

# Aeration During Fermentation



## Introduction

This short paper is meant to provide ideas for proper aeration during fermentation. I have included Venturi from two different manufacturers, as well as some alternative ideas for aeration during pumpover.

For those using rotary or punch down fermentors, I have provided a picture (rather bad one) of a sparger that can be inserted through a valve to provide aeration.

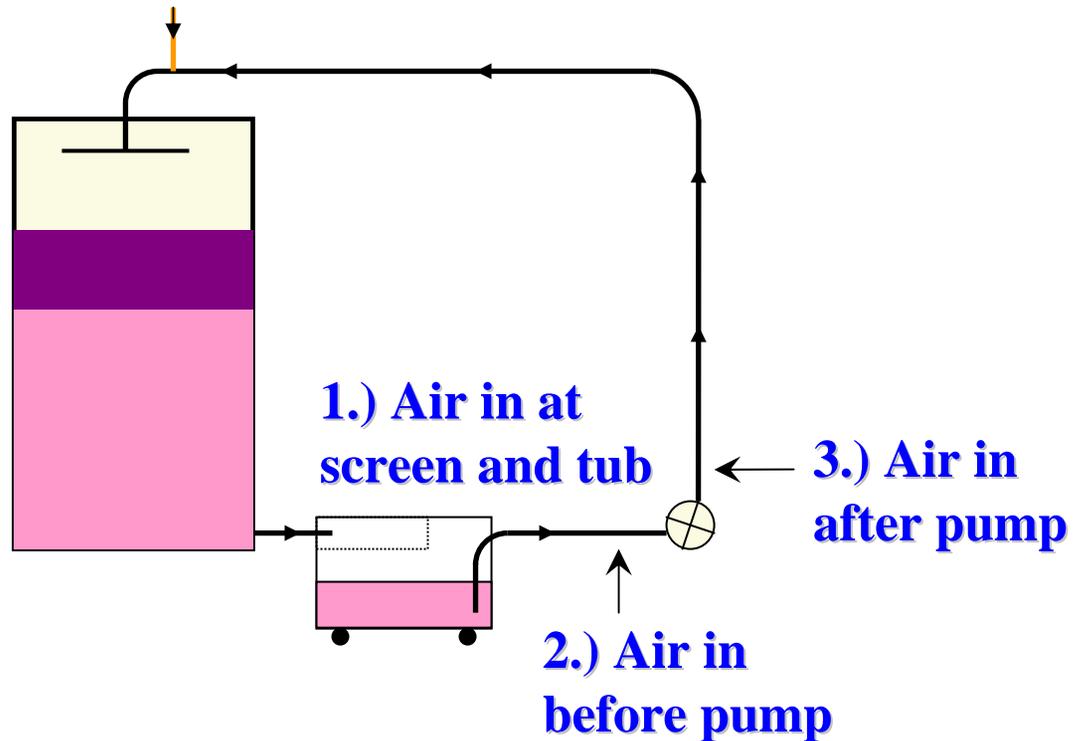
## Why Aerate???

Aeration provides a nutrient (oxygen) that aids in the growth and development of stronger yeast, which is more able to finish the fermentation. It also appears to enable control of redox potential in the fermenting must - minimizing the production of reductive characters such as hydrogen sulfide ( $H_2S$ ). Lastly, proper aeration appears to minimize green vegetal characters in the wine, some related to sulfides other to short chain aldehydes.

# Aeration During Fermentation

Pumpover w/Aerator (**too much is not enough**)

**4.) Air in just before irrigator**



# Where to add air or oxygen



1. Screen and tub - this alone does not provide adequate aeration of fermenting must.
  - a) Simply using a fan, blowing on screen and tub, will ensure that some air contacts the must. Mostly carbon dioxide will be evolving from the must as it splashes on the screen.
  - b) Another method to aerate is using a sparging stone in the tub to add air or oxygen, before being pumped back and irrigated into the tank.
  
2. Addition of air before the pump.
  - a) This can be done using a small valve, which is manually opened after starting the pump. This procedure works, but is not recommended since it may cause cavitation of the pump and unnecessary shear of the must. Also, the valve must be closed after completing the pumpover.
  
3. & 4. Addition of air or oxygen after the pump.
  - a) Three methods are shown in the following pictures:
    - i. The Mazzei Venturi installed on or just after the pump - this must include a check valve to prevent backflow. If installed just before the irrigator at the top of the tank, the check valve should not be necessary.
    - ii. The York Venturi is usually installed just before the irrigator. (Note: This has not been tested in combination with a check valve just after the pump)
    - iii. A direct infusion of air or oxygen can be achieved via a tee and inline stainless steel sparger. This is a most effective method of aeration and oxygen can easily replace air for larger fermentors.

## i. Mazzei Injector

An easy to use, no hassle Venturi system for macro-aeration of fermenting must.

This device is best placed on the pressure side of the pump, either at position **3 or 4**.

For more information contact:

### **Mazzei Injector**

500 Rooster Dr

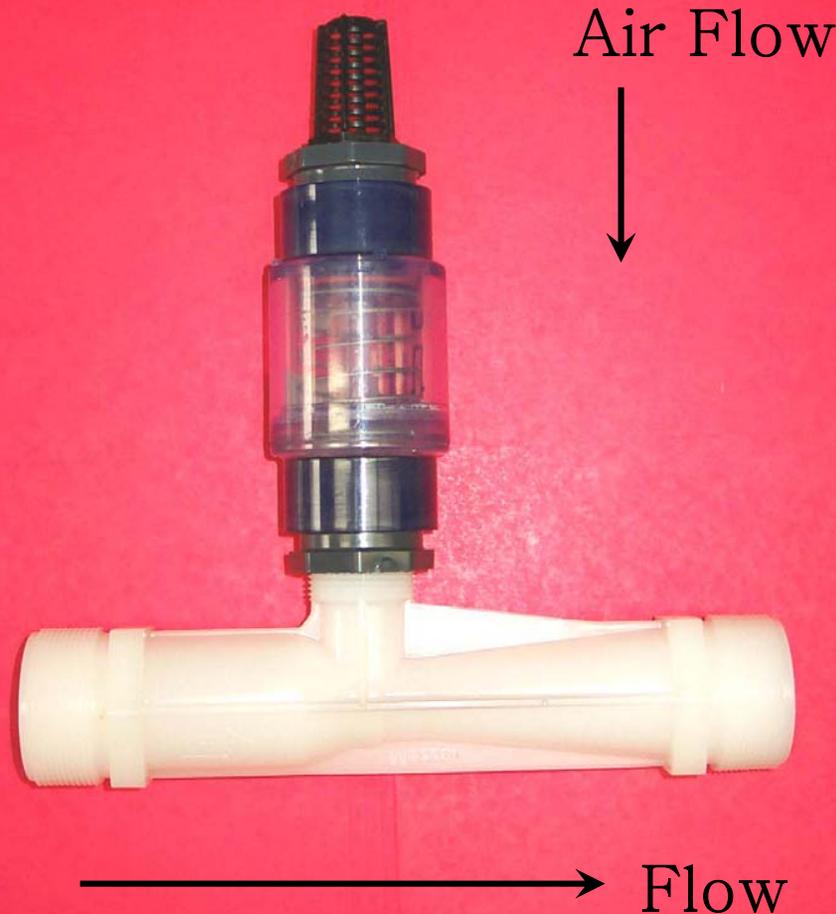
Bakersfield, CA 93307

Phone: 661-363-6500

Fax: 661-363-7500

[www.mazzei.net](http://www.mazzei.net)

Check valve – to prevent backflow of must





Mazzei Injector inline between pump and irrigator, with adapters to Tri-Clover fittings and check valve.



Note shut-off valve

This device is best placed on the pressure side of the pump, either at position **3** or **4**.



## ii. York Venturi

For more information contact:

**York Machine Works**

1401 Charter Oak Ave

St. Helena, CA 94574

Phone: 707-963-4966

Fax: 707-963-8408

Email: [york@napanet.net](mailto:york@napanet.net)



This device is best placed on the pressure side of the pump, either at position 3 or 4. (Note: this Venturi has not been tested when connected directly after the pump.)

Flow



Flow meter to measure flows being injected by the Venturis

We have seen flows from 4 to 6 cfm (cubic feet per minute) using the Mazzei Venturi in combination with a typical diaphragm pump.

The use of a flow meter can be very useful to help standardize flows between tanks and pumps using Venturi systems

# Other Methods to Introduce Air or Oxygen into Fermentations



## iii. Inline Injection of Oxygen

Uses a tee connected inline after the pump, with a stainless steel sparger (see below). A sight glass is used to gauge the sparging rate into fermenting must.

This device is best placed on the pressure side of the pump, either at position **1** or **2**.



For more information contact:

**Burgstahler Machine Works**

355 B La Fata St, St Helena, CA 94574

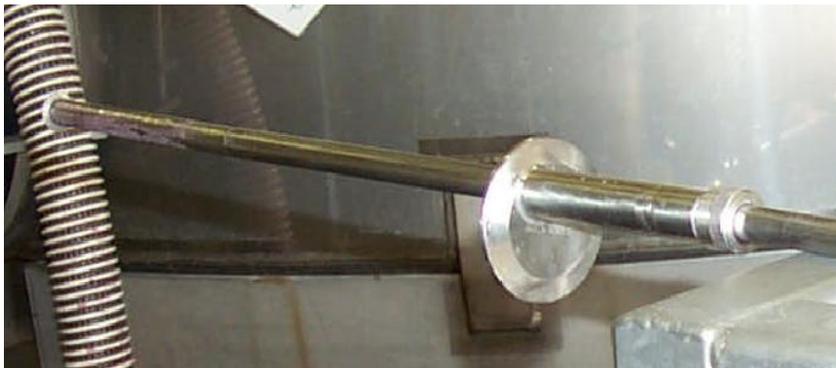
Tel: 707-967-0553 Fax: 707-967-0554

[Bmachineworks@aol.com](mailto:Bmachineworks@aol.com)



## Sparger for Rotary and Punch Down Fermentors

A piece of sintered stainless steel ( $8\mu$  pore size) is welded to stainless steel tubing. A tri-clover cap fitted with tube and friction fitting allows the sparging tube to slide, so it can be inserted through a valve in to either the rotary or punch down tank.



For more information contact:  
**Burgstahler Machine Works**  
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[Bmachineworks@aol.com](mailto:Bmachineworks@aol.com)

