

High Efficiency Fume Hoods in Laboratory Spaces

Draft Code Language

Last Updated: February 24, 2017

1. INTRODUCTION

The California Statewide Utility Codes and Standards Team actively supports the California Energy Commission in developing revisions to the 2019 California Building Energy Efficiency Standards (Title 24, Part 6). Our joint intent is to achieve significant energy savings through the development of reasonable, responsible, and cost-effective code change proposals for the 2019 Title 24 code change cycle.

The Statewide Utility Team is proposing code change for the mandatory installation of automatic sash closure systems for laboratory fume hoods with variable exhaust systems. This measure will apply to new construction as well as additions or alterations. The proposed measure is intended for laboratory spaces where ventilation requirements are fume hood driven. Automated sash closure systems detect the presence of laboratory technicians in front of the fume hood via an infrared occupancy sensor. When no occupancy is detected for a predefined period of time, the sash automatically lowers, thus reducing exhaust air.

The Statewide Utility Team is requesting feedback on the draft code language presented in this document. Input we receive will inform the code change proposal that the Statewide Utility Team will be proposing to the California Energy Commission in April 2017.

To provide feedback, please email us at info@title24stakeholders.com or contact the measure lead at:

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For more information about the California Statewide Utility Codes and Standards Team's 2019 Title 24, Part 6 advocacy efforts, and the latest information on this code change proposal please visit: www.title24stakeholders.com.

2. DRAFT CODE LANGUAGE

The proposed changes to the Standards, Reference Appendices, and the ACM Reference Manuals are provided below. Changes to the 2016 documents are marked with underlining (new language) and ~~strikethroughs~~ (deletions).

2.1 Standards

SECTION 120.6 – MANDATORY REQUIREMENTS FOR COVERED PROCESSES

(h) Mandatory Requirements for Fume Hoods

1. Variable air volume fume hoods in scientific laboratory spaces shall have an automatic sash closure system that complies with the following:
 - a. Have an accessible manual override of positioning with forces of no more than 10 lbs (45 N) mechanical, as specified by ANSI/AIHA Z9.5-2003, 3.1.1.4;
 - b. Occupant sensors shall meet the requirements in Section 110.9(b)4 and shall have suitable coverage and placement to detect occupants in front of the fume hoods. Each occupant sensor shall control no more than one fume hood;
 - c. Automatically close the sash after 1 minute of inactivity;
 - d. Have obstruction sensing capabilities that stop travel during sash closing operations, as specified by ANSI/AIHA Z9.5-2003, 3.1.1.4;
 - e. Automatically adjust exhaust air flow to maintain the minimum allowable constant face velocity requirements as defined in Title 24, Part 8 Section 5154.1 as the sash opening changes.
2. Acceptance for fume hoods: Before an occupancy permit is granted for fume hoods subject to 120.6(h), the equipment and systems shall be certified as meeting the Acceptance Requirement for Code Compliance, as specified by the Reference Nonresidential Appendix NA7. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the equipment and systems meet the acceptance requirements specified in NA7.16.

EXCEPTION 1 to Section 120.6(h): Scientific laboratory spaces sharing a common exhaust system with fume hood density less than 1 square foot of hood area per 35 gross square feet of laboratory.

2.2 Reference Appendices

NONRESIDENTIAL APPENDICES

2.2.1 NA7.16 – Fume Hood Automatic Sash Closure System Controls

2.2.1.1 NA7.16.1 Construction Inspection

Verify and document the following prior to functional testing:

- (a) The PIR sensor has a valid factory calibration certificate
- (b) Each light curtain sensor has a valid factory calibration certificate
- (c) Confirm that the average face velocity does not fall below the minimum requirements of 100 fpm per CAL OSHA §5154.1.c a when:
 - a. Fully open
 - b. Fully closed

2.2.1.2 NA7.16.2 Functional Testing

For each fume hood being tested, confirm the following:

- (a) Confirm that the overhead Passive Infrared Sensor (PIR) correctly acknowledges when:
 - a. Walking up to the fume hood and that the sash opens.
 - b. Confirm the sash closure delay time and step out of the PIR sensor for that amount of time. Ensure the sash correctly closes to the minimum position.
 - c. Confirm the sash closure delay time, stay out of the PIR sensor for that amount of time. While the sash is closing, trip the light curtain sensor and ensure the sash stops immediately when the light curtain is blocked.
- (b) Confirm that the safety light curtain correctly acknowledges when:
 - a. An obstruction is detected between the transmitter and receiver.
 - b. An obstruction is **not** detected between the transmitter and receiver.

- c. Confirm the sash closure delay time, stay out of the PIR sensor for that amount of time. While the sash is closing, trip the light curtain sensor and ensure the sash stops immediately when the light curtain is blocked.
- (c) Confirm that the manual push button controls are operational, find the appropriate buttons (e.g. up/down, open/close). Set the sash to the middle of the sash opening and confirm the following:
 - a. Press the button that opens the sash and ensure the sash opens to the appropriate maximum sash height.
 - b. Press the button that closes the sash and ensure the sash closes to the appropriate minimum sash height.