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Safer wine production in California

Exposure to high levels of carbon dioxide (CO₂) can be dangerous to workers in wineries. Care must be taken to protect workers from over exposure.



Chateau St. Jean, California.

Areas of concern for excess CO₂ exposure within wineries include pits, sumps and storage tanks, as well as fermentation rooms, barrel cellars and bottling rooms. CO₂ is twice as heavy as air; therefore it will sink to the bottom of a room forming potentially deadly pools of gas that will displace oxygen (O₂). CO₂ has been found to settle in corners of rooms and in areas that are generally undisturbed with low ventilation. CO₂ is a colorless, odorless gas. The presence of CO₂ is not known until symptoms of exposure are experienced.

The safety committee at Chateau St. Jean, California, has recognized the need for monitoring CO₂ in their facility. A significant amount of CO₂ is generated during the fermentation process. A good portion of their tanks are located indoors. The CO₂ that escapes can collect in low lying areas and pose a safety hazard to their employees.

Fixed CO₂ meters remove the need for spot-checking

The Chateau St. Jean has been relying on the Vaisala CARBOCAP® Carbon Dioxide Transmitters GMT222 for monitoring the CO₂ in their winery for over two years. The transmitter was recommended by another site within their corporation. Their previous monitoring process called for several daily sweeps through production areas with a portable CO₂ meter. Using fixed monitors freed up technicians to work on other tasks. Also, replacing spot checking with constant monitoring has helped to provide a safer work environment.

At installation, a portable CO₂ meter was used to identify CO₂ concentrated areas. Fixed monitors were then installed at the potentially hazardous locations. Each of their monitors was assembled by Chateau St. Jean's maintenance technicians. Their monitors incorporate the GMT222 with a 0 to 10,000 ppm

measuring range, digital display, and alarm relays programmed to activate at 5,000 ppm and 8,000 ppm.

The Chateau St. Jean uses a two-stage alarm system. The first is a warning yellow light that comes on at 5,000 ppm. This alarm is used as an indicator to alert the area manager of the problem and as a prompt for him/her to manually create ventilation by turning on fans and opening doors. The second stage is a red light accompanied by an audio alarm that activates at 8,000 ppm. This alarm requires evacuation of the area. They are planning to retrofit the monitors with a feature that opens vents and turns on fans automatically at 5,000 ppm.

Flawless performance

Maintenance Manager, Chuck Banks from the Chateau St. Jean says, "Our monitors have performed flawlessly. We do a monthly inspection and an annual calibration with the Vaisala CARBOCAP® Hand-held Carbon Dioxide Meter GM70 on each monitor to verify accuracy."

Further information:

www.vaisala.com/gmt220

CO₂ safety levels:

- 5000ppm 8 hour period; Time Weighted Average (TWA)
- 30,000ppm <15 minutes; Short Term Exposure Limit (STEL)
- 50,000ppm < 5 minutes; Imminent Danger To Life and Health (IDLH)

One of the Vaisala CARBOCAP® Carbon Dioxide Transmitters GMT222 used at the Chateau St. Jean winery.



Effect of CO₂ on people:

- 10,000 ppm breathing rate increases slightly
- 30,000 ppm breathing rate increases to twice normal rate and a person will likely experience impaired hearing, headache, and increased blood pressure
- 50,000 ppm breathing increases to approx. 4x normal rate, symptoms of intoxication become evident and slight choking may be felt
- 75,000 ppm very labored breathing experienced, headache, visual impairment, and ringing in the ears. Judgment will be impaired and loss of consciousness within minutes
- >100,000 ppm unconsciousness occurs rapidly. Prolonged exposure to high concentrations could result in death from asphyxiation