

**INSTALLER and INSPECTOR QUICK-REFERENCE:
2022 NRCA-PRC-14-F
Lab Exhaust Ventilation System Controls**

Purpose and Scope of the Test

Verify the design and installation of the laboratory exhaust system in operation to limit excessive energy use, without sacrificing operator safety.

Test trigger

Newly Constructed Laboratory and Factory Exhaust Systems with airflow greater than 10,000 cubic feet per minute (cfm).

Relevant Energy Code References and Required Compliance Documents

Title 24, Part 6 of the California Building Code, Building Energy Efficiency Standards (Energy Code) sections 140.9(c)3; NA7.16; NRCC-PRC-E Table O.

Who Can Perform the Test

There are no restrictions. The test is typically performed by the startup technician responsible for programming the setpoints in the control system.

Required Tools

- Stack flowrate monitoring equipment: S-pilot tube, 2-D or 3-D pilot tube.
 - Wind speed/direction measurement: handheld anemometer.
- Optional:**
- Simulation of wind speed on monitor: fan with variable speed control (must hold a simulated wind speed within 2 percent of target speed for the duration of the test).

Estimated Time to Complete Test

Construction Inspection: 1 hours
Functional testing: 2 hours

Potential Issues and Cautions

The most difficult issue will be the air dispersion modeling that must be completed prior to testing the system.

Inspection Enforcement

- Required:**
- Wind speed and direction sensor is factory-calibrated (with calibration certificate) or field calibrated, as specified by the Energy Code.
 - The sensor is located in a location and at a height that is outside the wake region of nearby structures and experiences similar wind conditions to the free stream environment above the exhaust stacks as specified by the Energy Code.

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Inspection Enforcement (cont.)

- The sensor is installed in close proximity to the fan that it will control so that it captures a representative wind speed/direction reading.
- The sensor is wired correctly to ensure proper control of volume flow rate.
- Wind speed/direction look-up table has been established and matches dispersion analysis results.
- Verify the methodology to measure volume flow rate at the stack:
 - a. Airflow sensor.
 - b. Static pressure as proxy.
 - c. Fan speed to volume flow rate curve.
 - d. Other.

Acceptance Criteria

Wind Speed Directional Control Option:

- Simulate minimum, mid-range, and maximum look-up table wind-speeds per the curve; the corresponding volume flow rate at the stack (e.g., minimum wind speed should produce the minimum flow rate at the stack) should be observed.
- Simulate contamination events at minimum, mid-range, and maximum look-up table wind-speeds per the curve; the corresponding volume flow rate at the stack (e.g., minimum wind speed should produce the minimum flow rate at the stack) should be observed.
- Upon detection of sensor and/or signal failure, the system shall reset the exhaust volume flow rate to the value needed to maintain downwind concentrations below health and odor limits for all detectable contaminants at worst-case wind conditions, and send an alarm to the facility operators.