty to the cellar master or another qualified cellar employee.

The manual should be used as a training tool and should not take place of initial training conducted in the first week of employment. A printed copy should go to every intern or new cellar employee at time of initial training. The manual is a valuable training tool and should be used as such.
Conclusion

The management team, winemaker, assistant winemaker, and cellar master, stated their approval of the training manual. It has been a pleasure working with the assistant winemaker and acquiring new skills and knowledge throughout the process of writing the training manual. It is a pleasant feeling knowing that this senior project will benefit a local, San Luis Obispo, business. Hopefully this manual will continue to be edited with the advancement of cellar technology and administered to future harvest interns in years to come.
BIBLIOGRAPHY


"Discussion #2 with Assistant Winemaker Michael Bruzus." Personal interview. 12 Aug. 2013.

"Discussion #1 with Assistant Winemaker Michael Bruzus." Personal interview. May. 2013.


