

Energy Saving Initiatives

Blair North



Lighting

Air
Loss

STARS

VFD's

Lighting Replacement

- 400 Watt High Pressure Sodium (HPS) replaced with T8 Fluorescent fixtures.
- Benefits
 - 50% reduction in utility cost.
 - Improved color rendering.
 - Warm-up time eliminated.
 - Cooler operating temperature

Lighting Replacement

- Estimated Savings.
- 51% wattage reduction (lighting only)
- One time utility rebate \$26,505
- 186 fixtures = annual reduction
 - 392,975 kwh
 - \$20,018
- 3 year payback

Air Loss Prevention

- Minimize compressed air leaks.
 - Often 20% -30% of compressors output.
 - Equipment may not function properly.
- Leak detection.
 - Ultrasonic acoustic detector.
 - Soapy water.

Air Loss Prevention

- Recommended actions.
 - Identification & Tagging
 - Tracking, Repair, Verification
 - Employee involvement
- Set target for leak reduction.
 - 5- 10% of total system flow is a typical goal
- Once repairs are complete, reevaluate the compressed air system.

Air Loss Prevention

Leakage rates^a (cfm) for different supply pressures and approximately equivalent orifice sizes^b

Pressure (psig)	Orifice Diameter (inches)					
	1/64	1/32	1/16	1/8	1/4	3/8
70	0.3	1.2	4.8	19.2	76.7	173
80	0.33	1.3	5.4	21.4	85.7	193
90	0.37	1.5	5.9	23.8	94.8	213
100	0.41	1.6	6.5	26.0	104	234
125	0.49	2.0	7.9	31.6	126	284

^a For well-rounded orifices, multiply the values by 0.97, and for sharp-edged orifices, multiply the values by 0.61.

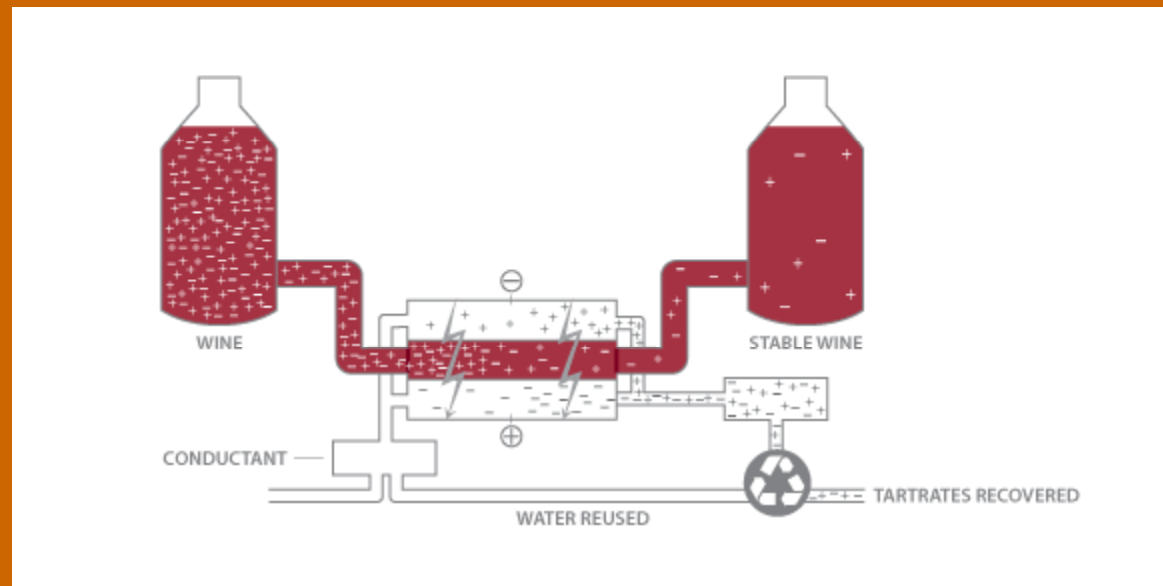
^b Used with permission from *Fundamentals of Compressed Air Systems Training* offered by the Compressed Air Challenge™.

Air Loss Prevention

- **Example**
- Cost savings = # of leaks x leakage rate (cfm) x kW/cfm x # of hours x \$/kWh
- Assume 7000 annual operating hours, an aggregate electric rate of \$0.05/kWh, and compressed air generation requirement of approximately 18 kW/100 cfm.
- Cost savings from 1/32" leaks = $100 \times 1.5 \times 0.61 \times 0.18 \times 7000 \times 0.05 = \$5,765$
- Cost savings from 1/16" leaks = $50 \times 5.9 \times 0.61 \times 0.18 \times 7000 \times 0.05 = \$11,337$
- Cost savings from 1/4" leaks = $10 \times 104 \times 0.61 \times 0.18 \times 7000 \times 0.05 = \$39,967$
- Note that the savings from the elimination of just 10 leaks of 1/4" account for almost 70% of the overall savings. As leaks are identified, it is important to prioritize them and fix the largest ones first.

STARS

Selective Tartrate Removal System uses electro dialysis technology to reliably remove tartrate salts from wine.



STARS

- Annual savings when using the STARS unit vs cold stabilization is \$89,490
- Reduction on purchase power and gas for refrigeration & heating to cold stabilize \$43,200
- Reduction of .5% wine loss when using the stars unit \$114,800 (additional losses on tartrates with cold stabilization vs. the stars process)
- Offset the savings is the membrane maintenance cost for (\$68,700)
- Conservation grant from energy co. \$188,422
- 5.8 year payback (not including conservation grant)

VFD's

- Centrifugal loads offer the greatest potential for energy savings by using variable frequency drives (VFD's).
- Affinity laws: Flow is proportional to speed, pressure is proportional to the square of speed, and horsepower is proportional to the cube of speed.
- If an application only needs 80% flow, it will run at 80% of rated speed and only requires 50% of the power.



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