



*Taste the edge of sound*

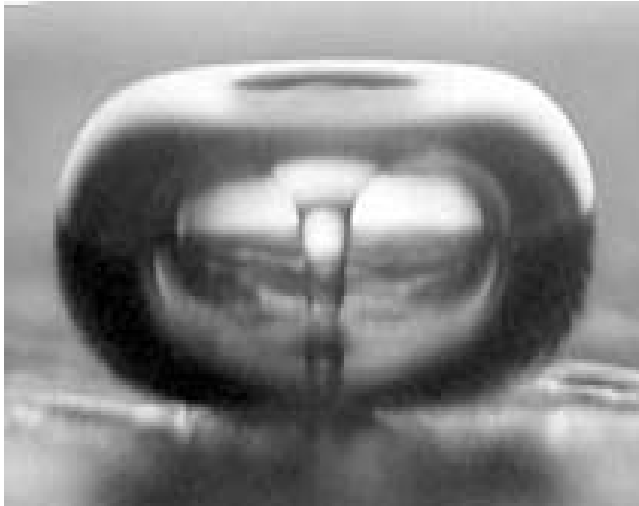
Cavitus Pty. Ltd.  
ACN 112 372 488  
[www.cavitus.com](http://www.cavitus.com)

## **Barrel Cleaning and Disinfection System (Pat. Pend.)**

**November, 2009**

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# Cavitus' Pat. Pend. Barrel Cleaning and Disinfection System ('BCDS') Works Using High-Power Ultrasound



*Ultrasonic cavitation creates high pressure and shear on a microscopic scale from the collapse of micron-size bubbles thousands of times per second, both on the surface and in the pores of organic materials*

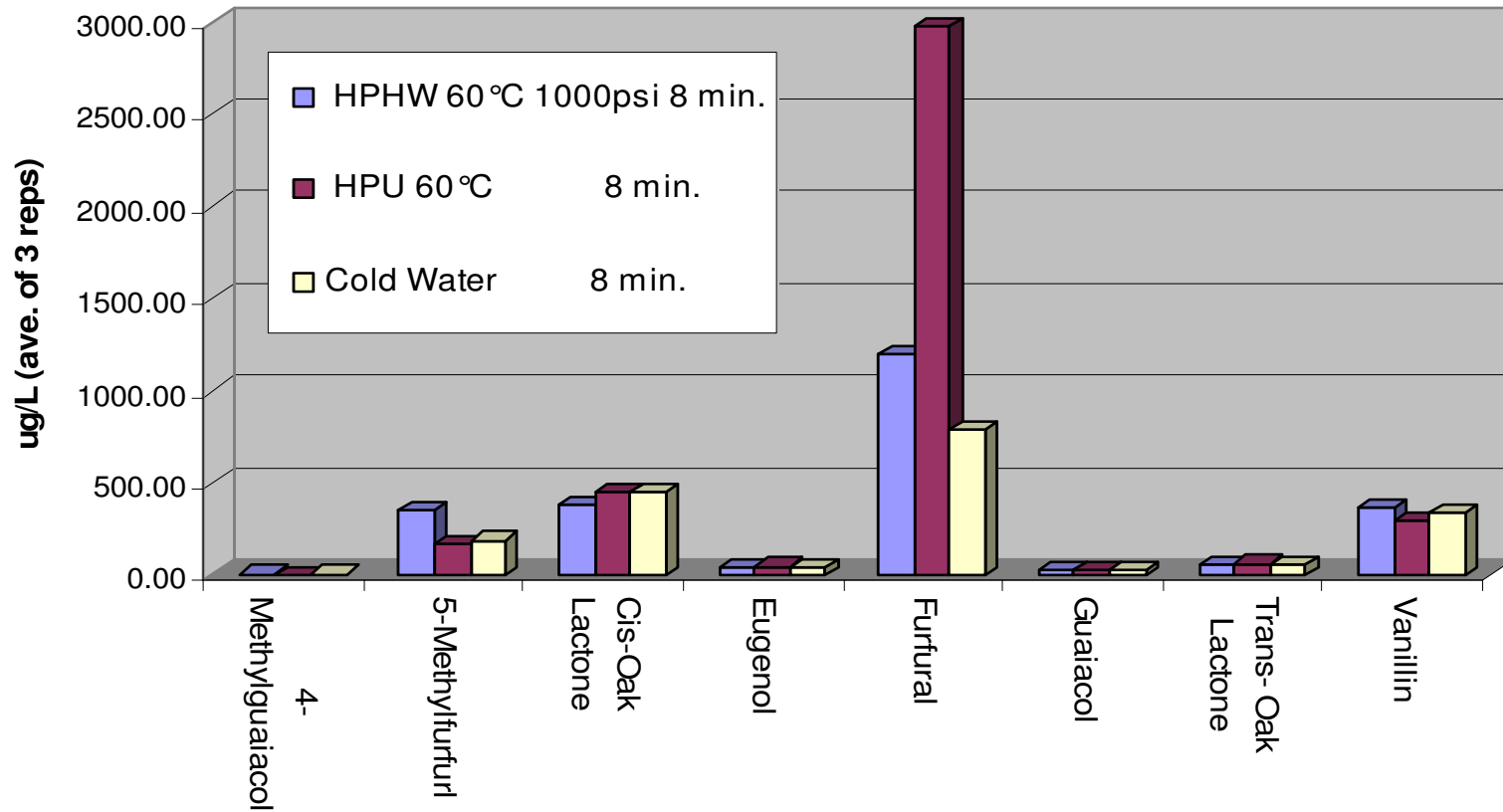
## □ Benefits

- ✓ Validated simultaneous surface and subsurface cleaning and Brett destruction
- ✓ Superior tartrate removal
- ✓ Increased toasted flavours
- ✓ No additives or chemicals
- ✓ Low energy consumption
- ✓ High water efficiency (<2 gals/barrel)
- ✓ Low labor cost to operate
- ✓ Competitive cycle time vs. conventional high pressure/hot water (HPHW) cleaning
- ✓ Robust mobile or static units
- ✓ Options for fitting into cleaning line
- ✓ Options for recycling water and various levels of automation

**Competing solutions are ineffective, damage barrel integrity, use more energy and water, and require use of chemicals**

# BCDS Prolongs Barrel Life by Increasing Extractable Toasted Oak Flavours

Oak flavour volatiles in red wines at 12 months in 1-year old barrels



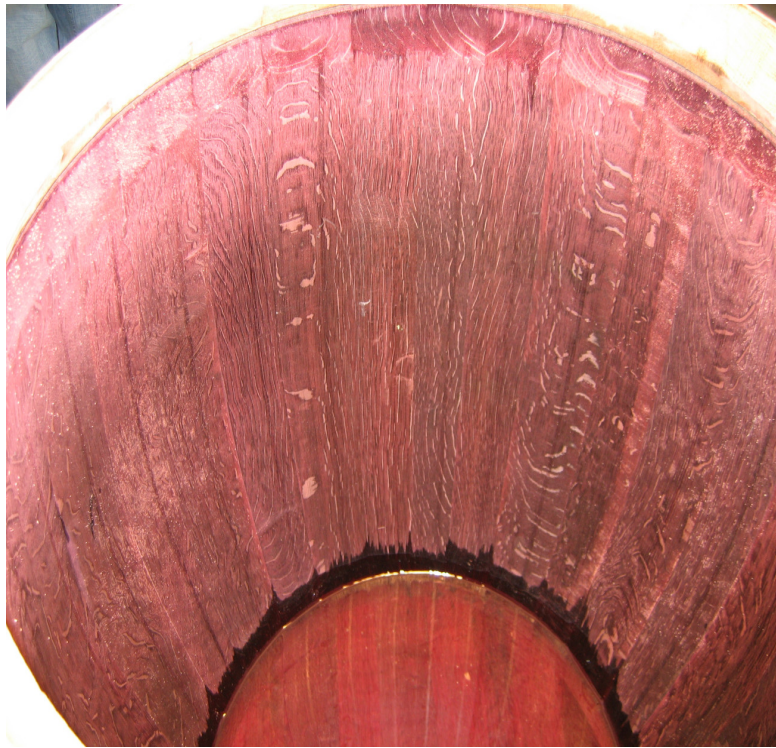
**Source: Analyses performed by a Barossa Valley winery (AU) over 12-month period on French barriques**

# BCDS Increases Barrel Life by Superior Cleaning and Disinfection of Tartrated Barrels...

*5-year old barrel before Cavitus' HPU treatment*

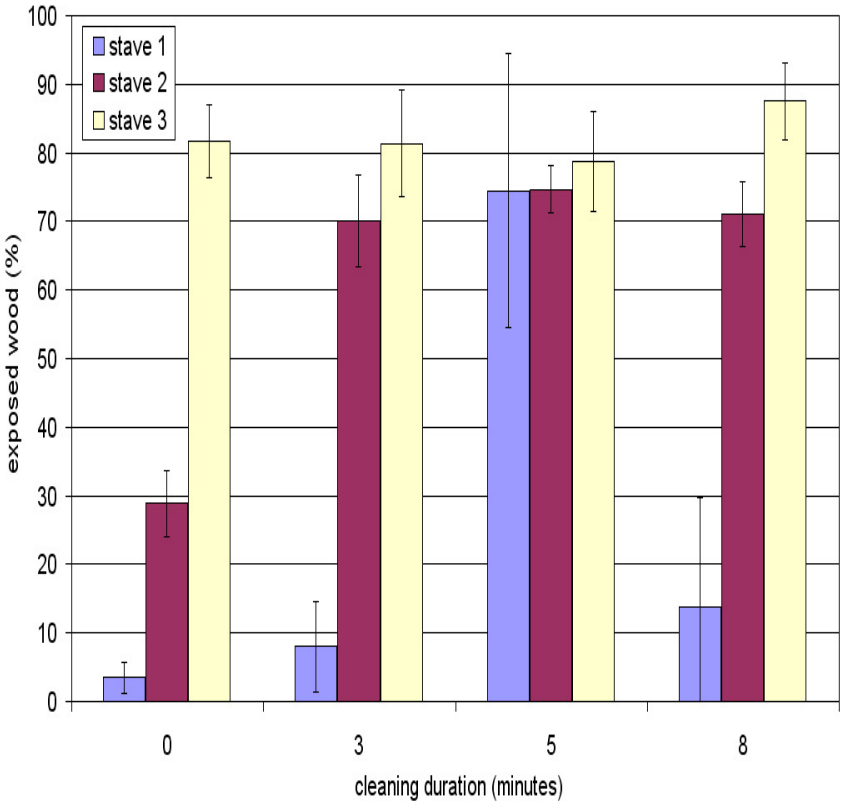


*5-year old barrel after Cavitus' HPU (pat. pend.) treatment*

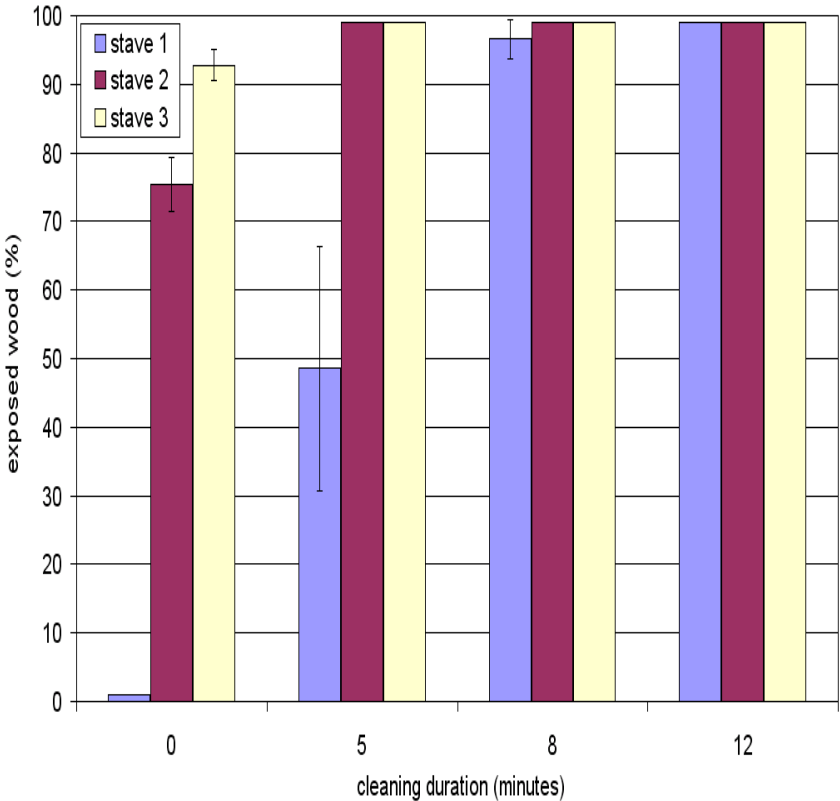


# ...Illustrated by Image Analyses of 1 Year-Old Wood Surfaces Before/After Treatment...

**HPHW – 1,000 psi and 60C**

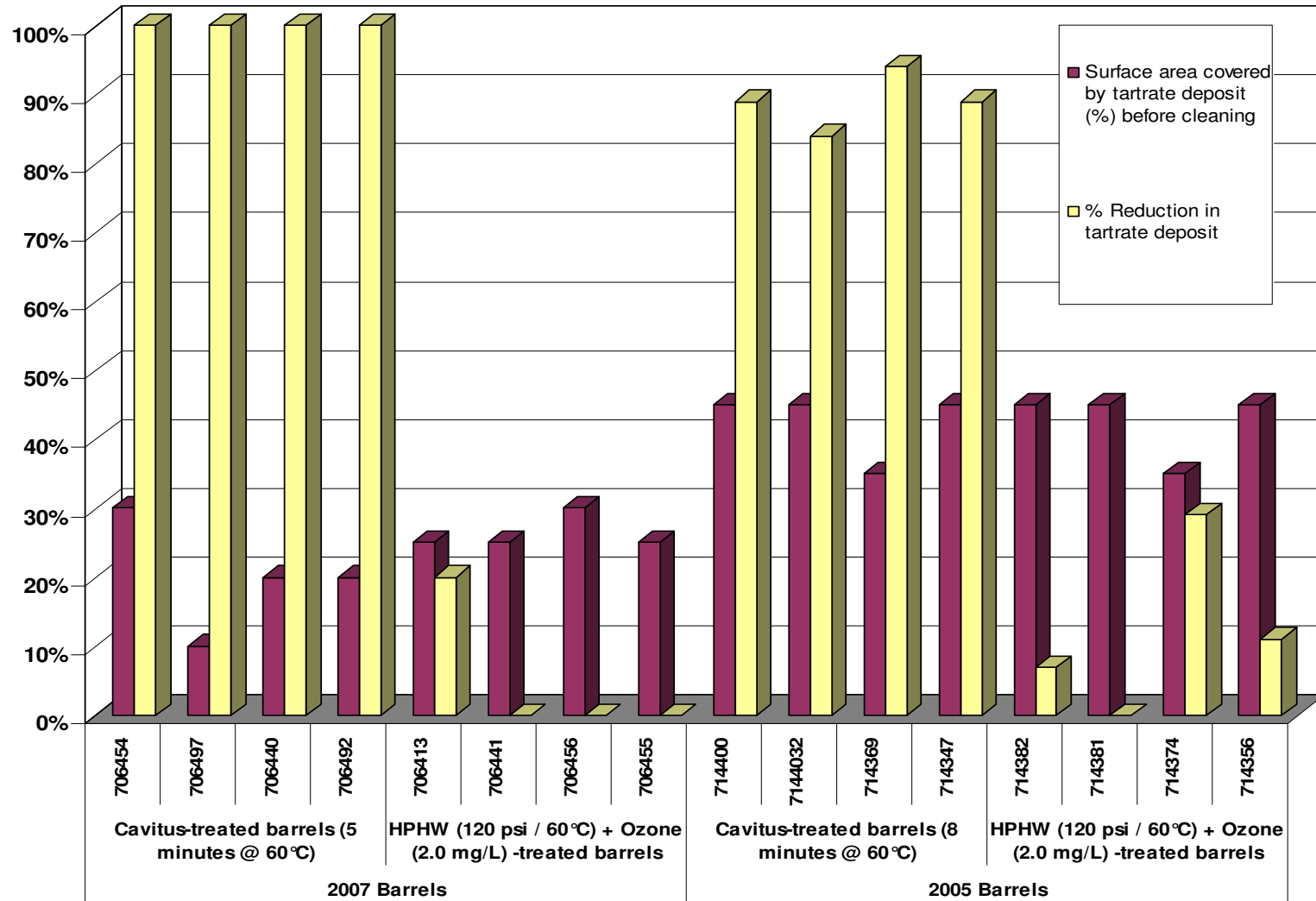


**Cavitus BCDS**



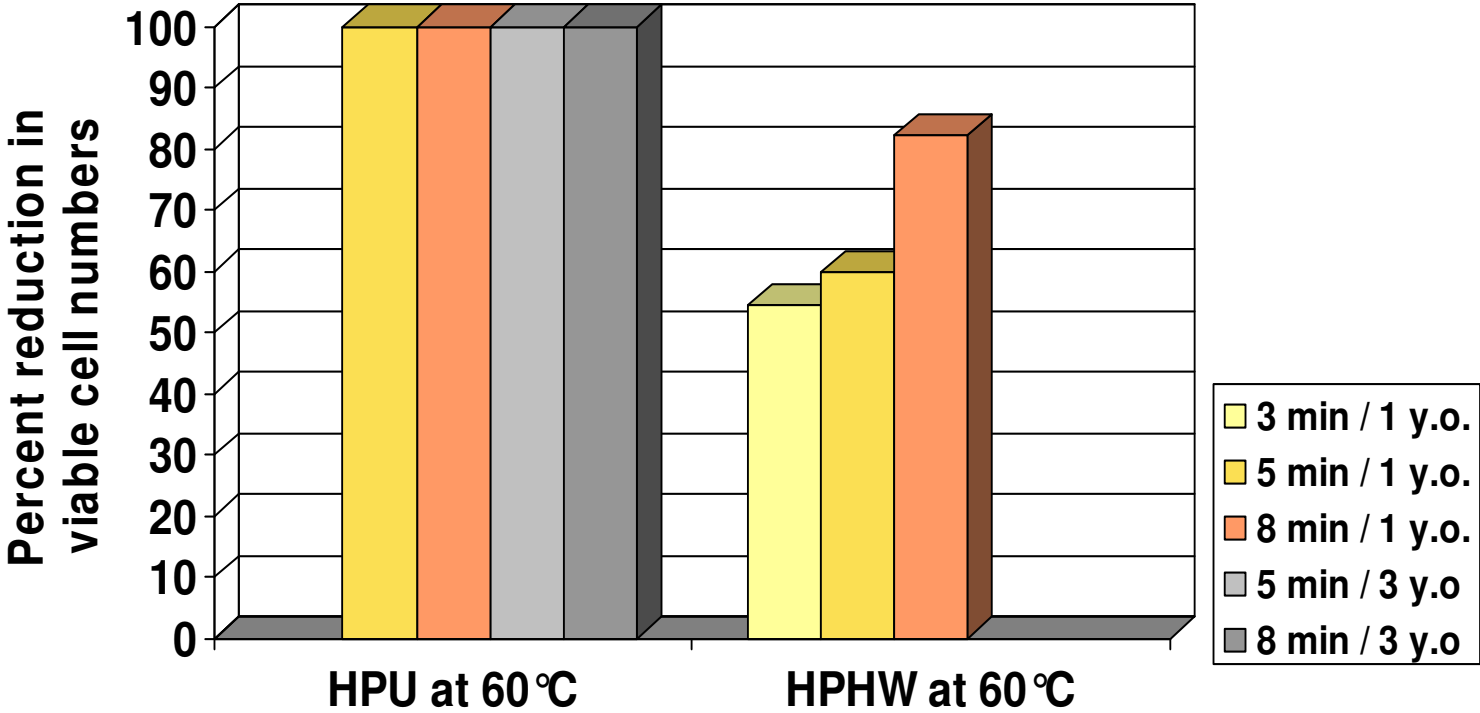
Source: University of South Australia report , 2008

# ...And Visual Observation – As with this CA Winery Study of 2007 and 2005 Red Wine Barrel Surfaces



# Cavitus' BCDS Comparative *Brett* Reduction Is Also Superior...

Reduction of viable *Dekkera bruxellensis* cells (AWRI 1499) on the subsurface (2-4 mm) of infected 1- and 3-year old oak staves by Cavitus BWDD at 60 °C compared with HPHW (1000 psi at 60 °C).



Source: Australian Wine Research Institute (AWRI) report, 2008

# ...Even Compared with Ozone + HPHW – As with a CA Winery's 2007/06/05 Brett-Infected Red Barrels

Cavitus BCDS-treatment			High Pressure Hot Water + Ozone Treatment		
Sample ID	Viable cells/mL pre-cleaning	% reduction post-cleaning	Sample ID	Viable cells/mL pre-cleaning	% reduction post-HPHW cleaning (82°C) + Ozone (3.5 mg/L for 4 mins)
CAV101	135,750	99.997	OZ101	253,530	47.1
CAV102	154,150	97.3	OZ102	218,640	0
CAV103	4,698,260	99.999	OZ103	359,880	34.8
CAV104	1,166,160	96.7	OZ104	245,410	0
CAV105	591,440	99.96	OZ105	80,640	0
CAV106	314,970	99.97	OZ106	243,130	0
CAV107	67,950	97.8	OZ107	347,810	21.1
CAV108	141,000	99.3	OZ108	108,840	0
CAV109	144,880	99.997	OZ109	118,070	0
CAV110	311,810	97.2	OZ110	189,440	0
CAV111	383,790	100.0	OZ111	130,790	99.94
CAV112	167,739	99.998	OZ112	411,520	0

***All trials conducted in 2009; subsequent ozone trial at 7.6 mg/L provided 1-log kill in 75% of barrels treated (data not shown in this table)***

# Barrel Value-Recovery Potential from Regular Treatment With Cavitus Pat. Pend. BCDS Is High

- ❑ **Cavitus BCDS' benefits**
  - ✓ >99.999% Brett reduction on surface AND below oak surface
  - ✓ >50% increase in toasted oak extraction potential vs. competing alternatives
  - ✓ Competitive cycle time (~8 min.)
  - ✓ Low water and energy usage (<1 gallon and <1kWh per barrel)
- ❑ **Compare: US\$10–25/barrel service fee for high pressure/hot water (HPHW)**
  - ✓ Little or no Brett disinfection (separate treatment required)
  - ✓ Inferior tartrate removal
  - ✓ Destroys toast and offers limited toasted flavour extraction improvement
  - ✓ Higher water costs
- ❑ **Compare: US\$50-70 service fee for CO<sub>2</sub> /sand blasting**
  - ✓ Little or no Brett disinfection
  - ✓ Extra \$20-\$50 cost for staves to replace destroyed toast
  - ✓ Long cycle time per barrel (>30 minutes)
  - ✓ Skilled personnel required

***Typical barrel value drops by >50% after first use, so any barrel-life improvement is of high value to barrel hall managers***

# Cavitus BCDS – Frequently Asked Questions

- ❑ **Impact on barrel integrity?**
  - ✓ Works through bunghole and has no effect on barrel integrity
- ❑ **What about barrel life?**
  - ✓ Increases barrel life by giving access to new oak compounds
  - ✓ Energy is transmitted as cavitation -- not heat
- ❑ **Installation?**
  - ✓ Retrofit into existing line
  - ✓ Static & mobile units – available for purchase, lease or rental
  - ✓ Mobile services commences 1Q 2010
- ❑ **Green credentials?**
  - ✓ <1 kW.h per barrel or less
  - ✓ < 2 gals per barrel
- ❑ **Capacity?**
  - ✓ Depends on barrel age and size but typically 15 barrels/hr for 2-head system
- ❑ **'Rocket scientist' to operate?**
  - ✓ Typical winery employee
  - ✓ 1 person for 1- or 2-head system

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