

This overview is directed to winemakers considering fogging water to maintain humidity in the barrel room.

Fogmaster entered the market for barrel room humidification in 2000, delivering prototype humidification systems to six cooperating wineries. They had barrel rooms of 600-3,600 sq. ft., ceilings of 12-20 ft. and humidity goals of 75-84%. All rooms reached their target humidity level within 2 hours of startup. Thereafter the humidification systems operated 10-15% of the time (3-4 minutes in 30) to replenish water vapor losses.

Enhancements to the Sentinel® 5850-H humidification system since then include built-in humidity controller, do-it-yourself installation, brushless motor and quieter operation. Today, the 5850 is delivering reliable humidification for users on four continents.

- The benefits of barrel room humidification are improved quality; better control of alcohol levels; and reduced topping losses. One customer (600 barrels in storage) saw topping losses drop from 8 to 4 percent per year. The savings in labor and increase in saleable product gave a quick return on his investment.

Your mileage will vary, depending on your set-up, the value of your product, and your loss experience. But if topping losses exceed 5% you should run the numbers.

- Most wineries set a target humidity in the 70 - 80% range. A few, with “tight” barrel rooms and infrequent door openings, use a slightly higher RH setpoint (80-84%).
- The rate of water vapor loss is the biggest determinant of success. If vapor losses are high, the humidification system must run longer to maintain the RH at the setpoint; if losses are too high, the system may not be able to keep up.

Water vapor losses can arise both from the design of the barrel room and the way it is used. For example, night air cooling brings in cool (but usually dry) outside air while venting humidified inside air. In/out traffic and door openings let inside air escape and outside air enter. The humidification system must replace these losses to maintain the humidity target.

- Hard water is a challenge for all humidification systems, regardless of technology. Problems include boiler scale; dust from dissolved minerals on barrels and racks; plugged nozzles; wet spots from dripping nozzles; and high maintenance costs.

A water softener does not fix these problems; it merely exchanges dissolved calcium and magnesium salts for sodium salts, but these still produce dust and foul nozzles.

To remove dissolved minerals and eliminate the problems of hard water, install a small (50-75 gpd) reverse osmosis unit on the water line supplying the humidification system. They are available at Home Depot and Lowe's for about \$200.

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- Although the minerals in hard water will not *plug* the Sentinel nozzle – its minimum opening is nearly 1/8 inch – they can build up slowly reducing atomizing efficiency. To restore a nozzle, soak it in a 10% solution of citric acid, CLR or Lime-A-Way a day or so.
- Install the Sentinel nozzle so it can easily be reached for maintenance, particularly if your winery has hard water. A dripping nozzle 20 ft above the floor can be a big headache.
- Condensation is a **loss** of humidity. The water you see on fermentation chiller coils, or running down the refrigeration drain, or beading on cold metal grates and doors, started as vapor – humidity. Condensation losses may prevent you from reaching your humidity goals.
- The refrigeration system, if installed, should be designed for the target humidity of the room. If not, the chiller system may cool air below its dew point<sup>1</sup>, thus *dehumidifying* it. Sometimes only a simple change is needed for refrigeration to "play nice" with humidification – a different orifice to increase the coil face temperature, and possibly a change of fan motor or pulley ratio to increase air flow. A window air conditioner does not provide this flexibility.
- Case goods and flat cardboard are best stored *outside* the barrel room. They absorb moisture, which weakens both fiberboard and glue.
- Wineries that host winetastings or other events in the barrel room don't want equipment noise to intrude. Although the Sentinel 5850 humidification system is fairly quiet, some wineries turn it off for events. This doesn't have a major impact since the humidity level is quickly restored.
- A recurring question is "How large a barrel room can the Sentinel 5850 system handle?" The largest single nozzle installation to date is 10,000 sq.ft.; a standard 1 Hp Sentinel 5850 system is maintaining 78% RH without difficulty.

More important than barrel room size, however, is how well it retains water vapor. The escape of humidified air through open doors or night air cooling, or condensation losses, can stymie the best intentions. A small room with significant losses may easily require more humidification capacity than a large one with limited losses. See our white paper<sup>1</sup> for more information on this subject.

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<sup>1</sup> A Fogmaster white paper, "APN-008\_Winery\_Humidification\_Backgrounder" provides more detail about humidification, including humidity terminology, calculations of temperature, humidity and dewpoint and the design, management and operation of humidification systems. A PDF copy is downloadable from the Sentinel 5850 web page. For a print copy, contact Fogmaster Customer Service.