



# Fume Hood Modifications

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# Regulatory Context



# Occupational Safety & Health Standards in California

- California Occupational Safety & Health Standards Board must adopt regulations at least as effective as the federal standards
- Cal/OSHA standards are in the California Code of Regulations, Title 8. ([www.dir.ca.gov](http://www.dir.ca.gov))
- Employers are responsible for the Health & Safety of their Employees

# Who is the Employer?

- Regents, President, Chancellor, Dean...
- definitions
  - a person or entity which hires the services of another
  - a person or business who pays a wage or fixed payment to other persons in exchange for the services of such persons
  - one who hires, pays and fires employees

# Employer Responsibilities Includes:

- Make sure employees have and use safe tools and equipment and properly maintain this equipment
- Control of Hazardous Substances
  - Dusts, Fumes, Mists, Vapors and Gases
    - Ventilation Requirements for Laboratory-Type Hood Operations §5154.1 ([www.dir.ca.gov/Title8/5154\\_1.html](http://www.dir.ca.gov/Title8/5154_1.html))

# Modifications to 8CCR5154.1

- Proposed modifications presented to the public in the September of 2005
- Written and oral comments were received; April of 2006, proposed modifications published
- Modifications to:
  - Monitors
  - Training
  - Airflow
  - Testing, and
  - Construction requirements



# 1. *Monitors* are now required

- Quantitative airflow monitor installed on all hoods by January 1, 2008
- An airflow alarm system may be used so long as a visual or audible alarm is provided
- Alarm must alert when airflow decreases to less than 80 feet per minute (fpm)
- Qualitative airflow demonstrated (by smoke tubes or similar) upon installation and annually



## 2. Containment test required

- ▶ Variable Air Volume (VAV) hoods with Occupancy Sensors (Usage Based Controls)
- ▶ Allows for use of zone presence sensors to reduce face velocity from no less than 100 fpm to a no less than 60 fpm, under certain conditions:
  - ▶ An automatic system, requiring no manual intervention
  - ▶ Face velocity returns to 100 fpm, minimum, when the hood is accessed
  - ▶ Hood has been tracer gas containment tested at the reduced flow rate according to ANSI/ASHRAE 110
  - ▶ Hood achieves a performance rating of 4.0AU0.1, or less

### 3. Fume hood use training is required

- ▶ Hood operators shall be trained to
  - ▶ Use the hood safely
  - ▶ Determine
    - ▶ the date of the last performance test and
    - ▶ if hood met performance criteria
  - ▶ Understand
    - ▶ airflow characteristics,
    - ▶ potential for turbulent airflow, and
    - ▶ escape of hazardous substances from the hood
  - ▶ Know
    - ▶ where the quantitative airflow monitor is and
    - ▶ how it is to be used



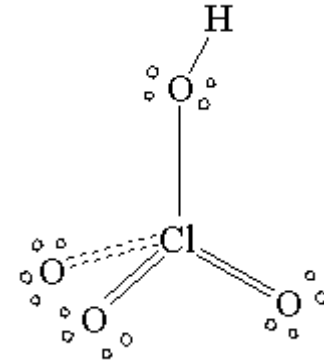
## 4. Flammable chemicals used

- 100 fpm face velocity should be obtained with sash fully opened
- When using flammable gases or liquids, hood openings at all sash positions provide sufficient airflow to prevent ignitable concentrations, not to exceed 20% of lower explosive limit (LEL) in the duct



## 5. Perchloric acid hood construction

- Materials must be inert, smooth, and nonabsorbent
- Organic polymers shall not be used except for inert fluoropolymers (PTFE, Teflon FEP)
- The hood and exhaust system shall be washed down with water for decontamination





# Application at UCR



# Where does this apply?

1. Older lab buildings constructed with Constant Air Volume (CAV) exhaust system are mostly without fume hood monitors need quantitative flow monitors
2. Newer buildings that use VAV with motion detectors at each hood require one-time containment testing

## Where does this apply? *Continued*

3. Every user of a fume hood has to be trained  
The only training currently documented is during the Lab Safety Orientation course which is not attended by everyone
4. The hood has to have a minimal flow of air even when the sash is closed
5. Evaporation of perchloric acid must be conducted in a hood designed for its safe use

# Interruptions

- ▶ Containment testing
  - ▶ takes 1 to 2 hours per hood
  - ▶ requires the hood be empty
  - ▶ requires the area in front of the hood be clear
  
- ▶ Fume hood monitor installation
  - ▶ takes 1 to 2 hours per hood
  - ▶ requires the immediate area around the hood be clear
  - ▶ requires all hazardous materials be removed from the hood

# Deadlines

- ▶ Training, containment testing, and construction requirements completed by August 30, 2006
- ▶ Fume hood monitors installed by January 1, 2008 – UCR applied for temporary extension through June 30, 2008